Table of Contents

Preface

Scope of MRM2019

Materials science is rapidly expanding across the traditional boundaries of physics, chemistry, biology, and earth science for achieving Sustainable Development Goals (SDGs). There are many issues in the world that need to be solved on a global scale. The future of humankind and the development of a sustainable society depend on the development of new materials and their integration in the energy-water-food nexus. To achieve this requires integration of modeling, basic theory, high throughput materials science, and advanced characterization in a new approach to science and technology.

The MRM2019 is intended to offer a venue to materials researchers from different disciplines to discuss recent scientific developments and applications of advanced materials for the SDGs. There are many new opportunities for invention and brilliant materials research, and implementation of new materials or processes, in fields far from our individual disciplines. Intensive discussions among participants with different background are expected to bring innovative ideas and strategic development for next generation materials research. The meeting will also provide active opportunities for young researchers to discuss their research projects, thus extending the groundwork for a successful network and for synergetic collaborations. A dialogue across the following topic areas with notable scientists who are world experts with diverse backgrounds in materials research will be constructed. Each topic area is of both current and future interest and must be addressed to achieve sustainability. The organizers welcome participants who are interested in materials research and expect an exciting and fruitful discussion.

Hideo HOSONO (Prof. Tokyo Tech)
Chairperson of MRM2019

Atsushi SUZUKI (Prof. YNU)
General Secretary of MRM2019

Conference Information

Date
December 10 (Tue.) – 14 (Sat.)

Conference Site
Industry & Trade Center (Yokohama Symposia): Trade-0~3
Workpia Yokohama: Work-1~8
Hotel Mielparque Yokohama: Miel-1~5
Hotel Monterey Yokohama: Mont-1~5
Kanagawa Kenmin Hall: Ken-1~2
Yokohama City Port Opening Memorial Hall: Port-1~4

Registration Desk
Marineria, Industry & Trade Center 1F (Trade-0)

Registration Hours
December 10 (Tue.) 11:00–18:00
December 11 (Wed.) 8:30–18:30
December 12 (Thu.) 8:30–18:30
December 13 (Fri.) 8:30–18:00

Welcome Party
December 10 (Tue.) 19:00–20:30
Work-1 & 2 (Oshidori & Kujaku), Workpia Yokohama, 2F

Banquet
December 12 (Thu.) 19:00–21:00
Rose Hotel Yokohama

Exhibition
Marineria, Industry & Trade Center 1F (Trade-0)

Exhibition Hours
December 11 (Wed.) 12:00–20:30
December 12 (Thu.) 9:30–18:00
December 13 (Fri.) 9:30–16:00

Emergency Contact
Secretariat for MRM2019
Email: info_mrm2019@jmru.org
Phone: 070-3157-6169 (Connected only for the conference period , Dec. 9 - Dec. 14, 2019)

Plenary Lectures

[Plenary Session 1]
December 10 (Tue.) 15:00–15:40
Place: Trade-1 (Industry & Trade Center)
Hans-Joachim Freund (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Germany)

[Plenary Session 2]
December 10 (Tue.) 15:50–16:30
Place: Trade-1 (Industry & Trade Center)
Jean-Marie Tarascon (College de France, France)

[Plenary Session 3]
December 10 (Tue.) 16:40–17:20
Place: Trade-1 (Industry & Trade Center)
Marius Grundman (Universitat Leipzig Institut fur Experimentelle Physik, Germany)

[Plenary Session 4]
December 10 (Tue.) 17:30–18:20
Place: Trade-1 (Industry & Trade Center)
Shinji Tsuneyuki (University of Tokyo, Japan)

[Plenary Session 5]
December 11 (Wed.) 13:00–13:40
Place: Ken-1 (Small Hall, Kanagawa Kenmin Hall)
Easo P George (Oak Ridge National Laboratory and the University of Tennessee, USA)

[Plenary Session 6]
December 12 (Thu.) 13:00–13:40
Place: Ken-1 (Small Hall, Kanagawa Kenmin Hall)
David S. Ginley (NREL Fellow, USA)

[Plenary Session 7]
December 13 (Fri.) 13:00–13:40
Place: Ken-1 (Small Hall, Kanagawa Kenmin Hall)
Michael Coey (Trinity College Dublin, Ireland)

Cluster Keynote

Place: Ken-1 (Small Hall, Kanagawa Kenmin Hall)

A Cluster	December 11 (Wed.)	16:30–18:30
B Cluster	December 12 (Thu.)	9:30–12:00
C Cluster	December 13 (Fri.)	14:00–16:00
D Cluster	December 12 (Thu.)	14:00–16:00
E Cluster	December 11 (Wed.)	9:30–12:05
F Cluster	December 12 (Thu.)	16:30–18:30
G Cluster	December 13 (Fri.)	9:30–11:50
H Cluster	December 11 (Wed.)	14:00–16:00
I Cluster	December 13 (Fri.)	16:30–18:00

Oral Presentation

December 11 (Wed.)
Oral Session 1, Oral Session 2, Oral Session 3
December 12 (Thu.)
Oral Session 4, Oral Session 5, Oral Session 6
December 13 (Fri.)
Oral Session 7, Oral Session 8, Oral Session 9
December 14 (Sat.)
Oral Session 10

Poster Session

Place: Trade-0 (Marineria)

Poster 1 December 11 (Wed.)

Symposium	F-2, H-1
Set up	9:00–11:30
Poster Display	12:00–13:00
Removal	Until 14:00

Poster 2 December 11 (Wed.)

Symposium	A-3, B-4, C-1, D-1, D-2, D-3, D-4, E-2, F-3, H-1
Set up	16:00–19:00
Poster Display	19:00–20:30
Removal	Until 21:00

Poster 3 December 12 (Thu.)

Symposium	B-1, B-3, H-2, H-3, H-4
Set up	9:00–14:00
Poster Display	14:00–15:30
Removal	Until 16:00

Poster 4 December 12 (Thu.)

Symposium	A-1, A-4, C-2, C-3, E-1, G-2
Set up	16:00–16:30
Poster Display	16:30–18:00
Removal	Until 18:30

Poster 5 December 13 (Fri.)

Symposium	E-3, F-1, I-1, I-2
Set up	9:00–14:00
Poster Display	14:00–15:30
Removal	Until 16:30

Poster 6 December 13 (Fri.)

Symposium	A-2, C-4, F-4, G-1, G-3, G-4, G-5, H-5
Set up	17:00–19:00
Poster Display	19:00–20:30
Removal	Until 21:00

Tutorial

December 10 (Tue.) Only in Japanese

[Tutorial Session 1]

12:00–12:50 Work-1 (Oshidori, Workpia Yokohama)

What we can know from first-principles quantum calculations

Speaker: Toshio Kamiya (Laboratory for Materials and Structures (MSL), Institute of Innovative Research (IIR), Tokyo Institute of Technology (Tokyo Tech))

Chair: Shunichi ARISAWA (National Institute for Materials Science)

[Tutorial Session 2]

12:55–13:45 Work-1 (Oshidori, Workpia Yokohama)

Sparse modeling for Materials informatics

Speaker: Yasuhiko Igarashi (Graduate School of Frontier Sciences, The University of Tokyo)

Chair: Shunichi ARISAWA (National Institute for Materials Science)

[Tutorial Session 3]

13:50–14:40 Work-1 (Oshidori, Workpia Yokohama)

Materials Informatics and Physics Informatics by Interpretable Machine Learning

Speaker: Yuma Iwasaki (Central Research Laboratories, NEC Corporation)

Chair: Shunichi ARISAWA (National Institute for Materials Science)

[Tutorial Session 4]

12:00–12:50 Work-2 (Kujaku, Workpia Yokohama)

How to start using neutron and muon at J-PARC

Speaker: Kazuki Ohishi (Comprehensive Research Organization for Science and Society (CROSS))

Chair: Takaaki AOKI (Institute for Information Management and Communication, Kyoto University)

[Tutorial Session 5]

12:55–13:45 Work-2 (Kujaku, Workpia Yokohama)

Application of Synchrotron Radiation Research and Use of SPring-8

Speaker: Toyohiko Kinoshita (Japan Synchrotron Radiation Research Institute (JASRI))

Chair: Takaaki AOKI (Institute for Information Management and Communication, Kyoto University)

[Tutorial Session 6]

13:50–14:40 Work-2 (Kujaku, Workpia Yokohama)

New trend in materials science by integration of quantum beam analysis and machine learning

Speaker: Tetsuro Ueno (National Institutes for Quantum and Radiological Science and Technology)

Chair: Takaaki AOKI (Quantum Beam Science Research Directorate, Institute for Information Management and Communication, Kyoto University)

Schedule Overview

	Dec. 10 (Tue.)	Dec. 11 (Wed.)	Dec. 12 (Thu.)	Dec. 13 (Fri.)	Dec. 14 (Sat.)
8:30		8:30–18:30 Registration	8:30–18:30 Registration	8:30–18:30 Registration	
9:00		**Oral Session 1** 9:00–11:30 A-1 / A-3 / A-4 / B-1 / B-3 / B-4 / C-1 / D-1 / D-3 / D-4 / F-2 / F-3 / G-2 / H-1 / H-2 / H-3 9:30–12:05 **E Cluster Keynote**	**Oral Session 4** 9:00–11:30 A-1 / A-4 / C-1 / C-2 / C-3 / C-4 / D-1 / D-2 / D-3 / D-4 / E-3 / F-1 / F-3 / G-2 / G-3 / H-1 / H-2 / H-3 / H-4 / H-5 9:30–12:00 A-2 9:30–12:00 **B Cluster Keynote**	**Oral Sesssion 7** 9:00–11:30 A-2 / A-4 / B-2 / B-3 / C-2 / C-3 / C-4 / D-1 / D-3 / E-1 / E-3 / F-1 / F-3 / F-4 / H-2 / H-3 / H-4 / H-5 / I-1 / I-2 / I-3 9:30–12:00 A-2 / B-2 / B-3 / C-3 / F-4 9:30–11:50 **G Cluster Keynote**	9:00–11:30 **Oral Session 10** D-3 / I-3
10:00					
11:00	11:00–18:00 Registration				
12:00	12:00–12:50 **Tutorial 1** **Tutorial 4**	12:00–13:00 **Poster Session 1**			
13:00	12:55–13:45 **Tutorial 2** **Tutorial 5**	13:00–13:40 **Plenary 5** Easo P George	13:00–13:40 **Plenary 6** David S. Ginley	13:00–13:40 **Plenary 7** Michael Coey	
14:00	13:50–14:40 **Tutorial 3** **Tutorial 6**	14:00–16:00 **Oral Session 2** A-1 / A-3 / A-4 / B-1 / B-3 / B-4 / C-1 / C-3 / D-1 / D-3 / D-4 / E-2 / E-3 / F-2 / F-3 / G-2 14:00–16:00 **H Cluster Keynote**	14:00–16:00 **Oral Session 5** A-1 / A-2 / A-4 / B-2 / C-1 / C-2 / C-3 / C-4 / E-1 / E-3 / F-1 / F-3 / G-2 / G-3 / G-4 / H-1 / H-5 / I-2 14:00–16:00 **D Cluster Keynote** 14:00–15:30 **Poster Session 3**	14:00–16:00 **Oral Session 8** A-2 / B-2 / B-3 / D-1 / D-3 / E-1 / F-3 / F-4 / G-1 / G-2 / G-3 / G-4 / G-5 / H-3 / H-4 / H-5 / I-3 14:00–16:00 **C Cluster Keynote** 14:00–15:30 **Poster Session 5**	
15:00	14:50–15:00 **Opening** Hideo Hosono Tokyo. Tech. / Chairperson of MRM2019 15:00–15:40 **Plenary 1** Hans-Joachim Freund 15:50–16:30 **Plenary 2** Jean-Marie Tarascon 16:40–17:20 **Plenary 3** Marius Grundman 17:30–18:20 **Plenary 4** Shinji Tsuneyuki 18:20–18:30 **Short Message**				
16:00		16:30–18:30 **Oral Session 3** B-1 / B-3 / B-4 / C-1 / C-3 / D-1 / D-3 / D-4 / E-2 / E-3 / F-2 / F-3 / G-2 / H-1 / H-2 / H-3 / H-4 / H-5 16:30–18:30 **A Cluster Keynote**	16:30–18:30 **Oral Session 6** B-1 / B-2 / B-3 / C-1 / C-4 / D-1 / D-2 / D-3 / D-4 / E-3 / G-3 / G-4 / H-1 / H-2 / H-3 / H-4 / H-5 / I-2 / I-3 16:30–18:30 **F Cluster Keynote** 16:30–18:00 **Poster Session 4**	16:30–18:30 **Oral Session 9** A-2 / B-2 / B-3 / C-3 / C-4 / D-3 / E-1 / F-3 / F-4 / G-1 / G-2 / G-3 / G-4 / G-5 / H-5 16:30–18:30 **I Cluster Keynote**	
17:00					
18:00					
19:00	19:00–20:30 **Welcome Reception**	19:00–20:30 **Poster Session 2**	19:00–21:00 **Banquet**	19:00–20:30 **Poster Session 6**	
20:00					

Venue Map

1 Industry & Trade Center (Yokohama Symposia)

Trade-1	Main Hall (9F)
Trade-2	Room 803+804 (8F)
Trade-3	Spacial Meeting Room (8F)
Trade-0	Marineria (1F)
	• Registration (1F)
	• Exhibition (1F)
	• Poster session (1F)

2 Workpia Yokohama

Work-1	OSHIDORI (2F)
Work-2	KUJAKU (2F)
Work-3	Room 201 (2F)
Work-4	YAMAYURI (3F)
Work-5	KAMOME (3F)
Work-6	ICHOU (3F)
Work-7	Room 302 (3F)
Work-8	Room 301 (3F)

3 Kanagawa Kenmin Hall

Ken-1	Small Hall (1F)
Ken-2	Conference Room (large) (6F)

4 HOTEL Monterey Yokohama

Mont-1	Hall MAPLE (1F)
Mont-2	Hall KENSINGTON (2F)
Mont-3	RICHMOND (2F)
Mont-4	AJISAI • ICHOU (2F)
Mont-5	Hall VICTORIA (3F)

5 HOTEL Mielparque Yokohama

Miel-1	Cherie (2F)
Miel-2	Etoile (2F)
Miel-3	Kohaku (2F)
Miel-4	Ruby (2F)
Miel-5	Hisui (2F)

6 Yokohama City Port Opening Memorial Hall

Port-1	Room 1 (1F)
Port-2	Room 6 (2F)
Port-3	Room 7 (2F)
Port-4	Room 9 (2F)

7 Rose Hotel Yokohama

Banquet (The Grand Rose Ballroom 2F)

Time Table (Symposium Oral Sessions)

Symposium Time / Room	Day 1 Dec. 11			Day 2 Dec. 12			Day 3 Dec. 13			Day 4 Dec. 14
	Oral Session 1	Oral Session 2	Oral Session 3	Oral Session 4	Oral Session 5	Oral Session 6	Oral Session 7	Oral Session 8	Oral Session 9	Oral Session 10
A-1	9:00–11:20 Mont-5	14:00–16:00 Mont-5	16:30–18:30 A Cluster Keynote Ken-1	9:00–11:20 Mont-5	14:00–15:50 Trade-1					
A-2				9:30–12:15 Ken-2	14:00–16:30 Ken-2		9:30–11:45 Ken-2	14:00–15:40 Ken-2	16:30–17:30 Ken-2	
A-3	9:00–11:35 Mont-2	14:00–15:55 Mont-2								
A-4	9:00–11:30 Miel-4	14:00–15:55 Miel-4		9:00–11:15 Mont-2	14:00–16:15 Mont-2		9:00–11:35 Miel-5			
B-1	9:00–11:30 Miel-1	14:00–16:00 Miel-1	16:30–18:30 Miel-1	9:30–12:00 B Cluster Keynote Ken-1		16:30–18:30 Port-1				
B-2					14:00–16:10 Port-3	16:30–18:20 Port-3	9:30–11:30 Port-3	14:00–15:50 Port-3	16:30–18:30 Port-3	
B-3	9:00–11:20 Work-3	14:00–16:00 Work-3	16:30–18:40 Work-3			16:30–18:30 Port-2	9:30–11:40 Port-2	14:00–15:50 Port-2	16:30–18:00 Port-2	
B-4	9:00–11:30 Work-8	14:00–16:00 Work-8	16:30–18:30 Work-8							
C-1	9:00–11:20 Mont-1	14:00–16:10 Mont-1	16:30–18:30 Mont-1	9:00–11:20 Mont-1	14:00–15:55 Mont-1	16:30–17:30 Mont-1		14:00–16:00 C Cluster Keynote Ken-1		
C-2				9:00–11:30 Work-8	14:00–16:00 Work-8		9:00–11:30 Work-8			
C-3		14:00–16:05 Work-6	16:30–18:25 Work-6	9:00–11:25 Work-6	14:00–15:45 Work-6		9:30–11:50 Port-1		16:30–18:25 Port-1	
C-4				9:00–11:30 Work-4	14:00–16:10 Work-4	16:30–18:30 Work-4	9:00–11:40 Work-4		16:30–18:30 Miel-5	
D-1	9:00–11:30 Work-4	14:00–16:00 Work-4	16:30–18:30 Work-4	9:00–11:30 Mont-3	14:00–16:00 D Cluster Keynote Ken-1	16:30–18:30 Mont-3	9:00–11:30 Mont-3	14:00–16:00 Mont-3		
D-2				9:00–11:30 Work-7		16:30–18:30 Work-7				
D-3	9:00–11:40 Trade-1	14:00–16:00 Trade-1	16:30–18:30 Trade-1	9:00–12:10 Work-1		16:30–18:30 Work-1	9:00–12:10 Work-1	14:00–16:00 Work-1	16:30–18:30 Work-1	9:00–12:20 Work-1
D-3 (2)							9:00–12:10 Work-6	14:00–16:00 Work-6	16:30–18:30 Work-6	
D-4	9:00–11:30 Trade-3	14:00–16:00 Trade-3	16:30–18:30 Trade-3	9:00–11:30 Miel-5		16:30–18:30 Work-6				
E-1	9:30–12:00 E Cluster Keynote Ken-1				14:00–16:00 Mont-3		9:00–11:30 Mont-4	14:00–16:00 Mont-4	16:30–17:30 Mont-4	
E-2		14:00–16:20 Miel-5	16:30–18:35 Miel-5							
E-3		14:00–16:00 Trade-2	16:30–18:35 Trade-2	9:00–11:30 Trade-3	14:00–16:05 Trade-3	16:30–18:55 Trade-3	9:00–11:45 Trade-1			

Symposium Time / Room	Day 1 Dec. 11			Day 2 Dec. 12			Day 3 Dec. 13			Day 4 Dec. 14
	Oral Session 1	Oral Session 2	Oral Session 3	Oral Session 4	Oral Session 5	Oral Session 6	Oral Session 7	Oral Session 8	Oral Session 9	Oral Session 10
F-1				9:00–11:30 Work-5	14:00–16:05 Work-5	16:30–18:30 F Cluster Keynote Ken-1	9:00–11:20 Work-5			
F-2	9:00–12:15 Work-5	14:00–16:10 Work-5	16:30–18:40 Work-5							
F-3	9:00–12:05 Work-2	14:00–16:00 Work-2	16:30–18:30 Work-2	9:00–12:05 Trade-1	14:00–16:10 Work-2		9:00–12:05 Work-2	14:00–16:10 Work-2	16:30–18:45 Work-2	
F-4							9:30–11:40 Port-4	14:00–16:00 Port-4	16:30–18:20 Port-4	
G-1							9:30–12:00 G Cluster Keynote Ken-1	14:00–16:20 Work-3	16:30–18:30 Work-3	
G-2	9:00–11:30 Work-1	14:00–16:00 Work-1	16:30–18:30 Work-1	9:00–11:30 Miel-2	14:00–16:00 Miel-2			14:00–16:00 Trade-1	16:30–17:30 Trade-1	
G-3				9:00–11:30 Miel-1	14:00–16:00 Miel-1	16:30–18:30 Miel-1		14:00–16:00 Miel-3	16:30–18:40 Miel-3	
G-4					14:00–16:00 Miel-5	16:30–18:05 Miel-5		14:00–16:05 Work-4	16:30–18:00 Work-4	
G-5								14:00–16:10 Work-8	16:30–18:20 Work-8	
H-1	9:00–11:45 Miel-3	14:00–16:00 H Cluster keynote Ken-1	16:30–18:30 Miel-3	9:00–12:25 Miel-3	14:00–16:00 Miel-3	16:30–18:40 Miel-3				
H-2	9:00–11:30 Mont-3		16:30–18:30 Mont-3	9:00–11:30 Work-3		16:30–18:30 Work-3	9:00–11:30 Work-3			
H-3	9:00–11:20 Miel-2		16:30–18:30 Miel-2	9:00–11:25 Work-2		16:30–18:30 Work-2	9:00–11:30 Miel-2	14:00–15:40 Miel-2		
H-4			16:30–18:30 Miel-4	9:00–11:00 Miel-4		16:30–18:45 Miel-4	9:00–11:00 Miel-4	14:00–15:30 Miel-4		
H-5			16:30–18:35 Mont-5	9:00–11:30 Trade-2	14:00–16:00 Trade-2	16:30–18:25 Trade-2	9:00–11:30 Mont-5	14:00–16:00 Work-5	16:30–18:25 Work-5	
I-1							9:00–11:20 Mont-1		16:30–18:00 I Cluster Keynote Ken-1	
I-2					14:00–16:00 Mont-4	16:30–18:30 Mont-4				
I-3						16:30–18:25 Mont-2	9:00–11:25 Mont-2	14:00–15:52 Mont-2		9:00–11:29 Work-3

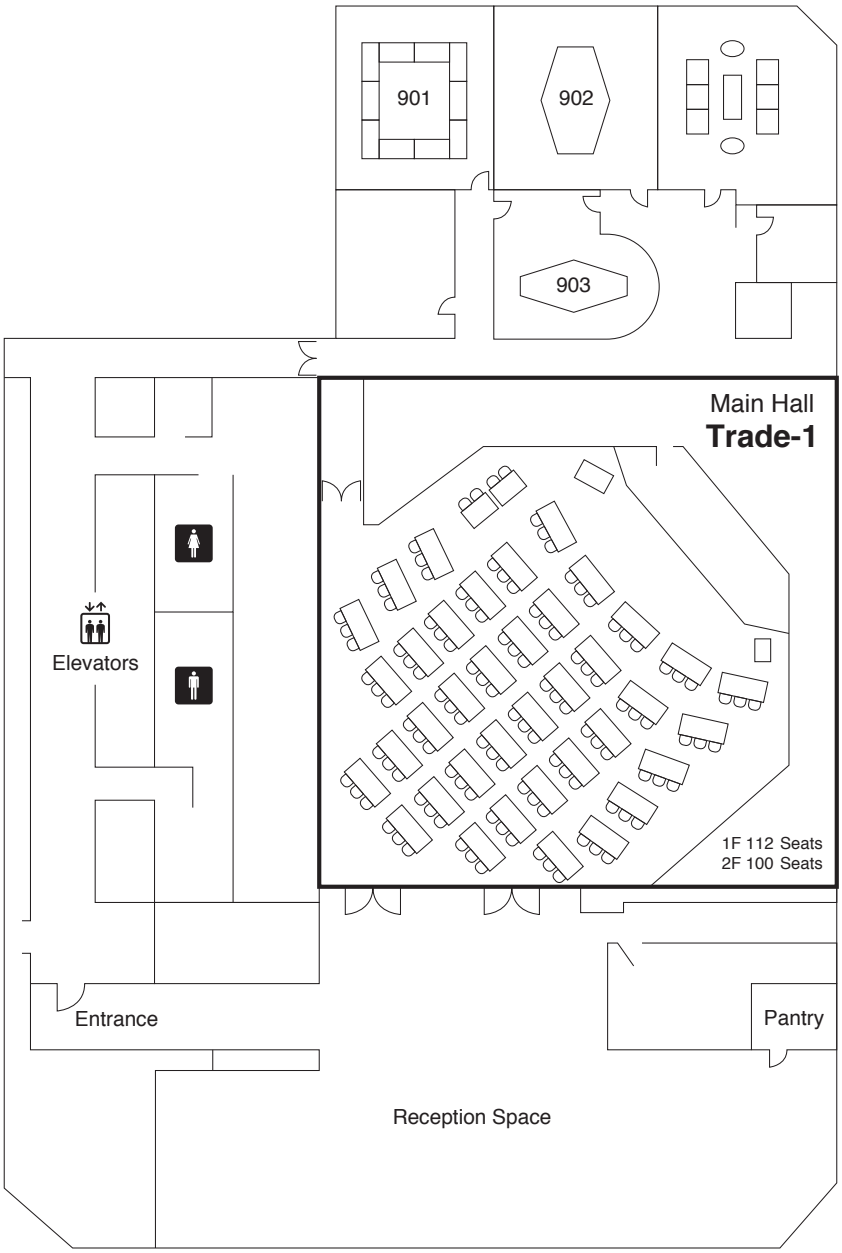
Time Table (Symposium Poster Sessions)

	Dec. 11		Dec. 12		Dec. 13		
	Poster 1	Poster 2	Poster 3	Poster 4	Poster 5	Poster 6	
	11:30-14:00	19:00-20:30	14:00-15:30	16:30-18:00	14:00-15:30	19:00-20:30	
A-1				○			A-1
A-2						○	A-2
A-3		○					A-3
A-4				○			A-4
B-1			○				B-1
B-2							B-2
B-3			○				B-3
B-4		○					B-4
C-1		○					C-1
C-2				○			C-2
C-3				○			C-3
C-4						○	C-4
D-1		○					D-1
D-2		○					D-2
D-3		○					D-3
D-4		○					D-4
E-1				○			E-1
E-2		○					E-2
E-3					○		E-3
F-1					○		F-1
F-2	○						F-2
F-3		○					F-3
F-4						○	F-4
G-1						○	G-1
G-2				○			G-2
G-3						○	G-3
G-4						○	G-4
G-5						○	G-5
H-1	○	○					H-1
H-2			○				H-2
H-3			○				H-3
H-4			○				H-4
H-5						○	H-5
I-1					○		I-1
I-2					○		I-2
I-3							I-3

Floor Guide

Industry & Trade Center
Yokohama Symposia

9F



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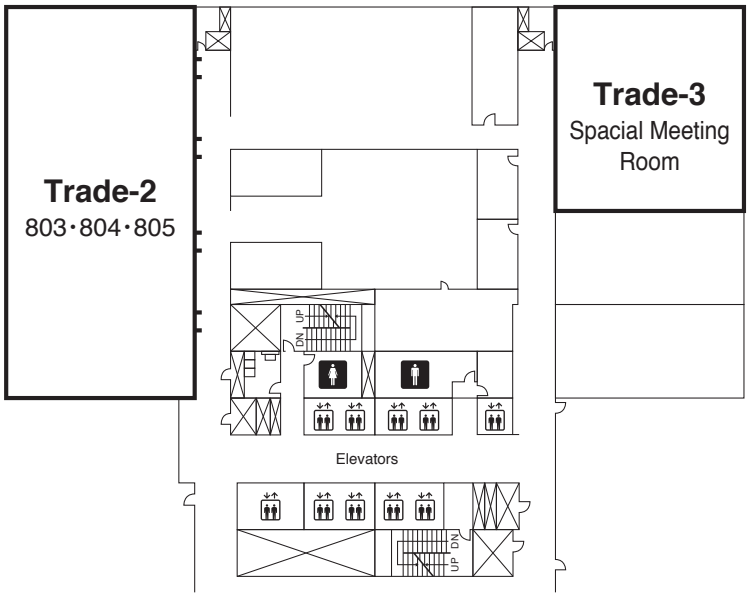
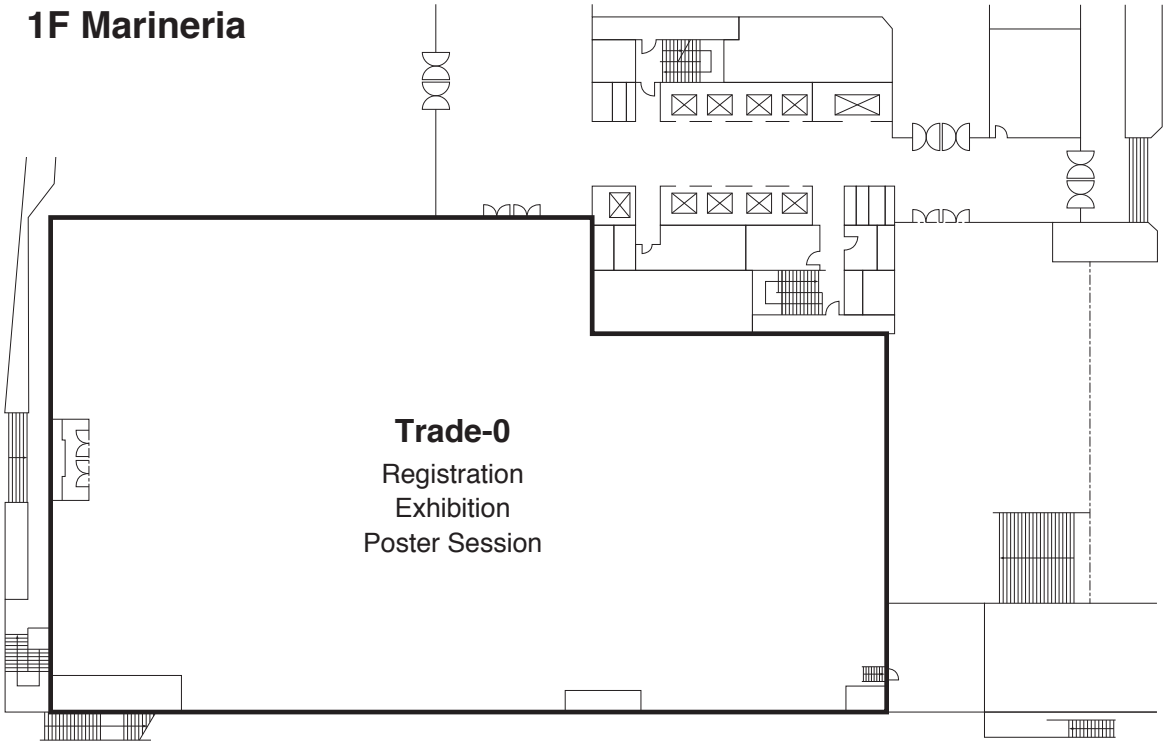
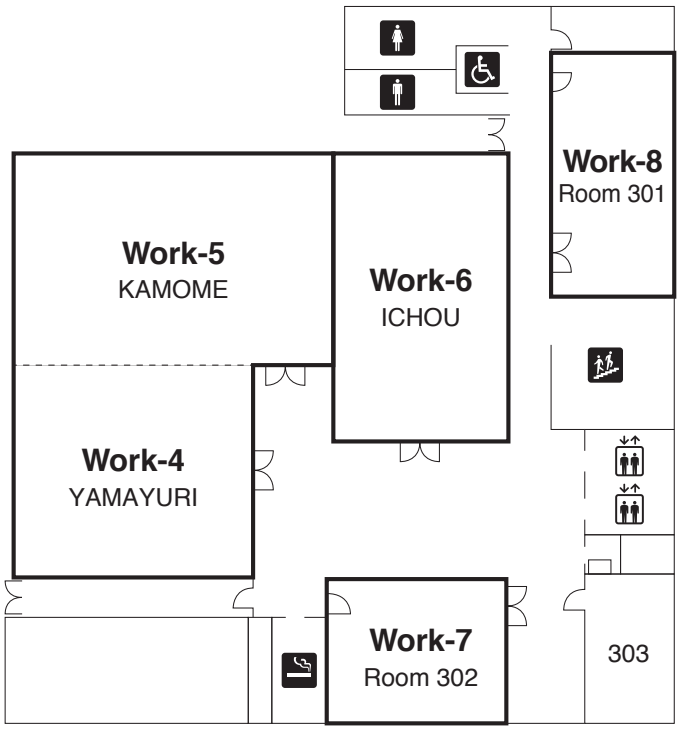


1F Marineria

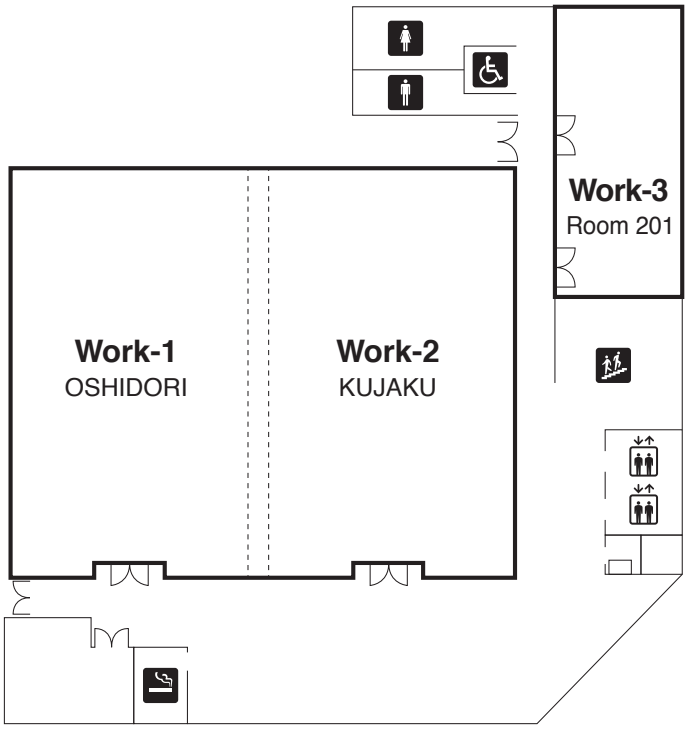


Workpia Yokohama

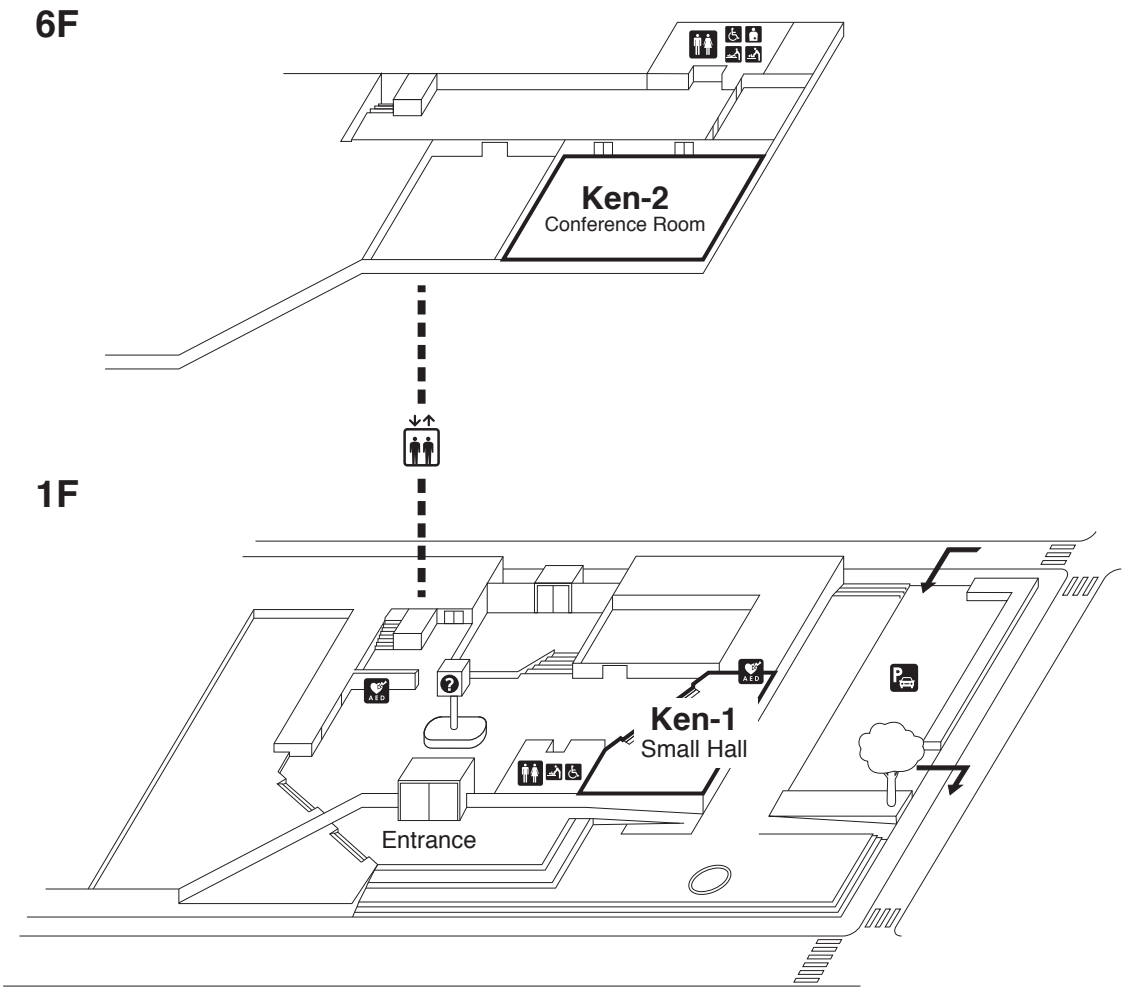
3F



2F



Kanagawa Kenmin Hall



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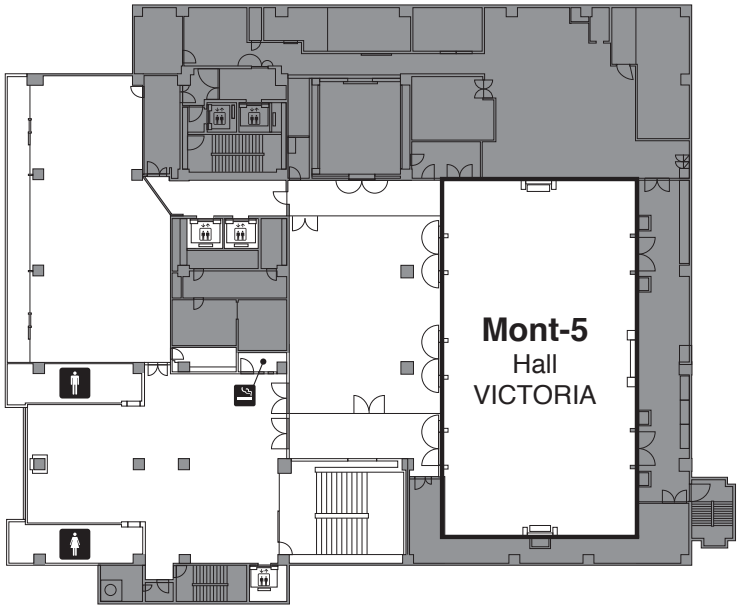

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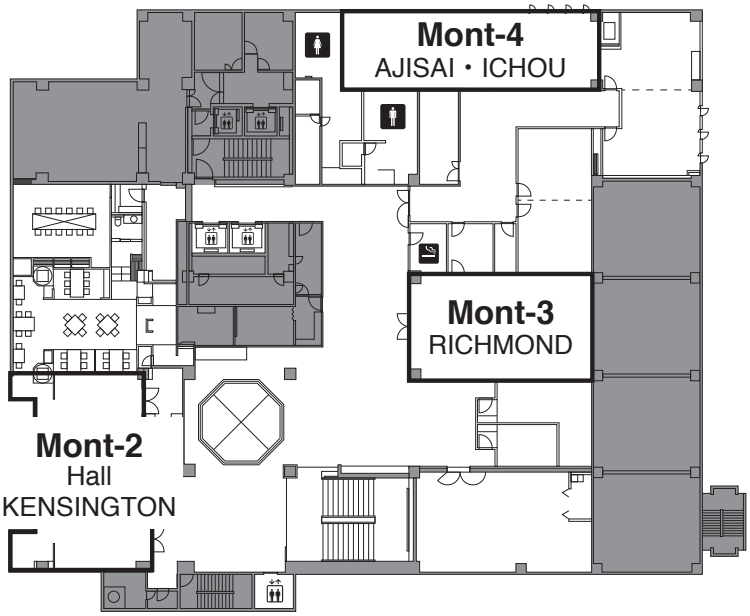

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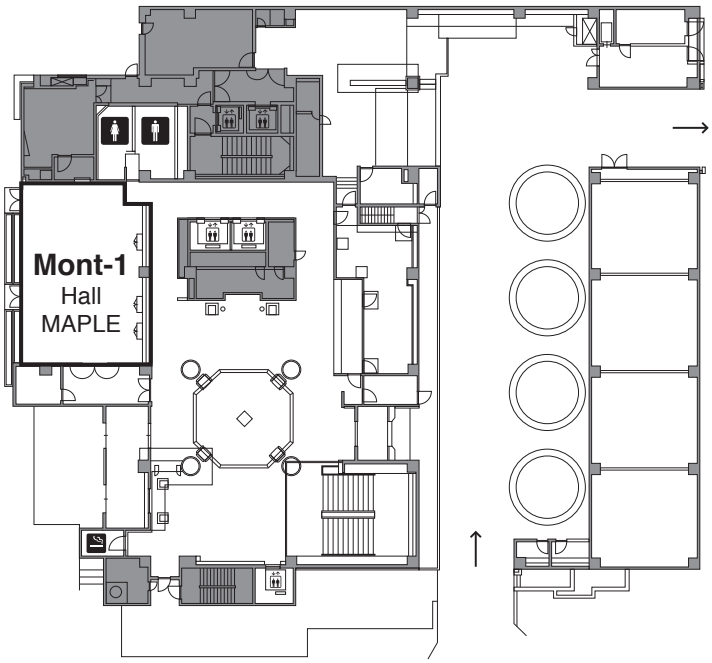

Hotel MielParque Yokohama

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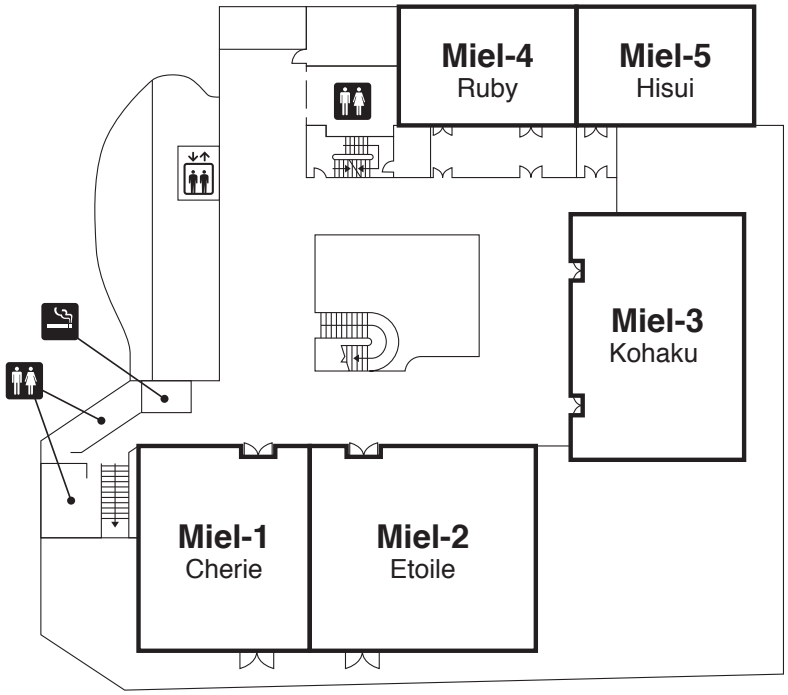

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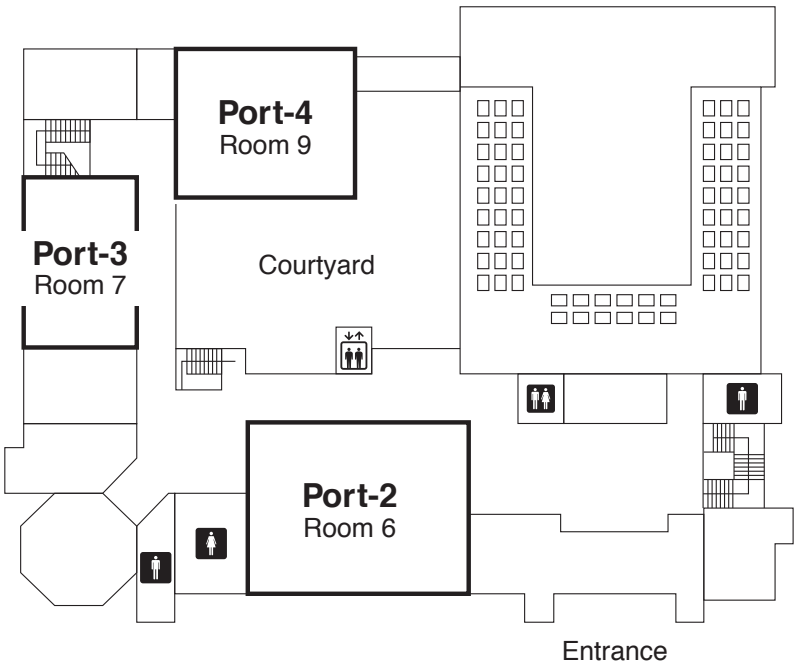

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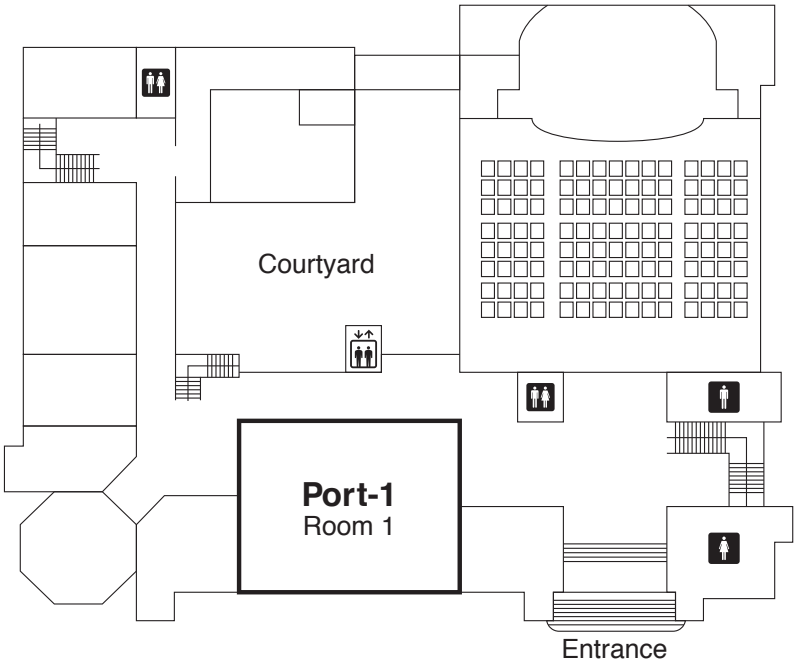

Plenary Lectures

December 10–13, 2019

Plenary Lectures

December 10, 2019

Opening
Session 1-4

Opening

Hideo Hosono
Tokyo. Tech. / Chairperson of MRM2019
14:50–15:00

PL-1 15:00–15:40

Experimental Modelling of Catalyst Materials at the Atomic Scale

Hans-Joachim Freund
Fritz-Haber-Institut der Max-Planck-Gesellschaft, Germany

Chairperson: Tsunehiro Tanaka (Kyoto University)

PL-2 15:50–16:30

Materials Science for Better Batteries Achievements and Future Trends

Jean-Marie Tarascon
College de France, France

Chairperson: Atsuo Yamada (The University of Tokyo)

PL-3 16:40–17:20

$(Al,Ga)_2O_3$ and $(In,Ga)_2O_3$ Alloy Semiconductors in Various Crystal Phases: Physical Properties, Pseudomorphic Epitaxy and Device Perspectives

Marius Grundman
Universitat Leipzig Institut fur Experimentelle Physik, Germany

Chairperson: Yuzo SHIGESATO (Aoyama Gakuin University)

PL-4 17:30–18:20

First-Principles Material Simulation and Beyond

Shinji Tsuneyuki
The University of Tokyo, Japan

Chairperson: Hidetoshi FUKUYAMA (Tokyo University of Science)

December 11, 2019

Session 5

PL-5 13:00–13:40

High-Entropy Alloys

Easo P George
Oak Ridge National Laboratory and the University of Tennessee, USA

Chairperson: Isao Tanaka (Kyoto University)

December 12, 2019

Session 6

PL-6 13:00–13:40

The Terrawatt Opportunity: New Materials Paradigms Toward Sustainability

David S. Ginley
NREL Fellow, USA

Chairperson: Hideo Hosono (Tokyo Institute of Technology)

December 13, 2019

Session 7

PL-7 13:00–13:40

Magnetic Materials: Innovation and Sustainable Development

Michael Coey
Trinity College Dublin, Ireland

Chairperson: Hisazumi Akai (The University of Tokyo)

PL-1

Experimental Modelling of Catalyst Materials at the Atomic Scale

Hans-Joachim Freund
Fritz-Haber-Institut der Max-Planck-Gesellschaft, Germany

Hans-Joachim Freund is a scientific member and director at the Fritz-Haber-Institut der Max-Planck-Gesellschaft in Berlin where he is head of the Department of Chemical Physics. The department is dedicated to the study of model catalysts, applying a large number of techniques and instruments, some of which were newly developed within the department to investigate oxide surfaces and oxide metal interfaces. He serves as Adjunct Professor at five universities in Germany and UK. He received awards in Europe, the US, and Asia. He is a member of six Academies including the German National Academy of Sciences Leopoldi-na and the American Academy of Arts and Sciences and holds three honorary Doctorates. He received the Gaede-Langmuir Award of the American Vacuum Society and is the recipient of the 2015 Michel Boudart for the Advancement of Catalysis by the North American Catalysis Society and the European Federation of Catalysis Societies. He is Fellow of the American Physical Society and has published more than 815 scientific papers with more than 45.000 citations and given about 770 invited talks. He has held a number of named lectureships around the world. He has educated more than 130 PhD students and collabo-rated with more than 80 postdoctoral associates.

PL-2

Materials science for better batteries Achievements and future trends

Jean-Marie Tarascon
College de France, France

Jean-Marie Tarascon (1953) is Professor at the College de France holding the chair "Chemistry of solids – Energy). But much of his early career was spent in the United States where he discovered new electrolytes for Li-ion developed (1994) the plastic Li-ion technology. Back to France in 1995, he created the European network of excellence ALISTORE-ERI and more recently the French network on electrochemical energy storage (RS2E). Tarascon's present research is devoted to batteries with emphasis on designing new materials and electrolytes, developing new eco-efficient synthesis processes, understanding reaction mechanisms, identifying novel reactivity concepts, and exploring chemistries beyond Li. .. He is the author of more than 650 scientific papers, and detains ~100 patents. He received many honours, with the last ones in 2017 being the CNRS innovation medal, the Galvani medal and the Eric and Sheila Samson Prime Minister's Prize.

PL-3

$(Al,Ga)_2O_3$ and $(In,Ga)_2O_3$ Alloy Semiconductors in Various Crystal Phases: Physical Properties, Pseudomorphic Epitaxy and Device Perspectives

Marius Grundman
Universitat Leipzig Institut fur Experimentelle Physik, Germany

Marius Grundmann received his PhD (Dr. rer. nat., 1991) from Technische Universität Berlin (TUB). In 1992 he worked as post-doc at Bellcore, Red Bank, NJ, on quantum wires, then at TUB on self-organized semiconductor III-V quantum dots and devices based on them. Since 2000 he is professor for semiconductor physics at Universität Leipzig. His research interest is focused on oxide semiconductors in the form of bulk, thin films, heterostructures, microcavities and nanostructures for the use in transparent electronic devices and nanosystems. Among his most recent scientific achievements are the first general model for Raman scattering in anisotropic crystals, exceptional points in anisotropic micro-cavities and devices from amorphous zinc-tin-oxide and (p-type) copper iodide. He has published three books and over 550 journal papers with an h-index of 64 (WoS). He is a member of DPG, MRS, APS and Sächsische Akademie der Wissenschaften zu Leipzig. He currently serves as Director of the Felix Bloch Institute for Solid State Physics of Universität Leipzig.

PL-4

First-Principles Material Simulation and Beyond

Shinji Tsuneyuki
University of Tokyo, Japan

Shinji TSUNEYUKI is a Professor in the Department of Physics, School of Science, The University of Tokyo from 2007. He received Ph. D on Physics at The University of Tokyo in 1990. His current research interest is in developing and applying methods of computational physics to clarify the physics of materials, to predict material properties, and to create new materials. Areas of current research include the transcorrelated method, a first-principles wave function theory for condensed matter; electronic properties and structural transformation of materials under high pressure; thermal properties of materials; quantum effect of light particles (protons, muons, etc.) in solids; impurities in ferroelectric materials; microscopic understanding of laser ablation; data assimilation and structure prediction of crystals. He won the IBM Japan Science Prize in Physics in 2001.
Since 2010, he has been working for the application software development project for the K computer and the post-K computer as a representative of the field of device and materials science.

1987-1992	Research Associate, Department of Physics, The University of Tokyo, Japan
1992-2002	Associate Professor, The Institute for Solid State Physics, The University of Tokyo
2002-2007	Associate Professor, Department of Physics, School of Science, The University of Tokyo, Japan
2007-present	Professor, Department of Physics, School of Science, The University of Tokyo, Japan Concurrent Professor, The Institute for Solid State Physics, The University of Tokyo, Japan
2011-present	Manager of the Center of Computational Materials Science, The Institute for Solid State Physics, The University of Tokyo, Japan

Current Research: Condensed Matter Physics Theory, Computational Materials Science

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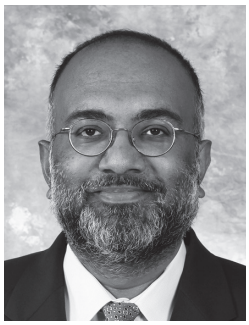
PL-5

High-entropy alloys

Easo P George
Oak Ridge National Laboratory and the University of Tennessee, USA



Position: Governor's Chair for Advanced Alloy Theory and Development
Brief bio: Prior to taking up his current position, George was Professor of Materials Design and Director of the Center for Interface Dominated High Performance Materials at the Ruhr University Bochum in Germany. Before that, he was a distinguished research staff member at ORNL where he led the Alloy Behavior and Design Group and was a joint faculty professor of materials science and engineering at UT. George earned his PhD in materials science and engineering from the University of Pennsylvania, Philadelphia and BTech in metallurgical engineering from the Indian Institute of Technology, Kanpur. His current research interests include the physical metallurgy and mechanical properties of high-entropy alloys for structural applications, iridium and other refractory metals for space power applications, and size effects on mechanical behavior.

PL-6

The Terrawatt Opportunity: new materials paradigms toward sustainability

David S. Ginley
NREL Fellow, USA

Dr. David S. Ginley is currently Chief Scientist for Materials and Chemistry Science and Technology and a Research Fellow at the National Renewable Energy Laboratory. He received his PhD in Inorganic Chemistry from MIT and his BS in Chemistry from the Colorado School of Mines. He directed the Solar Energy Center for India and the US (SERIIUS) and is chief experimentalist for the EFRC Center for Next Generation Materials by Design. Current work focuses on advancing solar and geothermal energy conversion and storage specifically in the areas of development and application of new materials by computational materials design in the areas of transparent conducting oxides, organic electronics materials, nano-materials and the development of process technology for materials and device development including; combinatorial methods, direct write materials, composite materials and non-vacuum processing for materials in extreme environments. A key focus is looking at how to significantly reduce the cost of renewable generated energy through novel devices and processing. He has over 400 publications and 40 patents.

PL-7

Magnetic Materials: Innovation and Sustainable Development

Michael Coey
Trinity College Dublin, Ireland

Michael Coey is Professor Emeritus at Trinity College Dublin, Ireland, and author of several books and many papers on magnetism and magnetic materials. These include contributions to amorphous and disordered magnetic materials, permanent magnetism, magnetism of soils and minerals, dilute oxides and magneto-electrochemistry, with more recent work on magneto-microfluidics, spin electronics, d-zero magnetism and half metals. A Fellow of the Royal Society and Foreign Associate of the National Academy of Science, he has served as Chairman of the IUPAP Magnetism Commission, and Divisional Associate Editor of Physical Review Letters. He founded Magnetic Solutions Ltd and the Trinity College Science Gallery, and was a promoter of CRANN, Ireland's nanoscience research centre. He was awarded the 2019 Max Born Medal by the German Physical Society.

PL-1

Experimental Modelling of Catalyst Materials at the Atomic Scale

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Keywords: Model Catalysts, Strong Metal-Supported Interaction, Confined Space, Reaction at Metal-Oxide Interface,

In order to capture the complexity of real powder catalysts, we have tried to develop an approach that adds complexity in a controlled way starting from simple model systems. The experimental techniques come from the tool box of surface science. We will discuss a number of systems addressing different questions, including:

a) Which role is played by the metal oxide interface in a chemical reaction involving charge transfer? (Fig.1)[1]
b) What is the role of the Strong Metal Support Interaction (SMSI) of supported catalysts in a simple oxidation reaction such as CO oxidation?[2]
c) Is it possible to use surface science approaches to learn something about confined space reactions? (Fig.2)[3]

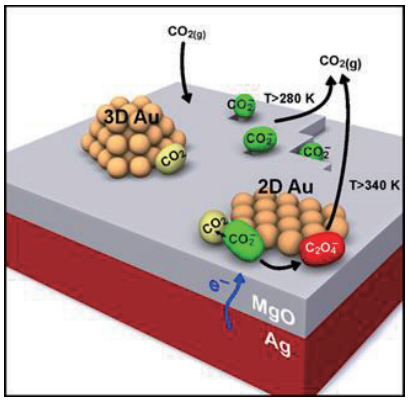

Fig. 1. Thin film MgO/Ag system controlling the morphology and electron charge transfer of supported Au nano-particles in CO_2 activation

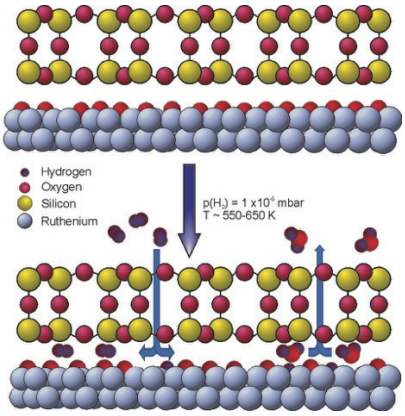

Fig. 2. Water formation in confined space between a crystalline/vitreous silica film and a Ru(1000) surface in direct comparison to the open space reaction.

References:
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PL-2

Materials science for better batteries Achievements and future trends

Jean-Marie Tarascon
Collège de France, - UMR CNRS 8260, 11 Place Marcelin Berthelot, 75005 Paris, France
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Li-ion, Na-ion, batteries, anionic-redox, sensing

Research's progresses in rechargeable batteries are driven by ever increasing demands for portable electronic devices as well as for powering electric vehicles and providing load-leveling for mass storage of renewable energy. Li-ion batteries are the systems of choice for the aforementioned applications. Therefore, for this to fully happen, new concepts and new sustainable chemistries are sorely needed, and this is what this presentation will address.

Firstly, regarding new concepts, we will show how the discovery of a new Li reaction mechanism that involves the anionic network with the reversible formation of dimers (O-O) represents a transformational approach for creating electrode materials with exacerbated capacities[(1)]. Towards, higher energy density systems, recent advances on solid state Li batteries will be discussed. Concerning new chemistry, we will present our new findings with the Na-ion chemistry which enlists novel materials/electrolyte designs[(2)] and the assembly of practical 18650 prototypes prior to touch on our recent studies with aqueous systems. Lastly, an indirect way to enhance simultaneously energy density and sustainability via the use of sensing and self-healing functionalities will be introduced. Through these examples, we hope to convey that the future of battery offers new opportunities for materials scientists as long as we are willing to explore new risky paths.

References:

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2) Guochun Yan, Sathiya Mariyappan, Gwenaelle Rousse, Quentin Jacquet, Michael Deschamps, Renald David, Boris Mirvaux, John William Freeland, Jean-Marie Tarascon., Higher energy and safer sodium ion batteries via an electrochemically made disordered $Na_3V_2(PO_4)_2F_3$ material (2019) Nature Communications, 10, pp. 585

PL-3

$(Al,Ga)_2O_3$ and $(In,Ga)_2O_3$ Alloy Semiconductors in Various Crystal Phases: Physical Properties, Pseudomorphic Epitaxy and Device Perspectives

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Keywords: Oxide Semiconductors, Sesquioxides, Gallium Oxide, Heterostructures

The binary sesquioxide semiconductor Ga_2O_3 and related materials have been in research focus for a few years due to its possible use in high power transistor applications [1]. Electromobility and renewable energies drive the demand for devices that can surpass the performance of SiC or GaN. Epitaxial layers of this material have been realized by us in various phases using physical [2] and chemical [3] methods. Other devices such as (deep) UV photodetectors, transparent inter-subband detectors and HEMT can be envisioned from hetero-structures employing $(In,Ga)_2O_3$ or $(Al,Ga)_2O_3$ alloy layers. Especially interesting for HEMT's is the κ-phase, exhibiting possibly a large spontaneous polarization and high electron interface density (2DEG).

Similar to the situation in arsenide and nitride alloy semiconductors, the oxide sesquioxide alloys exhibit an increase (decrease) of lattice constant with indium (aluminum) incorporation. Using combinatorial epitaxial techniques (Fig. 1), we have determined the phases and their alloy concentration ranges and their dependence on growth parameters. The stress-strain relation of pseudomorphic layers on lattice-mismatched substrates has been modeled by us in the framework of continuum elastic theory for various phases, in particular the monoclinic (β), orthorhombic (κ) and trigonal (corundum) (α) phases [4,5].

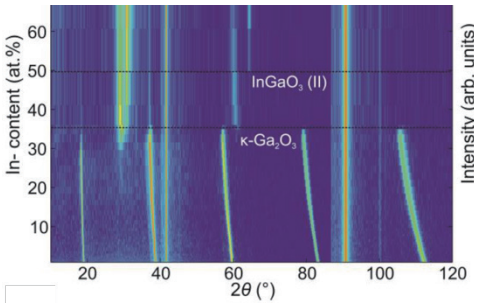

Fig. 1. False color image of 55 XRD 2θ-ω measurements of $(In,Ga)_2O_3$ layer, acquired along the gradient direction of a PLD combinatorial epitaxy wafer. Up to an In-content of 35 at.%, the κ-phase exists.

The oxide alloy semiconductors exhibit a decrease (increase) of their band gap energy with indium (aluminum) incorporation. We have investigated this effect in detail using spectroscopic ellipsometry. The optically anisotropic character of the materials (birefringence and dichroism) is discussed in detail [6]. The consequences for correct evaluation of Raman scattering are pointed out [7]. Also, the band alignment with different dielectrics is discussed.

This work has been done in cooperation with H. von Wenckstern, M. Lorenz, M. Kneiß, D. Splith, A. Hassa, C. Sturm, T. Schultz, N. Koch, M. Albrecht, Ch. Fares, S.J. Pearton, members of the GraFOx consortium and others. Parts of this work have been funded by European Social Fund within the Young Investigator Group "Oxide Heterostructures" (SAB 100310460) and by Deutsche Forschungsgemeinschaft in the framework of Sonderforschungsbereich 762 "Functionality of Oxide Interfaces" (projects A02, B04).

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PL-4

First-Principles Material Simulation and Beyond

*Shinji Tsuneyuki[1,2]
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Keywords: Computer simulation, first-principles calculation, data centric science,

Material simulation based on the first-principles calculation of electronic states aims to explain the physics of materials, to predict material properties, and to create new materials by fully utilizing high-performance computers. In line with the development of computer hardware, novel computational methods and algorithms have been developed for such purposes, and they are opening new doorways in materials science and technology with connecting theories and experiments.

In this presentation, I will give a brief overview of recent advances and remaining problems in the first-principles simulation from the viewpoint of accuracy, system size, dynamics, and exploration. I will show that some of these problems are solvable by a combination of first-principles calculation with modeling and data-centric science approaches.

The first example is the simulation of the thermal properties of crystals, where a precise calculation of the anharmonic phonon effect is necessary. Although the spatiotemporal scale of phonon properties is so diverse, the thermal properties and their temperature dependence can be precisely calculated by a combination of first-principles molecular dynamics and so-called sparse modeling[1,2].

The second one is the theoretical exploration of crystal structures. There has been much progress in the methodology of crystal structure prediction for years, and yet it is a severe problem if the number of atoms exceeds ~50. Here I will show that crystal structure exploration is efficiently accelerated by the Bayes' theorem with a little help from incomplete powder-diffraction data[3,4]. The method is helpful for high-pressure materials science.

The third example is the simulation of non-thermal laser ablation by a femtosecond laser pulse. First-principles calculation of a small and idealized system has brought an idea for the mechanism of this complex phenomenon, while model simulations with first-principles parameters have given strong support by comparison with experimental data[5].

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PL-5

High-entropy alloys

*E. P. George[1,2]
[1] Materials Science & Technology Division, Oak Ridge National Laboratory, Oak Ridge, TN, 37831-6115, USA
[2] Department of Materials Science and Engineering, University of Tennessee, Knoxville, TN, 37996-2100, USA
*georgeep@ornl.gov
Keywords: Structural materials, Mechanical properties, Microstructure, Deformation mechanisms

Conventional alloys consist of a primary element chosen with a primary property in mind (e.g. gold for luster) to which secondary elements are added for other properties (e.g. copper for strength). Recently, however, a novel alloy design strategy has taken the metallurgical world by storm, as summarized in a recent review [1]. It eschews the primary-element approach and, instead, mixes together four, five, or more elements in near-equal amounts. These alloys have high (ideal) entropies of mixing – hence the name. They are scientifically interesting because theories that have been developed for dilute solid solutions break down in concentrated alloys lacking "solvents" or "solutes" in the traditional sense. A handful also exhibit striking mechanical properties (Fig. 1), including strength [2,3], ductility [2,3], and toughness [4,5] that are simultaneously enhanced at cryogenic temperatures, unlike in conventional materials where they have to be traded off.

The multidimensional compositional space occupied by high-entropy alloys remains largely unexplored. One of the reasons for the current excitement in the field is that many more alloys may be lurking in these regions, just waiting to be discovered. A possible strategy for narrowing down the search area relies on identifying both the physical mechanisms responsible for the superior properties as well as their composition dependence. Such a bottom-up approach allows a more targeted probing of limited areas within the available composition space. In this talk, I will summarize what we have learned about the mechanical properties of this new class of alloys. By focusing on a few model systems, it is possible to gain fundamental mechanistic understanding of certain properties and phenomena. These insights serve as a useful guide to navigate the vast multi-dimensional space that remains to be explored. They also help us develop broadly applicable scientific principles for alloy design.

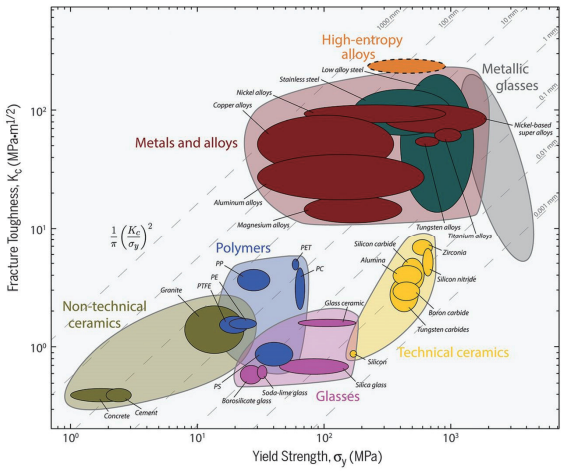

Fig. 1: Strength-toughness map showing the outstanding damage-tolerant properties of high-entropy alloys relative to other material classes [4].

References:
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PL-6

The Terrawatt Opportunity: new materials paradigms toward sustainability

David Ginley, Kristin Persson[2], Lauren Garten[1], Praneetha Selvarasu[1], John Perkins[1], Wenhao Sun[2], Kirill Popov[2], Shyam Dwaraknath[2], Gerbrand Ceder[2], John Mangum[3], Brian Gorman[3], Laura Schelhas[4], Michael Toney[4], Zamyla Chan[5], Daniel Nocera[5], James Haggerty[6], Okan Agirseven[6], Janet Tate[6], Daniil Kitchaev[7], Nancy Haegle[1], William Tumas[1]

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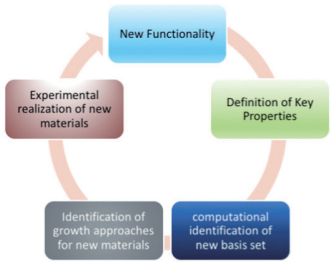
There is an increasing realization that long term sustainability requires significant societal changes from both in infrastructure and in use patterns. This requires significant restructuring of our overall energy systems including an increasing integration of renewable energy generation with active storage, a minimization of CO2 generating energy technologies and transformations in transportation and buildings. To achieve the kind of penetration of renewable energy needed is both a challenge and an opportunity. Si solar cells are headed toward being the largest business on the planet. To achieve such a large shift in the topology of our energy systems requires new functional materials and just as importantly approaches on how to make them. We can no longer afford the 20 year cycle from discovery to application in a new material or device.



We view the approach as being similar to that shown in the figure, whereby the desired functionality is defined as are the key properties needed for an applications space; such as temperature, chemical environment etc. Computationally this can lead to a definition of a set of potential materials and then upon down selection of appropriate candidates it is possible to computationally examine a number of synthetic pathways including possible substrate and or approaches to nucleation and growth. We will demonstrate this approach with examples of the targeted synthesis of high energy polymorphs of $SrHfO_2$ that are piezoelectric (the ground state is not). And by targeted solution synthesis of polymorphs of MnO_2 and TiO_2 with diverse functionality. This new methodology for the realization of new functional and metastable materials is foundational toward developing a sustainable society.

This work was supported by the US Department of Energy, Office of Science, Office of Basic Energy Sciences, as part of the CNMGD Energy Frontier Research Center under contract No. DE- AC36-08GO28308 to NREL.

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PL-7

Magnetic Materials: Innovation and Sustainable Development.

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Trinity College Dublin, Ireland.

Magnetic materials are important in a huge range of applications; two principal categories are bulk functional materials and thin films for data recording and electronic devices. An increasing focus on energy efficiency and sustainability is driving a quest for new materials and reshaping how we think about existing solutions. *Soft magnets* are already highly efficient and barring a breakthrough on the Slater Pauling curve, scope for improvement is limited. *Permanent magnets* create a magnetic field in their surrounding space with no continual expenditure of energy. An electromagnet producing 1 Tesla in a volume of 500 cc will consume $2000 worth of energy over 10 years. A permanent magnet does the same job for free. Although the energy stored is in the magnetic field is only 200 Joules — it in a particularly useful form, providing the basis of highly-efficient energy converters, both electric motors and generators. Demand for rare-earth magnets for new applications, notably electric vehicles and robotics, but also direct-drive wind turbines and microscale energy harvesting, is increasing rapidly from the present base of 100,000 tonnes per annum. The 2011 rare earth crisis focussed attention worldwide on reducing and recycling heavy rare earths.
Regarding archival recording, a focus is on developing media structures compatible with heat-assisted *magnetic recording*. As digital data processing consumes ever-greater quantities of energy the challenge to magnetic or other solutions is to drastically curb the energy requirement to sustain information technology and to advance data rates into the terahertz gap, where chip-based *spin electronics* solutions could be attractive.
Finally, there are prospects of magnetic materials based on entirely new principles, that will be discussed briefly.

Cluster Keynotes

Ken-1

A. Fundamentals for Materials

B. New Trend of Materials Research

C. Novel Structural Materials Based on New Principles

D. Advanced Electronic Materials

E. Magnet and Spintronics

F. Energy

G. Materials for Smart Systems

H. Green Technology and Processing

I. Biopolymers

December 10–13, 2019

Cluster Keynotes

Ken-1

December 11, 2019

Cluster Session A

Time 16:30–18:30

Chairpersons Shin-ichi ORIMO, Koichi HAYASHI, Taisuke OZAKI

AX-11-CLK01 16:30–17:10

Ions and electrons at interfaces of functional ionic materials

Truls NORBY
University of Oslo, Norway

AX-11-CLK02 17:10–17:50

White Neutron Holography – New Probe of Local Atomic Structures around Dopants in J-PARC

Kenji OHOYAMA
Ibaraki University, Japan

AX-11-CLK03 17:50–18:30

Bridging atomic-resolution experiment and computation using machine learning

Teruyasu MIZOGUCHI
The University of Tokyo, Japan

December 12, 2019

Cluster Session B

Time 9:30–12:00

Chairperson Shinji Tsuneyuki

BX-12-CLK01 9:30–10:20

When the New Science is in the Outliers

Matthias Scheffler
Fritz Haber Institute of the Max Planck Society, Germany

BX-12-CLK02 10:20–11:10

Data driven discovery of new materials

Isao Tanaka
Kyoto University, Japan

BX-12-CLK03 11:10–12:00

Geometric frustration and the intrinsic approach in material science

Efi Efrati
Weizmann Institute of Science, Israel

December 13, 2019

Cluster Session C

Time 14:00–16:00

Chairpersons Eiji Abe, Junichi Tatami, Kozo Ito

CX-13-CLK01 14:00–14:40

Evolution of LPSO Structure to Mille-Feuille Structure in Ultrahigh-Strength Magnesium Alloys

Yoshihito KAWAMURA
Kumamoto University, Japan

CX-13-CLK02 14:40–15:20

Additive Manufacturing of Ceramic Components with Unique Structures

Tatsuki OHJI
National Institute of Advanced Industrial Science and Technology, Japan

CX-13-CLK03 15:20–16:00

Detecting bond scission in fracture of soft materials

Prof. Costantino Creton
CNRS Research Director, ESPCI, Paris Tech, France

December 12, 2019

Cluster Session D

Time 14:00–16:00

Chairpersons Yoshihiro Iwasa, Kenji Shiojima, Susumu Saito

DX-12-CLK01 14:00–14:40

Atomic-level control of high temperature superconductor materials for unveiling their pairing mechanism

Qi-kun XUE
Tsinghua University, China

DX-12-CLK02 14:40–15:20

Development of Corundum-Structured Gallium Oxide Power Devices by MIST EPITAXY®

Takashi SHINOHE
FLOSFIA INC., Japan.

DX-12-CLK03 15:20–16:00

Emergent electromagnetism in quantum materials

Naoto NAGAOSA
RIKEN and U. Tokyo, Japan

December 11, 2019

Cluster Session E

Time 9:30–12:05

Chairpersons YoshiChika Otani, Jun Sugiyama

EX-11-CLK01 9:30–10:10

Antiferromagnets for neuromorphics and opto-electronics

Tomas Jungwirth

University of Nottingham/Institute of Physics, Academy of Sciences of the Czech Republic, United Kingdom

EX-11-CLK02 10:10–10:50

Quantum Criticality in Organometallics Studied by Neutrons & Muons

Martin Månsson

Royal Institute of Technology, Sweden

Break

10:50-11:05

EX-11-CLI03 11:05–11:35

Probing antiferromagnets with currents

Vimcent Baltz

SPINTEC - Univ. Grenoble Alpes / CNRS / CEA / GINP, France

EX-11-CLI04 11:35–12:05

Nanocrystalline formation of the iron based soft magnet FINEMET studied by operando muon spin rotation technique

Akihiro Koda

KEK IMSS, Japan

December 12, 2019

Cluster Session F

Time 16:30–18:30

Chairpersons Yoshiharu SAKURAI, Atsuo YAMADA, Takao MORI

FX-12-CLK01 16:30–17:10

Hard X-ray spectro-ptychography: Visualization of heterogeneous oxygen storage behavior in three-way catalyst particles

Yukio TAKAHASHI

Osaka University, Japan

FX-12-CLK02 17:10–17:50

Quantifying Inactive Lithium in Lithium Metal Batteries

Ying Shirley MENG

University of California San Diego, USA

FX-12-CLK03 17:50–18:30

Withdrawal

December 13, 2019

Cluster Session G

Time 9:30–11:50

Chairperson Tsutomu Miyasaka

GX-13-CLK01 9:30–10:05

Soft Electronic and Robotic Systems

Martin Kaltenbrunner

Johannes Kepler University Linz, Austria

GX-13-CLK02 10:05–10:40

Design, development, and doping of novel inorganic optoelectronic functional materials

Toshio Kamiya

Tokyo Institute of Technology, Japan

GX-13-CLK03 10:40–11:15

Gold Nanorods with Ultranarrow LSPR Bands

Luis M. Liz-Marzán

CIC biomaGUNE, Spain

GX-13-CLK04 11:15–11:50

Perovskite Solar Cells: History, Progress and Perspective

NamGyu Park

School of Chemical Engineering, Sungkyunkwan University, Korea

December 11, 2019

Cluster Session H

Time 14:00–16:00

Chairpersons Katsuya Teshima, Tetsuya Yamamoto

HX-11-CLK01 14:00–14:30

Photocatalytic water splitting for solar hydrogen production

Kazunari Domen

The University of Tokyo / Shinshu University, Japan

HX-11-CLK02 14:30–15:00

Plasma Synthesis, Conversion, and Processing of Energetic Materials

Alexander Fridman

Drexel University, USA

HX-11-CLK03 15:00–15:30

Gallia(Ga_2O_3) for Green and Efficient Energy applications

Ekaterina Chikoidze

Paris Saclay University, France

HX-11-CLK04 15:30–16:00

Lead-free Piezoelectric Ceramics – Future perspectives –

Akira Ando

Murata Manufacturing Co., Ltd., Japan

December 13, 2019

Cluster Session I

Time 16:30–18:00

Chairpersons Jun Kikuchi, Masaya Yamamoto

IX-13-CLK01 16:30–17:15

Importance of strengthening “venous industry” for future plastics

Nobuyuki Kawashima

Mitsui Chemicals, Inc., Japan

IX-13-CLK02 17:15–18:00

Ceramic Additive Manufacturing Technologies for Biomedical applications

Hui-suk Yun

Korea Institute of Materials Science, Korea

AX-11-CLK01

Ions and electrons at interfaces of functional ionic materials

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*truls.norby@kjemi.uio.no
Keywords: Grain boundaries; heterointerfaces; surfaces; protons; electrons

The thermodynamics and kinetics of ionic and electronic defects in the bulk of crystalline ionic materials describe well the equilibrium deviation from the perfect structure as well as random and gradient-driven transport. Once heterogeneities like homo- or heterojunctions or surfaces are introduced, defect energies vary spatially, introducing primary equilibrium concentration gradients and charge separation, as well as secondary space charge regions with depletion or enrichment of charge carriers, causing large variations in transport properties. Examples comprise the highly resistive grain boundaries of oxide and proton conducting ceramics, the job-sharing separation of charged ionic defects and electronic species over heterointerfaces, and surface protonic conduction in adsorbed water. In this talk I discuss some of these aspects in further detail.

The high resistance of grain boundaries in acceptor-doped oxide ion and proton conducting ceramics is assigned to depletion of positive charge carrying defects in the space charge layers, caused by the accumulation of the same carriers in the core of the grain boundary for relaxation of lattice mismatch strain. But the positive charge of the core is hard to very directly. We have applied TEM electron holography to a grain boundary in Y-doped $BaZrO_3$.[1] This yields a phase shift of the electron beam caused by the local charge through the sample. Surprisingly, the grain boundary core appears negative rather than the expected positive. This can to some extent be understood by the loss of Ba^{2+} by out-diffusion to evaporation and formation of surface carbonate, competing with the accumulation of effectively positive oxygen vacancies and protons. But more importantly, the high energy TEM electrons used in holography feel a different local electrical potential – dominated by the spatial function of the positive atomic nuclei - than the comparatively stationary protons – dominated by the orbitals of the negative electron clouds.

As another example, I discuss recent computational results[2] on the heterointerface between two undoped ionic materials – $BaZrO_3$ and $SrTiO_3$ – showing how different defect formation energies can form charge separation between the two materials close to the interafces, leaving one with effectively positive ionic defects and the other with charge compensating negative defects, e.g. electrons. This may lead to development of for instance mixed ion-electron conducting (MIEC) nanocomposites with charge carriers with high mobilities due to the lack of trapping to heterovalent dopants. The heterointerface effectively induces a doping effect in both materials.

Finally, I discuss new directions in surface protonics. There is growing understanding and parameterisation of the fundamentals of conduction of free protons in chemisorbed and ice-like physisorbed water, and of vehicular protonic species in thicker liquid-like physisorbed water layers at high relative humidities.[3] This is caused by charge separation between the surface and the water and has large effects on a range of physicochemical processes e.g. on surfaces of catalysts and in nanoporous ceramics. But recent advances in heterogeneous catalysis enhanced by surface protonic currents on ceramic supports in the presence of dry hydrogen (no water)[4] requires new insight in dissociation and ionisation of hydrogen on ionic surfaces.

References:
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4) R. Manabe, S. Okada, R. Inagaki, K. Oshima, S. Ogo, Y. Sekine, *Scientific Reports*, [6] (2016) 38007.

Truls Norby
Professor, University of Oslo

Truls Norby (b. 1955) has his PhD from the University of Oslo (UiO) 1986, where he studied and worked with late prof. Per Kofstad.

Norby became professor at the Department of Chemistry 1994 and head of the Group for Solid-State Electrochemistry in 1997, now Group for Electrochemistry, which is part of the Centre for Materials Science and Nanotechnology (SMN) at UiO.

Norby works with thermodynamics and transport of defects in materials for solid-state fuel cells, electrolysers, batteries, gas separation membranes, sensors, and metal protection oxide layers. He specialises in protons in oxides and their use in high temperature proton conductors and hydrogen separation membranes. Recently, he also focuses on topics related to transport in adsorbed layers on surfaces and across interfaces (grain boundaries, electrodes) and on the semiconducting properties of oxides for uses in photoelectrochemistry and thermoelectrics.

He has published more than 240 journal papers, graduated 80 Master- and PhD-students, and is editor of Solid State Ionics and President of the International Society for Solid State Ionics (ISSE) 2019-2021. He is member of the Norwegian Academy of Science and Letters and other national academies. He has won the UiO Innovation Prize (2012) and the Norwegian Guldberg-Waage medal for chemistry 2018.

He has founded companies NORECS AS (2001) which develops, manufactures, and sells test equipment world-wide (including China) and Protia AS (now CoorsTek Membrane Sciences AS) (2007) which develops energy conversion processes using proton conducting ceramic materials.

AX-11-CLK02

White Neutron Holography – New Probe of Local Atomic Structures around Dopants in J-PARC

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Keywords: local atomic structure, light elements, neutron holography, dopants

For most of functional materials, the properties can be controlled by impurity doping. For Si semiconductors, B or P with a concentration of 10^{-5}-10^{-9} are doped to enhance transportation properties. Thus, the slightly distorted atomic structure around dopants, called "*local structure*", must be important for the functionality. The most powerfull probe for visualisation of local atomic strutures is atomic resolution holography (ARH), which can visualise 3D atomic structures in the rang of ~20 Å from the selected atoms (dopants). ARH has been already established using fluorescent x-rays, and photoelectrons.

However, light elements, such as H, Li or B, which are important for novel functional materials, cannot be observed by x-rays and electrons. To overcome this, neutron ARH, which have higher sensitibity to light elements, was proposed and developed by Cser *et al*. and Sur *et al*. in 2001 using a monochromatic beam[1]. Recently, our group has succeeded in enhacing accuracy of atomic images drastically by using *white* neutrons in Japan Proton Accelerator Research Complex (J-PARC) at Tokai, Japan[2]. Note that we can obtain data (holograms) with at most 130 wavelengths in the range of 0.36 – 6.5 Å at once; this is the essential point of the high accuracy. We successfully visualsed local atomic structures around Eu in 1% Eu doped CaF_2, which is a typical scintillation crystal, and found that there exist excess F^- around Eu^{3+} dopants. We also succeeded in visualising local atomic structures in many materials: the semiconductor 0.26% B doped Si[3], the thermoelectric material 0.75% B doped Mg_2Si, the typical strongly correlated electrons system 2% Sm doped RB_6 (R: Yb, La), and so on. Fig.1 shows local structure around ^{10}B (green) in 0.27 % ^{10}B doped Si obtained by white neutron ARH in J-PARC [3]. The Si structure around doped ^{10}B is the diamond structure, directly indicating that most of ^{10}B is located at Si positions. This indicats that the positions of light dopants can be determinded by this method. Fig.2 shows atomic images of Yb around Sm (green) in 2% Sm doped $Yb^{11}B_6$ (space group:Pm-3m, a = 4.16 Å). We also visualised B cages around rare earth atoms. At least 7th nearest neighbour Yb located at 12.5 Å from Sm was visualised, which is much longer than the typical range of x-ray absorption fine structure method. Thus, one can observe change of doping effects to the atomic structures of light and heavy elements in the large area from the area around dopants to the area which has the non-distorted structure without doping effects.

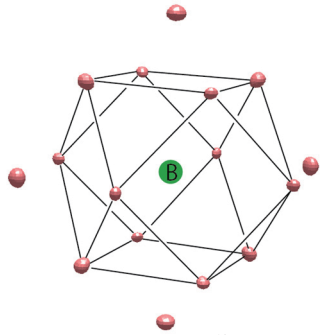

Fig. 1 Local structure of Si around ^{10}B (green) in 0.27 % ^{10}B doped Si obtained by white neutron ARH in J-PARC[3]. Reproduced with permission.

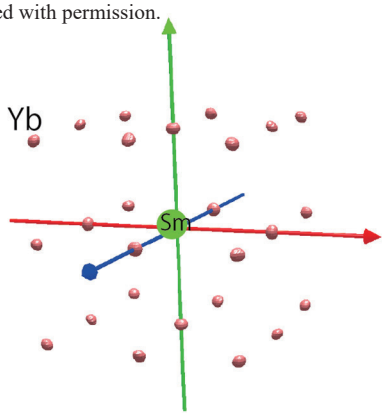

Fig. 2. Local structures of Yb around Sm (green) in 2% Sm doped $Yb^{11}B_6$. The distance between Yb is 4.16 Å

By using the white neutron ARH, one can discuss doping effects (lcattice distortions and/or fluctuations) by light element doping, such as B, or positions of light dopants, as well as local atomic structures of light elements around dopants. Thus, this technique is important to clarify the origins of properties in doped materials from a view point of structural physics.

References

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2) K. Hayashi et al., Science Advances, **3**, e1700294 (2017).
3) K. Ohoyama and K. Hayashi, Phys. Status Solidi B, **255**, 1800143 (20180).

Kenji Ohoyama was born in Tokyo, Japan in 1961. He obtained his B.Sc.(1986) and M.Sc. (1988) degrees from Tohoku University, and Ph.D. from Tohoku University in 1992. He worked in Institute for Materials Reserch of Tohoku University as a research associate (1992–2003), associate professor (2003–2013), and as an associate professor in Advanced Institute for Materials Research of Tohoku University (2013-2015). He moved to Ibaraki University as a full professor in 2015. His main research fields are investigations of materials science and magnetism in strongly correlated electron systems using neutron scattering, and developing novel techqniues of neutron scattering.

AX-11-CLK03

Bridging atomic-resolution experiment and computation using machine learning

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Keywords: Machine learning, spectroscopy, ELNES/XANES, first principles simulation, STEM

A combination between the experimental and computational investigations are crucial for the modern materials developments. In particular, an atomic scale investigation becomes more important for the recent down-sizing of the electric devices. On the other hand, one has to know that the “observation” is not identical to the “understanding”.

In recent years, machine learning approaches have widely spread in materials science to predict material properties quantitiely and overcome various obstacles with extensive computations. The machine learning was also applied to investigate lattice defects, such as grain boundary, and spectroscopic data, such as infrared (IR), nuclear magnetic resonance (NMR), ELNES/XANES, and extended X-ray absorption fine structure (EXAFS) to extract hidden information.

We are applying the machine learning method to build the bridge between the atomic resolution experiments and computations. In this presentation, I am going to present about following topics. 1) Atomic resolution analysis of liquid, 2) machine learning for ELNES/XANES. The respective contents are as blow:

1) Atomic resolution analysis using aberration-corrected STEM-EELS has been mainly applied to crystalline materials. On the other hand, its applications to liquid and gas have been limited. Recently, we are performing the atomic resolution analysis of ionic liquid [1-3] and investigation of the dynamic behavior of the gaseous molecule [4].

Ionic Liquids have characteristic properties, such as non-volatility, high ionic density, and hydrophilicity. Owing to such properties, ionic liquids have been studied for the wide range of applications. Atomic resolution observation of a gold doped ionic liquid was conducted by STEM-EELS. TEM specimen for the ionic liquid was fabricated using the simple method [1], and gold atoms were clearly observed as bright spots. originating We also observed the dynamics of monatomic ions in ionic liquids [2]. Quantitative molecular and ionic mapping in the ionic liquid was also achieved [3].

2) To develop a method that can interpret the ELNES/XANES spectra, hierarchical tree and decision tree methods are combined. First, ELNES/XANES database was constructed by the theoretical calculation. Then, hierarchical clustering was performed on the database, resulting in categorizing similar spectra into clusters. Spectral similarity was measured by cosine distance. Cutting the hierarchical tree at arbitrary threshold makes some clusters of the spectra. We successively lowered the cutting threshold to each branch point, resulting in making two clusters at every branch point. By using the branch point in the cluster as the teacher, the decision tree on the materials information was constructed by the supervised learning. We have confirmed that this method can correctly interpret the spectra [5].

In addition to the “interpret” the spectrum, the machine learning method was also applied to directly predict the materials structure and functions [6].

References

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6) S. Kiyohara et al., J. Phys.: Materials, 2 (2019) 024003-1-9

Teruyasu Mizoguchi is a professor in Institute of Industrial Science, The University of Tokyo. He received PhD from Kyoto University in 2002. From 2002~2005, he has been a postdoctoral researcher at Kyoto University, The University of Tokyo, and Lawrence Berkeley National Laboratory. He became a research assistant in Institute of Engineering Innovation, Graduate School of Engineering, The University of Tokyo in 2005 and an assistant professor in 2007. He moved to Institute of Industrial Science, The University of Tokyo in December 2009, as an associate professor and became a professor in January 2019. His research interest is investigating structure-property relationships of materials using atomic resolution electron microscopy and spectroscopy (STEM-EELS), first principles simulations, and machine learning.

BX-12-CLK01

When the New Science is in the Outliers

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Keywords: Big data, artificial intelligence, machine learning, compressed sensing, domain of applicability, materials science

Several issues hamper progress in data-driven materials science. In particular, these are a missing FAIR [1] data infrastructure and appropriate data-analytics methodology [2].

Significant efforts are still necessary to fully realize the A (accessibility) and I (interoperability) of FAIR. Here the development of metadata, their intricate relationships, and data ontology need more attention. Obviously, a FAIR data infrastructure – for being accepted by the community – should work without bureaucratic hurdles or the needs for special training. In this talk, I will discuss the challenges and progress, focusing on computational materials science.

Concerning the data-analytics, we note that the number of possible materials is practically infinite, but only 10 or 100 of them may be relevant for a certain science or engineering purpose. In simple words, in materials science and engineering, we are often looking for “needles in a hay stack”. Fitting or machine-learning all data (i.e. the hay) with a single, global model may average away the specialties of the interesting minority (i.e. the needles). I will discuss methods that identify statistically-exceptional subgroups in a large amount of data, and I will discuss how one can estimate the domains of applicability of machine-learning models.[3]

1) FAIR stands for Findable, Accessible, Interoperable and Re-usable. The FAIR Data Principles; https://www.force11.org/group/fairgroup/fairprinciples
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Prof. Dr. Matthias Scheffler
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Matthias Scheffler is known for his pioneering work linking density-functional theory with thermodynamics and statistical mechanics. Currently he leads the pan-European NOMAD project (Novel Materials Discovery)[1], which is a European Centre of Excellence that provides a central, FAIR data Repository and Archive for materials modelling. He is also pioneering in the field of big data analytics for the advancement of materials design and engineering.
Matthias Scheffler obtained his PhD in Physics from the Technical University Berlin, Germany (1978), and was then scientific staff member at the Physikalisch-Technische Bundesanstalt in Braunschweig (1978-1987). In 1979/80 he spent a year at IBM Yorktown Heights. In 1988, he became founding director of the Theory Department of the Fritz Haber Institute, where he has been since then. He is honorary professor at all three universities of Berlin and "Distinguished Visiting Professor for Materials Science and Engineering" at the University of California, Santa Barbara.

Honors and Awards (selection)

1998	Fellow of The American Physical Society
2001	Max Planck Research Award, jointly awarded by the Alexander von Humboldt Foundation and the MPG
2003	Medard W. Welch Medal and Prize, awarded by the AVS: Science and Technology of Materials, Interfaces, and Processing (formerly American Vacuum Society)
2004	Max-Born-Medal and Prize, jointly awarded by British Institute of Physics (IOP, GB) and the German Physical Society (DPG, DE)
2004-2012	*Visiting Professor* at the Dalian Institute of Chemical Physics of CAS
2007	Honorary doctorate, Faculty of Science at Lunds University, Sweden
2008	Ernst Mach Honorary Medal for Merit in the Physical Sciences, Academy of Sciences of the Czech Republic
2010	Rudolf Jaeckel Prize of the German Vacuum Society (DVG, DE)
Since 2016	*Visiting Professor* at the Institute for Catalysis, Hokkaido University, Japan
2017	Advanced Grant of the European Research Council
2017	Member of Leopoldina (German Academy of Sciences)

Synergistic Activities (selection)

- Organizer and co-organizer of numerous conferences, workshops, summer schools (about 5 per year).
- Member of the CECAM council, member of the board of directors of the node CECAM-DE-MM1P, Member of the board of trustees of psi-k, member of several scientific advisory boards.
- The computer code FHI-aims[2] is developed by Scheffler and his department.
- Initiator and coordinator of BiGmax[3], a Max Planck research network for Big-Data Driven Materials Science.
- Initiator, founder, and chairperson of the board of the association: *FAIR Data Infrastructure for Physics, Chemistry, Materials Science, and Astronomy e.V*[4].

[1] https://nomad-coe.eu/ [2] https://aimsclub.fhi-berlin.mpg.de/ [3] https://bigmax.iwww.mpg.de/
[4] http://www.fairdi.eu/

BX-12-CLK02

Data driven discovery of new materials

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Keywords: materials informatics, first principles calculations, phonon anharmonicity, recommender system, chemically relevant compositions

Recently, challenges for accelerated discovery of materials with the aid of data centric science have been well demonstrated. One of the approaches uses materials database that is generated by first principles density functional theory (DFT) calculations. Thanks to recent progress of computational power and technique, a large number of DFT calculations can be made with the accuracy comparable to experiments, which can be used for high throughput screening. Another approach uses machine-learning technique for making a model to estimate the target property. The whole library can then be screened. Verification process is generally required to examine the predictive power of the model. Models and the quality of the screening can be improved iteratively through Bayesian optimization process. The approach is useful when screening based upon the DFT data is not practical, i.e. when the computational cost for the descriptors is too high to cover the whole library within the practical time frame. This is the same if one needs to explore too large space to cover exhaustively. As an example of the use of a machine learning model to screen a library, I will talk about the story on the discovery of new low lattice thermal conductivity (LTC) crystals [1]. We have established our own LTC dataset computed by the first principles anharmonic force constant method [2]. Using approximately 100 theoretical LTC data, we made a machine learning model for LTC. Then all compounds registered in the inorganic crystal structure database (ICSD) library were ranked with respect to the predicted LTC. Finally, the candidates of the low LTC compounds were validated by first principles LTC calculations. A variety of compounds showing ultra-low LTC of approximately 0.1 Wm/K at 300 K were thereby discovered.

In the second part of my talk, I will explain matrix- and tensor-based recommender system using information of compounds registered in ICSD. It was found to be very powerful for discovery of currently unknown chemically relevant compositions (CRCs) of inorganic compounds from vast candidates [3]. The discovery rate was evaluated by the presence of highly-rated chemical compositions in the other databases of experimentally known compounds, i.e., ICDD-PDF and Springer Materials, excluding CRCs registered in ICSD. For ternary and quaternary compositions, the rate was approximately 60% and 50% for the top 100 compositions, respectively. The high discovery rate with neither DFT database nor other prior physical/chemical knowledge should be noteworthy.

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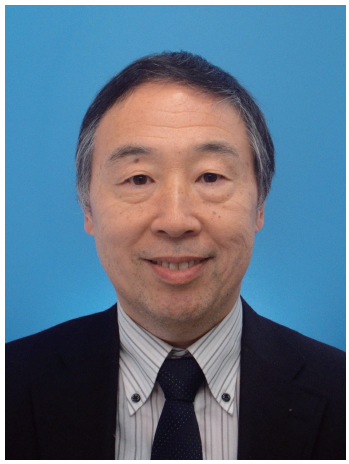

Isao TANAKA is Professor in the Department of Materials Science and Engineering, Kyoto University, Japan. Trained as a metal physicist, he received his B.E. and M.E. from Kyoto University and his Ph.D. from Osaka University. In 1987, he joined ISIR, Osaka University, as an assistant professor where he studied processing and characterization of high purity silicon nitride. He got an Alexander von Humboldt Fellowship in 1992 and stayed a year in Manfred Rühle's research group of Max Planck Institute for Metals Research in Stuttgart, Germany, where he studied intergranular glassy films of silicon nitride ceramics. He returned to Kyoto University in 1993 and started to use quantum mechanical calculations and combined them with experimental techniques such as ELNES and XANES to study fundamental issues in a wide range of ceramic materials. He also studied electronic processes of defects, impurities, grain boundaries, surfaces, and their roles in macroscopic properties. In 2000s he made pioneering studies on theoretical calculation of thermo-physical properties of ceramic materials through first principles phonon calculations. Recently he is actively working on data-centric or informatics approach for discovery of new materials. Materials of his current interests are quite diverse including solid-state ionics, battery materials, oxide/nitride semiconductors, engineering ceramics, etc. He is author or coauthor of 411 papers and holds *h*-index of 56. Recently he edited a book titled Nanoinformatics (Springer).

BX-12-CLK03

Geometric frustration and the intrinsic approach in material science

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Keywords: elasticity, geometric frustration, residual stress, incompatibility.

Unlike Lego bricks that perfectly assemble next to one another, in many molecular assemblies and modern applications of responsive materials some misfit is almost always present. The constituents of such structures must distort in order to fit next to one another resulting in geometrically frustrated structures that possess no stress-free rest state. The elastic behavior of such structures is thus best described through local intrinsic geometric quantities such as their metric.

In this talk, I will survey how the intrinsic approach is implemented to describe frustrated thin sheets known as non-Euclidean plates, twisted molecular crystals, and two-dimensional liquid crystals. The intrinsic approach predicts the striking variety of morphologies of ground states and exotic response properties such structures exhibit, and moreover allows to better engineer self-shaping responsive structures.

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Curriculum Vitae

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Academic employment and education

2014-present	Assistant professor, Weizmann institute of Science.
2010-2014	Simons Postdoctoral fellow, James Franck Institute, The university of Chicago.
2005-2010	Ph.D, Racah Institute of Physics, The Hebrew University Jerusalem. Summa cum laude.
2003-2005	M.Sc, Racah Institute of Physics, The Hebrew University Jerusalem.
2001-2003	B.Sc. Physics and Mathematics, The Hebrew University of Jerusalem. Magna cum laude.

Fellowships and awards

2016-present	Incumbent of the Ernst and Kaethe Ascher Career Development Chair.
2014-2017	Alon Fellowships for Outstanding Young Researchers.
2013	Compton lectureship, University of Chicago.
2011	The Hebrew University Max Schlomiuk award for outstanding PhD thesis.
2010-2013	Simons post-doctoral fellowship.
2010	Rothschild post-doctoral fellowship (declined).
2004	Giulio Racah prize for theoretical physics (M.Sc)

CX-13-CLK01

Evolution of LPSO Structure to Mille-Feuille Structure in Ultrahigh-Strength Magnesium Alloys

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Keywords: Magnesium, LPSO structure, Kink Strengthening, Mille-feuille structure, Structural materials

Mg alloys are attractive for use in aircraft components primarily because of their low density and high specific strength. But current commercial Mg alloys, e.g., AZ31, have low yield strength and unacceptably low ignition temperature. Moreover, several years ago America's FAA (Federal Aviation Administration) has lifted the ban on the use of some Mg alloy forms in the payload area and has set up a standardized testing method of flammability for Mg alloys [1)]. In addition, biodegradable tailored Mg alloys are some of the most promising scaffolds for cardiovascular stents.

Ultrahigh-strength Mg-M-RE (M is Co, Ni, Cu or Zn, and RE is Y, Gd, Tb, Dy, Ho, Er or Tm) alloys with high heat-resistance and great flame-resistance have been developed at Kumamoto University in Japan and are now a world leading focus of Mg R&D [2)3)]. These Mg-M-RE alloys, which are composed of alpha Mg phase and LPSO phase having a long-period stacking ordered (LPSO) structure, are called LPSO-type Mg alloys because their main strengthening phase is the LPSO phase [4)]. The LPSO phase is strengthened by kinking, which is a new concept for strengthening mechanism of metals. The LPSO-type Mg-M-RE alloys, which were produced by hot extrusion of cast ingot, exhibited very high symmetrical yield strength in both tension and compression, high heat resistance, and great flame resistance. A small amount addition of Al and La improved the corrosion resistance, resulting in the same as the commercial AZ31 alloy. Moreover, the ignition temperature was improved by a small amount addition of Be, Yb or Ca, resulting in high ignition temperature above 1200 K. A rapidly solidified powder metallurgy (RS P/M) method, where rapidly solidified powder or ribbons are consolidated by hot extrusion, improved the mechanical and corrosion properties as compared with ordinary ingot metallurgy (I/M) method, where cast ingot is hot extruded. The development of more sustainable and more affordable manufacturing technology for these next-generation Mg alloys has been conducted via an integrated and comprehensive collaboration between academia and industry. Moreover, the applications and commercialization of these advanced Mg alloys have been under serious investigation and study for automobile, aircraft, and biomedical industries. In the LPSO structure, $L1_2$-type M_6RE_8 cluster layer with 4 atomic planes and Mg layer with 1~4 atomic planes are orderly stacked. The former $L1_2$-cluster layer is hard and the later Mg layer is soft; thus resulting in an ordered stacking structure of hard and soft layers within the LPSO structure. We have, therefore, named these kinds of stacking structure of hard and soft layers "mille-feuille structure" after mille-feuille pastry having a stacking structure of pie and cream layers. Recently, we have discovered a new class of magnesium alloys with this kind of mille-feuille structure, in which stacking faults, composing of a single layer of $L1_2$-cluster, are sparsely distributed in alpha-Mg matrix. The new magnesium alloys were strengthened by kinking as well as LPSO phase, and they exhibited a greater mechanical strength than the LPSO-type Mg alloys. In my presentation, I will report the features of the performances and microstructure of the LPSO-type Mg alloys and introduce the new discovery of the mille-feuille structure.

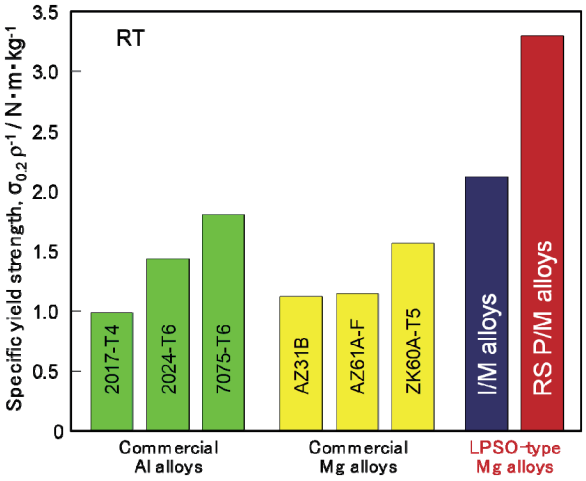

Fig. 1. Specific tensile yield strength of LPSO-type Mg alloys produced by I/M and RS P/M methods.

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Biosketch:

Professional Career

Dec. 2011 -To date	Director, Magnesium Research Center, Kumamoto University
Apr. 2004 – To date	Professor, Graduate School of Science and Technology, Kumamoto University
Oct. 2000 – Mar. 2004	Associate Professor, Graduate School of Science and Technology, Kumamoto University
Sep. 1999 - Sept. 2000	Associate Professor, Institute for Materials Research, Tohoku University
Apr. 1993 – Aug. 1999	Associate Researcher, Institute for Materials Research, Tohoku University
Apr. 1985 – Nov. 1989	Researcher, R&D Department, Nippondenso Co., Ltd

Academic Career

Mar. 1993	Doctor of Engineering, Tohoku University (ph. D)
Mar. 1985	Master of Engineering, Nagoya University
Mar. 1983	Bachelor of Engineering, Nagoya University

Major Awards

The Medal of Honor with Purple Ribbon, Cabinet office of Japan (2017)
The JIM Distinguished Contribution Award, Japan Institute of Metals and Materials (2015)
The ”HONDA” Frontier Award, The Honda Memorial Foundation (2013)
The “NISTEP” Award (The Researchers with Nice Step), MEXT (2012)
The “SOKEIZAI” Industry Technology Award, Sokeizai Center (2009)
The “MONOZUKURI RENKEI” Award, The Nikkan Kogyo Shinbun Ltd. (2008)
The JIM Meritorious Award, Japan Institute of Metals and Materials (2000)

Other Academic and Professional Activities

Science Council of Japan (Member, 2014-to date)
The Japan Institute of Metals and Materials (Director, 2012-2014)
The Japan Institute of Light Metals (Director, 2015-2018)
The Japan Magnesium Association (Director, 2017-to date)
The Kyushu Magnesium Network (President, 2004-to date)
MEXT “KAKENHI” Program of Grant-in-Aid for Scientific Research on Innovative Areas, “Materials Science of Synchronized LPSO Structure” (Project leader, 2011-2016)
JST “CREATE” Program (Project leader, 2008-2011)

Publications:

Published papers: 306 (from SCOPUS)
Citation: 12,166 (from SCOPUS)
h-index: 59 (from SCOPUS)

CX-13-CLK02

Additive Manufacturing of Ceramic Components with Unique Structures

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Keywords: Additive manufacturing, Ceramics, Components, Powder

Aiming for innovative ceramic manufacturing technologies which enable creative and novel products, a national R&D project “High-Value Added Ceramic Products Manufacturing Technologies (HCMT)” has been initiated since 2014 with 5-year scheme (2014-19) as a part of SIP “Innovative design/manufacturing technologies” program in Japan. The project deals with two key technologies: additive manufacturing (AM) for realizing complex-shaped ceramic products and reducing their lead-times, and hybrid coating on 3D bodies for enhancing their functionality and durability. Following an overview of this project and a brief description on the general status of AM technologies, this talk focuses on the R&D strategies and the final achievements on AM of ceramics in this project. Among a variety of AM approaches, we have employed two AM technologies for making ceramic green bodies; powder layer manufacturing (powder bed fusion or indirect selective laser sintering) and slurry layer manufacturing (vat photo-polymerization or stereolithography), because of their dimensional accuracy, shape-flexibility, density-adjustability, *etc*. The former is a dry forming process, and is suitable for large/porous components, while the latter is a wet one, being good for small/dense parts. In addition, intensive research efforts have been devoted to ceramic laser sintering (direct selective laser sintering) which enables concurrent forming and sintering (saving post-sintering-process). This paper describes several 3D prototype models produced for various application targets using the developed AM technologies, which have unique and complicated structures never attainable with conventional methods. The current issues and future perspective for AM of ceramics will be addressed and discussed as well.

This work was conducted as a part of ”High-value added ceramic products manufacturing technologies project” supported by CSTI, SIP, “Innovative design/manufacturing technologies (managed by NEDO)”.

Tatsuki Ohji is a Fellow of National Institute of Advanced Industrial Science and Technology (AIST), Japan. BS and MS in mechanical engineering from Nagoya Institute of Technology and Ph. D. in inorganic materials engineering from Tokyo Institute of Technology, he has authored or coauthored more than 350 peer-reviewed papers and 20 book chapters, edited more than 40 books and conference volumes, and chaired or co-chaired more than 40 international conferences and symposia. His research interests include mechanical property characterization of ceramics, ceramic composites and porous materials, microstructural design of ceramic materials for better performance, structural control of meso/ macro porous ceramics, and green manufacturing of ceramic components. Fellow of the American Association for the Advancement of Science (AAAS), The American Ceramic Society, ASM International, the Ceramic Society of Japan, and the European Ceramic Society and Academician of the World Academy of Ceramics, he has received numerous awards including John Jeppson Award, Samuel Geijsbeek PACRIM International Award, and ECD Bridge Building Award all from The American Ceramic Society, Academic Achievement Award from the Ceramic Society of Japan, IIM Lectureship Award from ASM International, Honour Medal of Aurel Stodola from the Slovak Academy of Science, Lee Hsun Lecture Award from Chinese Academy of Sciences, and Distinguished Research Achievement Award from the Japan Society of Powder and Powder Metallurgy. He currently serves as President of the American Ceramic Society and an Editor of “Journal of the American Ceramic Society” and “Ceramic International” in addition to an editorial board member of many international journals.

CX-13-CLK03

Detecting bond scission in fracture of soft materials

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Fracture of soft materials is a complex process coupling non linear mechanics and statistical physics[1-2]. Because of the large deformations involved before a crack propagates, molecular damage typically occurs in the bulk of the material and not only in the fracture plane[3]. This is particularly true for tough soft materials where bulk energy dissipation mechanisms such as sacrificial bonds are introduced by design. Until recently the detection of damage ahead of a crack was limited to the detection of crystallization or cavitation, detectable by wide or small angle X-ray scattering or optical visualisation, but molecular bond scission was not directly detectable. However organic chemists have now developed several molecules that respond to applied forces or bond scission by changing their light absorption or emission properties[4-6] providing novel opportunities for materials scientists to gain insight in molecular processes occurring during mechanical loading.

We have incorporated mechanosensitive fluorophore molecules[4] as crosslinkers in model transparent elastomers and studied how these bonds break during macroscopic fracture. Pi-extended anthracene based molecules can be used to obtain high resolution spatial information and the extent of damage can be quantified with suitable calibration samples. We will focus in this talk on the strain rate and temperature dependence of the molecular bond scission in simple networks and demonstrate how the extent of molecular irreversible damage during fracture is highly dependent on the viscoelastic effects.

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Research interests:
mechanical properties of elastomers, deformation, adhesion and fracture of soft polymer networks. mechanochemistry; mechanical properties of hydrogels.

Biographic description:

Costantino Creton graduated in Materials Science from the Ecole Polytechnique Fédérale de Lausanne (Switzerland) in 1985. He then moved on to the Materials Science and Engineering Department of Cornell University (USA) where he obtained his Ph.D in 1991. After a post-doc at the IBM Almaden Research Center (USA), he joined the ESPCI Paris first as a post-doctoral associate in 1993 and, since 1994 as a C.N.R.S. permanent researcher. He was promoted CNRS research director (equivalent to Professor) in 2001 in the Laboratory of Soft Matter Science and Engineering. Since 2019 he is the Dean of Research of the ESPCI Paris

He also holds since 2011 the position of scientific director of the ESPCI Paris, scientific chairman of the Performance Polymers technology area of the Dutch Polymer Institute and has been appointed in 2016, Distinguished Professor at the Global Station for Soft Matter of Hokkaido University.

He has published more than 180 articles in peer-reviewed journals, nine book chapters and has given more than 110 invited and plenary lectures at international conferences. He has received several prizes and awards including the Wake Medal from the UK Society of Adhesion and Adhesives in 2011 and the Adhesion Society's prize for Excellence in Adhesion Science in 2013. He was also elected in 2013 fellow of the American Physical Society and received an ERC Advanced Grant in 2016 to work on fracture of soft materials.

DX-12-CLK01

Atomic-level control of high temperature superconductor materials for unveiling their pairing mechanism

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Keywords: superconductors, molecular beam epitaxy, scanning tunneling microscopy

We investigate the pairing mechanism of high Tc superconductivity in cuprates and iron-pnictides by using state-of-the-art molecular beam epitaxy (MBE)-scanning tunneling microscopy (STM), angle-resolved photoemission spectroscopy and Josephson tunneling experiment. By MBE growth, we are able to prepare superconducting CuO_2 planes in BSCCO and LSCO and FeSe planes in Fe-based pinictides, which provides an unprecedented opportunity to investigate the pairing mechanism in well-controlled manner. We show that the pairing symmetry in both systems is rather conventional. We propose a model for understanding the complicated phase diagram and mechanism of unconventional high temperature superconductivity in the two systems.

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Education
1994 Institute of Physics, Chinese Academy of Sciences (CAS), Ph.D in physics.

Employment
2017 – present Director, Beijing Academy of Quantum Information Sciences.
2013 – present Vice President for Research, Tsinghua University.
2013 – 2014 Dean, Office of Scientifc Research and Development, Tsinghua University.
2011 – present Director, State Key Laboratory of Low-Dimensional Quantum Physics.
2010 – 2013 Chair, Department of Physics, Tsinghua University.
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2005 – present Distinguished Professor, Department of Physics, Tsinghua University.*1999 – 2005* Director, State Key Laboratory for Surface Physics, Institute of Physics, CAS.
1999 – 2007 Professor, Head of Group SF04, State Key Laboratory for Surface Physics, Institute of Physics, CAS.
1994 – 1999 Research Associate, Institute for Materials Research, Tohoku University.

Honors
2016 Future Science Prize-Physical Science Prize
2014 Asian Union of Magnetics Societies Award.
2014 HLHL Achievement Award in Science and Technology.
2014 Qiu Shi Outstanding Scientist Award.
2013 Distinguished Talent of 10000 Talents (Wanren) Program.
2012 Tan Kah Kee Science Award in Mathematic and Physical Sciences.
2011 National Natural Science Award (Second-class) of China.
2011 Qiu Shi Outstanding Scienti_c Research Team Award.
2010 TWAS Physics prize.
2006 HLHL Advancement Award in Science and Technology.
2005 Member of the Chinese Academy of Sciences.
2005 Cheung Kong Distinguished Professor, Ministry of Education.
2005 Outstanding Achievement Award in Science and Technology, CAS.
2004 National Natural Science Award (Second-class) of China.
2004 Young Scientist Prize, the Chinese Association of Science and Technology.
1998 100 Talents Program, the Chinese Academy of Sciences.
1997 Young Scientist Fund, National Natural Science Foundation of China.
1994 President Prize for Excellent PhD Students, CAS.

DX-12-CLK02

Development of Corundum-Structured Gallium Oxide Power Devices by MIST EPITAXY®

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Keywords: Power device, Ga_2O_3, MIST EPITAXY®, corundum family, SBD, MOSFET

For several decades the power electronics industry has relied on Si semiconductor devices. However, the physical limitations of Si have triggered the development of wide bandgap semiconductors, including SiC (Eg = 3.3 eV) and GaN (Eg = 3.4 eV). On the other hand, it is reported that corundum-structured Ga_2O_3 (α-Ga_2O_3) (Eg = 5.3 eV), which is one of the metastable phases in Ga_2O_3 polymorphs, thin films can be obtained by mist chemical vapor deposition (mist-CVD) [1]. Using inexpensive sapphire substrates and mist CVD growth technique, there is a possibility to fabricate Ga_2O_3 devices at low cost.

Gallium oxide takes five different phases (α, β, γ, δ, and ε). The orthorhombic β-gallia structure (β-phase) is the most stable crystal structure [2], and corundum-structure (α-phase) has the widest bandgap among them. As shown in Table 1 and Figure 1, the breakdown electric field (E_c) of α-Ga_2O_3 is about 30 times that of Si and 4 times that of SiC, and that offers the following advantages of α-Ga_2O_3 power devices over counterparts: (1) the thickness of the drift layer of α-Ga_2O_3 can be reduced to 1/30 of that of Si and 1/4 of that of SiC, and also higher doping is possible to the drift layer of α-Ga_2O_3, those combined enable reduction of the drift layer resistance to 1/340 that of Si and 1/6726 that of SiC in unipolar devices; and (2) the use of the same drift layer thickness enables a blocking voltage of 30 times that of Si and 4 times that of SiC. The characteristics (1) would enable further reduction of the on-resistance of unipolar devices. The characteristics (2) would enable the fabrication of devices operating at ultra-high blocking voltages (> 10 kV) and it would be possible to reduce the number of series connected devices required for construction of high power converter systems. Further, the wide bandgap of α-Ga_2O_3 (Eg = 5.3 eV) enables high temperature operation.

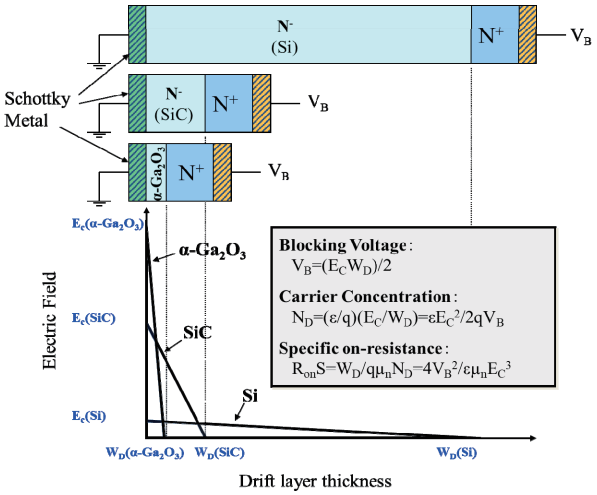

Fig. 1. The reason why low on-resistance can be attained.

In this paper, the development status of Corundum-Structured Gallium Oxide Power Devices, such as SBD [3] and MOSFET [4] will be presented.

Table 1. Comparison of physical properties with competing materials.

Name of material		Si	4H-SiC	GaN	β-Ga_2O_3	α-Ga_2O_3 (Corundum structure)
Bandgap Eg (eV)		1.1	3.3	3.4	4.5	5.3
Mobility μ (cm²/Vs)		1,400	1,000	1,200	300	300 (estimate)
Dielectric breakdown field Ec (MV/cm)		0.3	2.5	3.3	7	10 (estimate)
Relative dielectric constant		11.6	9.7	9.0	10	10 (estimate)
Baliga's figure of merit Si = 1	Low frequency ($\varepsilon\mu E_c^3$)	1	340	870	2,307	6,726 (estimate)
	High frequency (μE_c^2)	1	50	104	117	238 (estimate)

Acknowledgements:
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3) M. Oda, R. Tokuda, H. Kambara, T. Tanikawa, T. Sasaki, T. Hitora, App. Phys. Exp., vol. 9, 021101, 2016.
4) News release from FLOSFIA Inc., http://flosfia.com/20180713/

Biography:
CTO & Director of FLOSFIA Inc.
Fellow, The Institute of Electrical Engineers of Japan (IEEJ)

He had been contributing in many research & development activities on Silicon (Si) and Silicon Carbide (SiC) power devices (SBD, PiN, JFET, MOSFET, IGBT) and their applications (Inverter & Converter for trains) in Toshiba Research and Development Center over 35 years. In addition, he has participated in many national projects on power devices. He joined FLOSFIA Inc. in 2017, and is directing research and development of corundum-structured Ga_2O_3 power devices as CTO & Director.

DX-12-CLK03

Emergent electromagnetism in quantum materials

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Keywords: spin textures, spin-orbit interaction, Berry phase

Most of the physical properties of materials are formulated in terms of the electromagnetic responses. Electrical transport, magnetism, optical properties, dielectric response, superconductivity are all related to the responses of the materials to the electromagnetic field. Therefore, electromagnetism offers a fundamental of materials science. In this talk, I will discuss a new electromagnetism formulated for electronic systems in solids due to their quantum nature. Namely, the manifolds in Hilbert space are characterized by the connection and curvature, which correspond to vector potential and field strength of electromagnetic field, respectively. This geometric picture provides a predicting power for various properties of materials leading to the design of their functions.

Especially in magnets, it often happens that the spin structure is non-collinear as shown in Fig.1. With the tilting of the spins, the quantum mechanical amplitude for the hopping of a conduction electron between the two sites gains a phase factor analogous to the vector potential. This vector potential leads to the emergent electromagnetic field in real space. For example, the three spins subtending a solid angle produce an emergent magnetic field leading to the Hall effect.

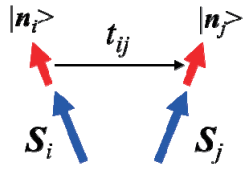

Fig. 1. Spin texture with tilting angle leads to the vector potential a for the transfer integral of conduction electrons.

Various effects viewed from this emergent electromagnetism will be discussed including the nonreciprocal transport and rectification effect, nonreciprocal photovoltaic effects with possible application to solar cell, various Hall responses, multiferroics for insulator spintronics, and nano-scale inductor made from spiral magnets.

References (Example: non-mandatory, 10 point):
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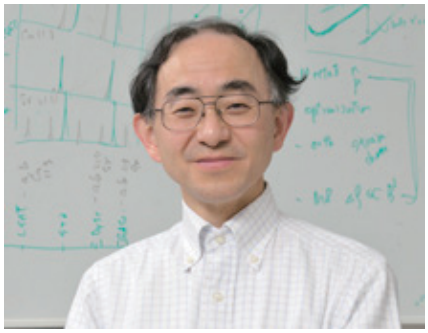
Curriculum Vitae　Naoto Nagaosa



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- Education:
1980 B. S. Dept. of Applied Physics, University of Tokyo
1980-1983 Graduate School of Engineering, University of Tokyo

- Degrees:
1986 University of Tokyo, Ph.D (Physics)

- Appointments:
1983-1986　Research associate, Theory division, Institute for Solid State Physics, University of Tokyo
1986-1989　Research associate, Department of Applied Physics, University of Tokyo
1989-1993　Lecturer, Department of Applied Physics, University of Tokyo
1993-1998　Associate professor, Department of Applied Physics, University of Tokyo
1998-　Professor, Department of Applied Physics, University of Tokyo
2001-2007　Team Leader, Theory Team, Correlated Electron Research Center, Advanced Industrial Science and Technology
2007-2013　Team Leader, Theoretical Design Team, RIKEN
2010-2013　Team Leader, Strong-Correlation Theory Research Team, RIKEN
2013-　Deputy Director, RIKEN Center for Emergent Matter Science (CEMS), Division Director, Strong Correlation Physics Division, RIKEN CEMS Group Director, Strong Correlation Theory Research Group,

EX-11-CLK01

Antiferromagnets for neuromorphics and opto-electronics

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Keywords: antiferromagnets, spintronics, memories, neuromorphics, opto-electronics

Louis Néel pointed out in his Nobel lecture that while interesting from theoretical viewpoint, antiferromagnets did not seem to have any applications. Indeed, the alternating directions of magnetic moments on individual atoms and the resulting zero net magnetization have made antiferromagnets hard to control by tools common in ferromagnets. This has hindered both the research and utility of these abundant magnetic materials. Recent studies have shown, however, that current-induced spin-orbit torque and anisotropic magnetoresistance can be used to efficiently manipulate and detect the Néel vector (1). Switching signals in these first realizations of antiferromagnetic memories where in the fraction of a per cent scale – far from the requirements for practical applications. We will present a concept showing alternative means for electrical or optical switching, spanning a broad range from microseconds to femtoseconds, in memory devices comprising a simple film of an antiferromagnet and showing readout signals in the ~10-100% range. We fabricate analogue memory micro-devices with remarkably reproducible, reversible multi-level switching signals that are insensitive to magnetic fields. Our concept should be generally applicable to the broad family of stray-field-free antiferromagnets and opens research and development directions ranging from microelectronic memory-logic components for spiking neural networks to opto-electronic memory-sensor devices with high temporal and spatial resolution.

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Curriculum Vitae

Tomáš Jungwirth

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Education and professional career:

2007-present	Head of the Department of Spintronics and Nanoelectronics, Institute of Physics, Academy of Sciences of the Czech Republic (ASCR)
2004-present	Professor, University of Nottingham, UK
2001-2007	Senior Research Scientist, Institute of Physics ASCR
2000-2002	Research Fellow, University of Texas, USA
1997-1999	Postdoctoral Fellow, Indiana University, USA
1997	PhD. degree in condensed matter physics, Charles University, Czech Republic
1991	M.S. degree in physics, Charles University, Czech Republic

Professional experience:
condensed matter physics; materials science; collective phenomena; electronic properties of semiconductor heterostructures, low-dimensional systems, and nanostructures; quantum Hall effects; carrier-mediated ferromagnetism in diluted magnetic semiconductors; magnetic, magneto-transport and magneto-optical properties of ferromagnetic semiconductors; spin-orbit coupling phenomena; anisotropic magnetoresistace in magnetic bulk and nano-devices; anomalous and spin Hall effects; non-magnetic, ferromagnetic, and antiferromagnetic metal and semiconductor spintronics

Accomplishments, awards, memberships:

- 225 publications, including 4 in Reviews of Modern Physics, 29 in Physical Review Letters, 30 in Nature/Science family journals; h-index 54 (WoS); ∼ 12, 000 citations (∼ 1, 500 in 2017); ∼ 150 invited talks at international conferences and colloquia since year 2000
- Member of the Scientific Council of the European Research Council, 2015-
- Member of the Academy of Europe (Academia Europaea), 2014-
- European Research Council Advanced Grant, 2011-2016
- Member of the European Research Council Evaluation Panel, 2009-2015
- Praemium Academiae, 2008-2014
- Academy of Sciences of the Czech Republic Prize, 2005
- Otto Wichterle Prize of the Academy of Sciences of the Czech Republic, 2002
- NATO-NSF Advanced Fellowship, 2000
- Bolzano Foundation Prize of the European Physical Society, 1996
- Josef Hl´avka Prize, 1996
- Milan Odehnal Prize of the Union of Czech Mathematicians and Physicists, 1996

EX-11-CLK02

Quantum Criticality in Organometallics Studied by Neutrons & Muons

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Keywords: quantum magnetism, neutron scattering, muon spin spectroscopy

Quantum phase transitions have been in the center of attention for scientists world-wide to understand the universality of quantum critical behavior in many-body systems. Gapped Heisenberg spin-½ systems have the potential to exhibit quantum critical phenomena in their excitation spectra as a function of *e.g.* magnetic field and pressure. In such compounds, tuning of the spin gap exercises a control of the ground state and enables the study of novel fundamental many-body phenomena. In this keynote I will give a brief overview on how we are able to build tailored spin compounds using organometallic frameworks and how to experimentally study their intrinsic properties using complementary neutron [1-3] and muon [4] techniques. Further, I will show how it is possible to induce quantum criticality in the quantum spin-liquid compound $[C_4H_{12}N_2][Cu_2Cl_6]$ using both magnetic field and hydrostatic pressure. Finally, I will also show future extensions for how to use an organic materials data base (OMDB) and advanced machine learning to model, search and identify future interesting compounds for targeted synthesis and characterizations [5,6].

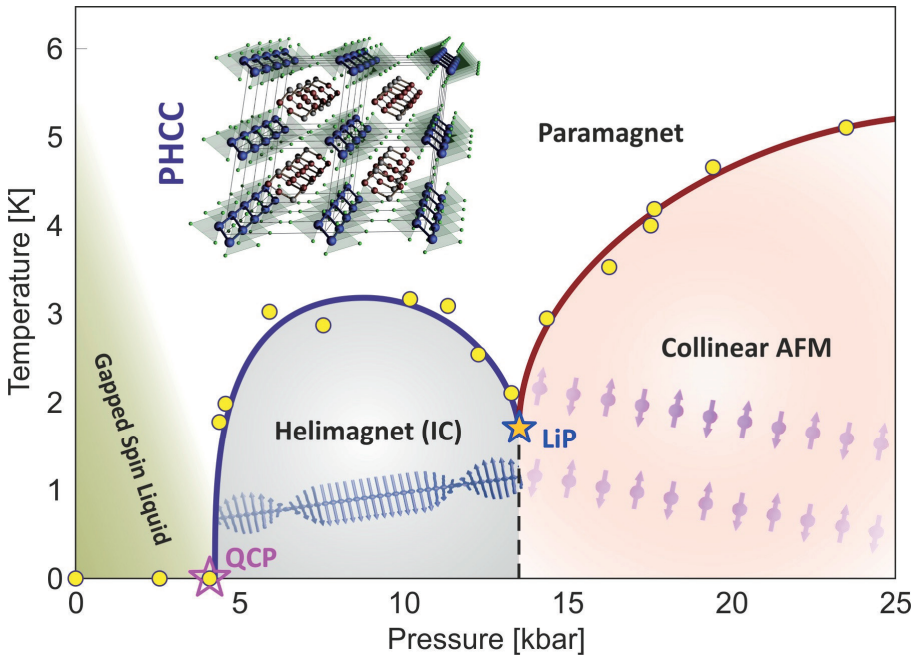

Figure 1: Pressure-Temperature phase diagram for the quantum spin-liquid compound $[C_4H_{12}N_2][Cu_2Cl_6]$, also known as Piperazinium hexachloro - dicuprate (PHCC)

References

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[3] D. Hüvonen, *et al.*, Physical Review B **88**, 094402 (2013)
[4] M. Thede, M. Månsson, *et al.*, Physical Review Letters **112**, 087204 (2014)
[5] https://omdb.mathub.io/ [2019]
[6] J. Hellsvik, M. Månsson, A.V. Balatsky, *et al.*, arXiv:1907.01817

Your Portrait:

Your C.V.

Martin Månsson is an experimental physicist with a PhD in materials physics from KTH Royal Institute of Technology in Stockholm with a thesis focusing on angle-resolved photoelectron spectroscopy (ARPES) investigations of correlated electron systems, *e.g.* high-temperature superconductors (HTSC). Subsequently he spent seven years in Switzerland as a postdoc and scientist at the Paul Scherrer Institute (PSI), ETH Zurich and EPF Lausanne. Here he focused on studying novel energy materials (in collaboration with Toyota Central R&D Labs.) as well as quantum magnetism using neutron scattering and muon spin rotation/relaxation (μ^+SR) techniques. Since 2015 he has returned to Stockholm and KTH where he is currently holding a tenured Assoc. Professor position in Applied Physics as well as Neutron Scattering. In addition to running a comprehensive research program on both sustainable energy materials as well as strongly correlated electron physics he is also highly involved in the strategic developments and educational efforts connected to the construction of the European Spallation Source (ESS) in Sweden. Among other things, he is *e.g.* the Director of Studies for the Swedish national graduate school in neutron scattering (SwedNess).

EX-11-CLI03

Probing antiferromagnets with currents

O. Gladii[1], R. L. Seeger[1], L. Frangou[1], G. Forestier[1], A. Hallal[1], P. Noël[1], S. Auffret[1], M. Rubio-Roy[1], I. Joumard[1], L. Vila[1], M. Chshiev[1], C. Gomez[2], S. Gambarelli[3], M. Houzet[4], *V. Baltz[1]

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Keywords: antiferromagnets, spin fluctuations, spin-charge conversion

The paradigm shift consisting of using the spin-dependent transport properties of antiferromagnets in electronics led to many exciting challenges.[1),2)]

In this talk, we will first discuss the nature of a spin current flowing through fluctuating antiferromagnets and distinguish between electronic and magnonic spin transport. The method used to inject the spin currents involved ferromagnetic resonance and spin pumping in ferromagnetic-spin-injector/(non-magnetic-spin-conductor)/antiferromagnetic-spin-sink multilayers. Three typical cases will be presented, magnonic spin flow in the insulating antiferromagnets NiO and NiFeOx, electronic spin flow in the metallic antiferromagnet IrMn, and electronic and magnonic parallel spin flows in IrMn when the latter is directly exchange coupled to the ferromagnetic-spin-injector. In this latter case, how it is possible to unravel the spin injection efficiency of the two types of spin flows will be demonstrated. We will also demonstrate how linear spin fluctuations enhance spin injection in spin-sinks (Fig. 1) and show why this is pertinent for studies of critical phenomenon like magnetic phase transitions in ultra-thin films. To show the far-reaching practical relevance of the method, extension to various phase transitions will be presented.[3)-6)] In search for spin fluctuations in several antiferromagnetic spin-sinks, we will also discuss how we found experimental evidence of self-induced spin-charge conversion in the spin-injector, corroborating the results of first-principle calculations.[7),8)] Beyond spin currents, we will finally present a stimulating example of how antiferromagnets and superconductors may envision a common future by showing how to infer essential information about domain walls using Cooper pairs through antiferromagnets.[9),10)]

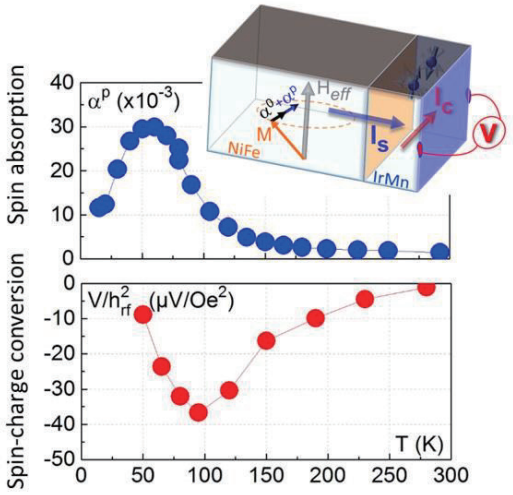

Fig. 1. Increased spin absorption due to the spin fluctuations of the absorber near its magnetic phase transition (here, the IrMn antiferromagnet). The expected increase of the spin-charge conversion in the absorber is masked by self-induced conversion in the injector (here, the NiFe ferromagnet).

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9) A. I. Buzdin, Rev. Mod. Phys. 77, 935 (2005).
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BALTZ Vincent

Vincent Baltz (born 1979) received the Ph.D. degree in physics in 2005 and the H.D.R. 'Habilitation à diriger des recherches' degree in physics in 2014 from the University of Grenoble, France. He has been conducting research in magnetism and spintronics with SPINTEC since 2007 as a C.N.R.S. research scientist. Before that, he was a post-doctoral fellow at the University of Leeds in the condensed matter group in the frame of a Marie-Curie European research training network.

His research interests include magnetic heterostructures with current focus on antiferromagnetic spintronics. His fields of expertise include magnetic relaxation, transfer of angular momentum, spin fluctuations, spin-charge conversion, and exchange bias coupling.

He is familiar with supervisions at the master, doctoral and post-doctoral level, was the coordinator of several funded projects, contributed to several committees, is accustomed to organization of workshops and conferences, and authored several publications (71 including 1 RMP, 16 PRB, and 5 PRL, ~2000 citations).

EX-11-CLI04

Nanocrystalline formation of the iron-based soft magnet FINEMET studied by operando muon spin rotation technique

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Keywords: FINEMET, soft magnetic material, nanocrystalline grain, operando measurement, μSR

FINEMET® has prevailed in our daily life. It was discovered in 1988 by Yoshizawa *et al.* that nano-sized grains formed by heat treatment of Fe-Cu-Nb-Si-B amorphous alloy exhibit superior soft magnetic behavior. Because of the high permeability and the high saturating magnetization, as well as the quite small magnetostriction, FINEMET® becomes widely used in many electronic power devices in these days. Accelerator facilities are no exception. It is emphasized that J-PARC (Japan Proton Accelerator Research Complex) is a pioneer to utilize FINEMET® as the wideband RF cavity.

Besides the high functionality, the microscopic mechanism of the nanocrystalline formation under magnetic field is yet to be clarified. It is well-known that the magnetic properties are controlled by applying magnetic field during the heat treatment. This gives an idea that the magnetic entropy plays an important role on the nano-crystal growing. Muon is a local magnetic probe, which sensitively detects the formation of ferromagnetic nano-crystals in FINEMET®. Moreover, the world's highest pulsed muon beam in J-PARC provides us an opportunity of *in situ* observation of time-derived development of the magnetic grains. Since 2010, we have started studying the nanocrystalline formation of FINEMET® under magnetic field at elevated temperature by using operando muon spin rotation (μSR) technique. The field-dependent behavior of nanocrystalline formation is reported.

1997 Doctor of Science, Osaka University
1999 Postdoctoral Fellow, Meson Science Laboratory, High Energy Accelerator Research Organization (KEK)
2002 Research Fellowship for Young Scientists, Japan Society for the Promotion of Science
2005 Research Associate, Muon Science Laboratory, High Energy Accelerator Research Organization (KEK)
2006 Muon Section, Meterials and Life Science Division, J-PARC center
2019 Associate Professor, Muon Science Laboratory, High Energy Accelerator Research Organization (KEK)

FX-12-CLK01

Hard X-ray spectro-ptychography: Visualization of heterogeneous oxygen storage behavior in three-way catalyst particles

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Keywords : X-ray spectro-ptychography, Oxygen storage, Three-way catalysts

X-ray ptychography is a rapidly emerging technique at synchrotron facilities, which can non-destructively observe thick samples at the nanoscale. So far, we have developed the techniques for high-resolution and high-sensitivity hard X-ray ptychography using total-reflection mirrors as the X-ray focusing device at SPring-8 in Japan [1,2]. The use of X-rays as a probe makes it possible to image both structures and chemical states through the absorption edges of a target element. X-ray ptychography using multiple energies including the absorption edge of a specific element, which is often referred to as X-ray spectro-ptychography, enables us to visualize the chemical state of nanostructures buried within thick samples. Hard X-ray spectro-ptychography (HXSP) is a promising tool for effectively and efficiently tackling the intrinsically complicated mesoscale materials science and chemistry.

Recently, we have demonstrated the two-dimensional(2D) visualization of the cerium valence in micrometer-size platinum-supported cerium-zirconium oxide $Pt/Ce_2Zr_2O_x$ (x=7–8) three-way catalyst particles at better than 50 nm resolution by HXSP [3]. However, significant ambiguities, especially regarding the three-dimensional(3D) oxygen-diffusion-driven cerium oxidation tracking areas in individual $Pt/Ce_2Zr_2O_x$ particles during the heterogeneous oxygen storage process, remain in the 2D images derived from projection of the structure and valence state along the optical axis. 3D HXSP combined with computed tomography can completely visualize the chemical states inside bulk materials, although the huge amount of structural and chemical data in real 3D space. Very recently, we have proposed the approach of 3D HXSP imaging coupled with unsupervised learning to achieve the 3D nanoscale chemical imaging of heterogeneous reaction events in bulk solid materials [4]. The 3D HXSP method allowed realization of 3D nanoscale imaging of the structure and valence state inside individual $Pt/Ce_2Zr_2O_x$ particles during the oxygen storage process. Unsupervised data mining of the visualized 3D nanoscale chemical maps then successfully revealed the concealed heterogeneous oxygen-diffusion-driven 3D nanoscale Ce oxidation tracking areas inside the individual mixed-oxide particles during the oxygen storage process.

3D HXSP is expected to be an indispensable tool for determining the relationships between the structure and function of heterogeneous functional materials. In particular, in next-generation synchrotron facilities where fluxes with much higher coherence will be achieved, the present approach will be applied to in-situ 3D measurements, which can be expected to significantly accelerate progress in mesoscale materials science and chemistry.

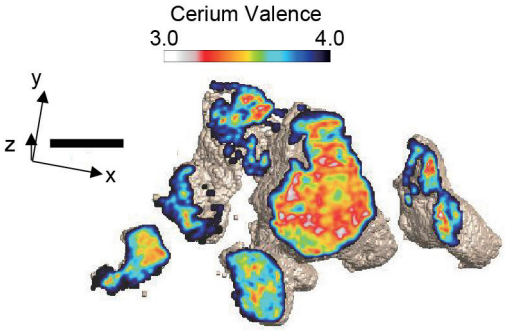

Fig. 1. 3D Ce valence image of $Pt/Ce_2Zr_2O_x$ particles. The scale bar is 700 nm.

References

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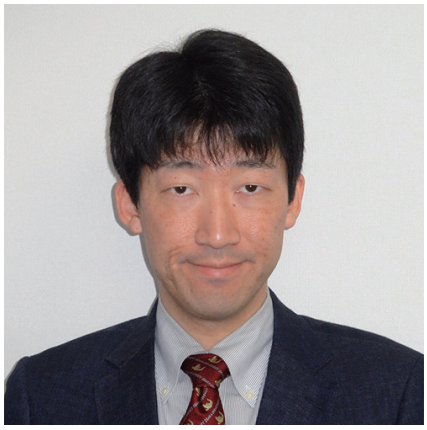

Brief Personal History:

Yukio Takahashi is a professor at the Institute of Multidisciplinary Research for Advanced Materials (IMRAM), Tohoku University. His research interests lie in the development of new coherent X-ray imaging techniques for characterization of functional materials. He received his PhD degree in engineering from the Tohoku University in 2004. After a two-year postdoctoral researcher at the RIKEN SPring-8 Center, he became a lecturer at the Osaka University in 2007 and an associate professor in 2011. He became a professor at the Tohoku University in 2019.

FX-12-CLK02

Quantifying Inactive Lithium in Lithium Metal Batteries

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Keywords: lithium metal, inactive lithium, quantification, failure mechanism, mitigation strategies

Inactive lithium (Li) formation is the immediate cause of capacity loss and catastrophic failure of Li metal batteries. However, the chemical component and the atomic level structure of inactive Li have rarely been studied due to the lack of effective diagnosis tools to accurately differentiate Li^+ in solid electrolyte interphase (SEI) components and the electrically isolated unreacted metallic Li^0, which together comprise the inactive Li. In this work, by establishing a new analytical method, Titration Gas Chromatography (TGC), we accurately quantify the contribution from unreacted metallic Li^0 to the total amount of inactive Li. We identify the Li^0, rather than the Li^+ in SEI, as the dominating cause for the inactive Li and capacity loss. Using cryogenic electron microscopies to further reveal the micro- and nanostructure of inactive Li, we find that the Li^0 is surrounded by insulating SEI, losing the electronic conductive pathway to the bulk electrode. Coupling the measurements of the Li^0 global content to observations of its local atomic structure, we reveal the formation mechanism of inactive Li in different types of electrolytes, and identify the true underlying cause of low Coulombic efficiency in Li metal deposition and stripping. We ultimately propose strategies for highly efficient Li deposition and stripping to enable Li metal anode for next generation high energy batteries.

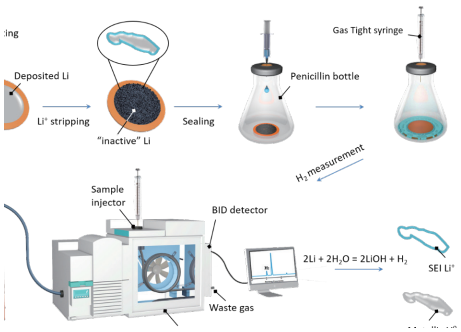

Fig. 1. Schematic working principle of the TGC method.

References:
1) C. Fang, Y.S. Meng* *et al*, Quantifying Inactive Lithium in Lithium Metal Batteries, Nature, accepted, 2019

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Assistant Professor, Materials Science and Engineering, University of Florida in 2009
Assistant Professor (2009-2013), Associate Professor (2013-2017) and Full Professor (2017 – present) at NanoEngineering, University of California, San Diego
Principal Investigator of Laboratory for Energy Storage and Conversion, http://smeng.ucsd.edu/
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PROFESSIONAL MEMBERSHIP/AWARDS

- Founding Director of Sustainable Power and Energy Center, http://spec.ucsd.edu/
- Serve as Executive Board Member and Secretary (Elected) for Battery Division of the Electrochemical Society USA (2014 – present)
- Serve as the Executive Board Member and Treasurer for International Battery Association (IBA) (2017 – present)
- Fellow of the Electrochemical Society (2018 – present)
- Faculty Excellence Award in Research in Science and Engineering (2019)
- International Battery Materials Association IBA2019 Research Award (2019)
- IUMRS-Singapore Young Scientist Research Award (2017)

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   S. Hy, H. D. Liu, M. Zhang, D. Qian, B.-J. Hwang and Y. S. Meng*-**Energy & Environmental Science**, 2016, 9, 1931
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GX-13-CLK01

Soft Electronic and Robotic Systems

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Keywords: Soft Electronics, Soft Robotics, Electronic Skins, Biodegradable materials, Tough Hydrogels, Stretchable Electronics, Soft Sensors

Electronics of tomorrow will be imperceptible and will form a seamless link between soft, living beings and the digital world. Exploring the fundamental physics, mechanical form factors, and materials required to meet the needs of this new generation of *soft* electronics and *soft* machines is driving multidisciplinary research worldwide. Weight, flexibility and conformability are pivotal for future wearable, soft and stretchable electronics to proliferate. The abilities to be imperceptible, epidermal, transient and self-healing are fueling the vision of autonomous smart appliances to be embedded everywhere, on textiles, on our skin, and even in our body.

This talk introduces a technology platform for the development of large-area, ultrathin and lightweight electronic and photonic devices, including solar cells, light emitting diodes and photodetectors, active-matrix touch panels, implantable organic electronics, imperceptible electronic wraps and “sixth-sense” magnetoception in electronic skins. Air stable perovskite solar cells, only 3 µm thick, endure extreme mechanical deformation and have an unprecedented power output per weight of 23 W/g. Highly flexible, stretchable organic light emitting diodes are combined with photodetectors for on-skin photonics and pulse oximetry, providing electrical functionality in yet unexplored ways. Tactile sensor arrays based on active-matrix organic thin film transistors can be operated at elevated temperatures and in aqueous environments as an imperceptible sensing system that ensures the smallest possible discomfort for patients requiring medical care and monitoring. Combined with organic amplifiers and biocompatible conductive gels, we demonstrate *in vivo* recording of vital signals. E-skins with GMR-based magnetic field sensors equip the wearer with an unfamiliar sense that enables perceiving of and navigating in magnetic fields. These large area sensor networks build the framework for electronic foils and artificial sensor skins that are not only highly flexible but become highly stretchable and deployable when combined with engineered soft substrates such as elastomers, shape memory polymers or hydrogels. We show mobile health monitoring systems, smart, tissue-like electronics and soft robots that utilize tough hydrogels as soft transducers, generators and adaptive lenses. A newly developed direct writing method for ultrathin oxide dielectrics and semiconductors will allow low-cost and large area fabrication of such soft systems.
Tackling issues of sustainability and resourceful production, we here introduce materials and methods for soft systems that facilitate a broad range of applications, from transient wearable electronics to metabolizable soft robots. These embodiments are reversibly stretchable, are able to heal and are resistant to dehydration. Our forms of soft electronics and robots – built from resilient biogels with tunable mechanical properties – are designed for prolonged operation in ambient conditions without fatigue, but fully degrade after use through biological triggers. Electronic skins merged with imperceptible foil technologies provide sensory feedback such as pressure, strain, temperature and humidity sensing in combination with untethered data processing and communication through a recyclable on-board computation unit. Such advances in the synthesis of biodegradable, mechanically tough and stable iono-and hydrogels may bring bionic soft systems a step closer to nature.

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Kaltenbrunner is a full professor at the Johannes Kepler University, heading the Soft Matter Physics Department and the LIT Soft Materials Lab. He received his master's and PhD degrees in physics from the Johannes Kepler University in 2008 and 2012, respectively. He then joined the Someya–Sekitani Lab for Organic Electronics at The University of Tokyo as postdoctoral researcher prior to his present position. Kaltenbrunner's research interests include soft electronics and machines, biodegradable soft materials, photovoltaics, lightning and thin film transistors, soft transducers and robotics, flexible and stretchable electronics, and electronic skin.

GX-13-CLK02

Design, development, and doping of novel inorganic optoelectronic functional materials

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Keywords: Optoelectronic devices, Materials design, Doping, Defects, Density functional theory

Many functional oxide materials are already used for active components of optoelectronic / mechanical devices such as piezoelectric actuators / gyroscopes, non-volatile memories such as ferroelectric RAM, positive temperature coefficient (PTC) thermistors, electrochromic anti-dazzle mirrors and so on. As for thin-film transistors (TFTs), the first proposal was given with CdS in 1961 by following the proposal of Si MOS field-effect transistors (FETs) in 1960. History of oxide FETs goes back also to mid 60's with SnO_2, In_2O_3 and ZnO FETs. However, the oxide TFT research had disappeared from open-accessible literatures after that, due probably to their instability. After the long incubation period, revival of oxide TFT research came up in 1996 as SnO_2 FET, and poly ZnO TFT has attracted intensive interest for overtaking the a-Si TFT technology. On the other hand, as known, e.g., in poly-Si TFTs, carrier transport, and device performances, and their stability are affected seriously by grain boundary issues in polycrystalline semiconductors. Amorphous oxide semiconductors (AOSs) represented by a-In-Ga-Zn-O (a-IGZO) then gathered practical interest due to their advantages over polycrystalline semiconductors; i.e., they are free from the grain boundary issues, their devices are fabricated at low temperature even at room temperature on glass / plastic substrate as well as they possess satisfactory high electron mobilities >10 $cm^2/(Vs)$; thus, they are now employed in many flat-panel displays from very high-resolution liquid-crystal displays to jumbo (up to 88 inch diagonal) organic light-emitting diode TVs. Although they are already commercialized, there remain many issues on their stability, and these are related closely to defects. Also for crystalline semiconductors, carrier doping is essential to develop new semiconductor materials and devices, while doping capability is often inactivated by so-called 'self-compensation' effects in particular for wide bandgap materials such as oxides and nitrides; therefore, understanding and control of such defects are critical to design and develop new functional materials.

In this paper, we will discuss what we need to consider to design and develop new functional materials with assistance of first-principles density functional theory (DFT) calculations. It will cover several categories of materials such as AOSs, ultrawide band gap materials, semiconductors, light-emitting materials, and thermoelectric materials, and also refer to the applications of DFT to extrapolating new materials, synthesizing high-quality materials with less defects, designing effective doping routes etc.

Toshio Kamiya started his research carrier as an assistant professor of Department of Inorganic Materials at Tokyo Tech., Tokyo, Japan, in 1991, and moved to Interdisciplinary Graduate School of Science and Engineering in 1996. He received the Dr(Eng) degree in materials science from Tokyo Institute of Technology in 1996. He spent two years at Microelectronics Research Centre, Cavendish Laboratory at the University of Cambridge as a visiting scholar from 2000 to 2002. He became an associate professor in 2002 and a full professor in 2010 in the Materials and Structures Laboratory at Tokyo Institute of Technology. He became the vice director of Materials Research Center for Element Strategy in 2012, and the director of Laboratory for Materials and Structures & vice director of Institute of Innovative Research in 2017.

His field of research includes exploration, materials design, and device applications of new functional inorganic materials. He has published about 400 scientific papers. He was awarded with The Ceramics Grand Prize by The Ceramics Society of Japan in 2016, SID Special Recognition Award in 2015, The CerSJ Awards for academic achievements in ceramic science and technology in 2013, Tejima Research Award (Invention) in 2011, The Young Scientists' Prize by MEXT in 2007, The Advanced Technology Award by the Fuji-Sankei group in 2005, etc, and the Fellow of The Japan Society of Applied Physics and The Ceramic Society of Japan.

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April, 1986 – March, 1990: Undergraduate course at Department of Inorganic Materials, Faculty of Engineering, Tokyo Institute of Technology (Bachelor of Engineering)

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March, 1992: Leave Department of Inorganic Materials, Tokyo Institute of Technology

December, 1996: Obtain Doctor of Engineering at Department of Inorganic Materials, Tokyo Institute of Technology for Study on Dielectric Crystals by First-Principles and Molecular Simulations

Professional Appointments

April, 1992: Assistant Professor of Department of Inorganic Materials, Tokyo Institute of Technology

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January, 2002: Lecturer at Materials and Structures Laboratory, Tokyo Institute of Technology

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GX-13-CLK03

Gold Nanorods with Ultranarrow LSPR Bands

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Keywords: gold nanorods, seeded growth, localized surface plasmon resonance, ultrafast lasers

Although seeded-growth methods have made available to us an extensive library of anisotropic metal nanoparticles, the chemical complexity of the growth solution, often involving organic additives, and the structural instability of the seeds hinder the quest for high quality products. For the sake of synthetic simplicity, merging different synthetic protocols by finding common growth routes, is a mandatory step to reach a universal growth mechanism and reproducible fabrication. This communication will introduce two recent discoveries, related to improving the optical quality of both pentatwinned and single crystal gold nanorods.

We recently demonstrated that a thermal treatment of small seeds results in extensive twinning and a subsequent drastic yield improvement (>85%) in the formation of different types of pentatwinned nanoparticles, including nanorods, with a high monodispersity and tunable aspect ratio.

On the other hand, although single crystal Au nanorods can be readily obtained with very high quality directly from optimized seeded growth methods, polydispersities below 10% are still difficult to reach, which leads to some broadening of the longitudinal LSPR band. We show here that femtosecond laser irradiation may lead to significant narrowing of the LSPR band, even to the limit of the single particle, as calculated from theoretical models, meaning pure “optical monodispersity”.

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Luis Liz-Marzán is Ikerbasque Professor and Scientific Director of the Center for Cooperative Research in Biomaterials, CIC biomaGUNE, in San Sebastián (Spain), since September 2012. He graduated in chemistry from the University of Santiago de Compostela, was postdoc at Utrecht University and Professor at the University of Vigo, Spain (1995–2012). He has been Invited Professor at Tohoku University, University of Michigan, University of Melbourne, University of Hamburg, the Max-Planck Institute of Colloids and Interfaces, King Saud University, Ecole Normale Supérieure Paris-Saclay and Jiangnan University. Liz-Marzán received numerous research awards, including a Humboldt research award, ACS Nano lecture award, Langmuir lectureship, Rhodia Prize of the European Colloid and Interface Society, Medal of the Spanish Royal Society of Chemistry, Rey Jaime I award, National Chemistry Prize of Spain, as well as 2 ERC Advanced Grants. He is also member of the Royal Spanish Academy of Sciences, the European Academy of Sciences and Academia Europaea. He is a highly cited researcher who has co-authored over 450 publications and 8 patents, and has delivered over 450 invited lectures and seminars worldwide. Liz-Marzán has supervised over 30 PhD students and 50 postdocs, many of them holding academic positions worldwide. He is currently associate editor of ACS Nano, has been senior editor of Langmuir and co-editor of ACS Omega, and serves in the editorial boards of various other journals, including Science. His major research activity is devoted to understand the growth mechanisms of metal nanocrystals, to tailor their surface chemistry and thereby directing their self-assembly. He also works on the design of biomedical applications based on the plasmonic properties of well-defined metal nanoparticles and nanostructures, including surface enhanced Raman scattering.

GX-13-CLK04

Perovskite Solar Cells: History, Progress and Perspective

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Keywords: Perovskite, Solar Cell, High Efficiency, Large-area

Since the first report on the 9.7% efficiency, 500 h-stable solid-state perovskite solar cell (PSC) in 2012 by our group, following two seed works on perovskite-sensitized liquid junction solar cells in 2009 (Miyasaka et al) and 2011 (Park et al), a power conversion efficiency (PCE) of 25.2% was recorded in 2019. According to Web of Science, publications on PSC increase exponentially since 2012 and total number of publications reaches over 13,000 as of August 2019, which indicates that PSC is considered as promising photovoltaics.

Although high photovoltaic performance was achieved from small area cell, scalable technologies are required for commercialization of PSC. In order to shift from small-area device to large-area module, the cheap materials and an effective coating procedure are highly required. We developed cost-effective materials based on delta $FAPbI_3$ powder for high efficiency PSC. The best PCE of 22.6% was achieved using the synthesized perovskite powder (certified stabilized efficiency was 21%). For large-area uniform perovskite coating, a precursor solution containing perovskite cluster was developed. Homogeneous $MAPbI_3$ perovskite film (>100 cm^2) was D-bar coated within 20 s, which demonstrated the PCE approaching 18%. Bifacial stamping technique was developed, which led to both high quality $FAPbI_3$ and $MAPbI_3$ on a large scale at milder condition. For higher efficiency, managing interfacial recombination is of critical importance. Interfacial engineering with organic or inorganic materials is found to improve voltage and fill factor, confirming that reduction in recombination can result in improvement of photovoltaic performance of PSC.

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Nam-Gyu Park is Distinguished professor and SKKU-Fellow at School of Chemical Engineering, Sungkyunkwan University (SKKU). He received his B.S. degree in chemical education, M.S. and Ph.D. degrees in chemistry from Seoul National University in 1988, 1992 and 1995, respectively. He worked at ICMCB-CNRS, France, from 1996 to 1997 and at National Renewable Energy Laboratory, USA, from 1997 to 1999 as postdoctoral researchers. He was director of solar cell research center at Korea Institute of Science and Technology (KIST) from 2005 to 2009 and principal scientist at Electronics and Telecommunications Research Institute (ETRI) from 2000 to 2005 before joining SKKU as a full professor in 2009. He is a fellow of Korean Academy of Science and Technology (KAST) since 2017. He has been working on high efficiency mesoscopic nanostructured solar cells since 1997. *He is pioneer of solid-state perovskite solar cell, which was first developed in 2012*. He was selected as *a New Class of Nobel Prize-Worthy Scientists* in September 20, 2017 and included in *highly cited researchers* (*top 1% scientists*) in Nov. 15, 2017 and Nov. 27, 2018 by Clarivate Analytics. He received awards including Scientist Award of the Month (2008), KIST Award of the Year (2009), Dupont Science and Technology Award (2010), SKKU fellowship (2013 and 2018), PVSEC Hamakawa Award (2015), Dukmyung KAST Engineering Award (2016), ACS-KCS Excellence Award (2018), and Samsung *Ho-Am Prize* (2018). Prof. Park has currently more than 300 refereed publications and more than 70 patents. He received H-index of 84 (google scholar). He is senior Editor of ACS Energy Letters and serves on the Editorial Advisory Board for Chem. Rev., ChemSusChem, and Solar RRL.

HX-11-CLK01

Photocatalytic water splitting for solar hydrogen production

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Keywords: Particulate photocatalyst, Photocatalyst sheet, Panel reactor, Scalability, Non-oxide, Cocatalyst

Sunlight-driven water splitting has been studied actively for production of renewable solar hydrogen as a storable and transportable energy carrier.[1)] Both the efficiency and the scalability of water-splitting systems are essential factors for practical utilization of renewable solar hydrogen. Particulate photocatalyst systems do not involve any secure electric circuit and can be spread over wide areas by inexpensive processes potentially. It is therefore important to activate particulate photocatalysts and develop their reaction systems.

$SrTiO_3$ is a photocatalyst active in overall water splitting under UV light irradiation with loading of proper cocatalysts. The author's group has found that doping Al into $SrTiO_3$ boosts the water splitting activity by two orders of magnitude.[2)] Through tuning of the preparation and modification methods of Al-doped $SrTiO_3$, the apparent quantum yield of photocatalytic water splitting has been upgraded to 56% and even greater at 365 nm. Panel reactors are studied to spread such active particulate photocatalysts (Fig. 1). Particulate photocatalysts are thinly fixed on substrates, and such “photocatalyst sheets” are contained in panel reactors. A panel reactor containing Al-doped $SrTiO_3$ photocatalyst sheets releases product hydrogen and oxygen gas bubbles at a rate corresponding to a solar-to-hydrogen energy conversion efficiency of 10% under intense UV illumination even when the water depth is merely 1 mm, and it can maintain the activity over several months under sunlight illumination.[3)] A 1-m^2-sized photocatalyst panel reactor splits water under natural sunlight irradiation without a significant loss of the intrinsic activity of the photocatalyst sheets.[2)] Panel-type reactors can accommodate various kinds of photocatalysts sheets and are expected to be built using light and inexpensive materials, being suitable for large-scale solar hydrogen production from water.

In practice, it is essential to develop photocatalysts active under visible light irradiation. Various oxides, (oxy)nitrides, and (oxy)chalcogenides have been developed.[4)] Some non-oxide photocatalysts can split water into hydrogen and oxygen under irradiation of up to approximately 600 nm. Two different photocatalysts can also be combined so that hydrogen and oxygen are evolved on the respective photocatalysts efficiently.

In my talk, the latest progress in photocatalytic materials and reactors and concepts toward large-scale demonstration will be presented.

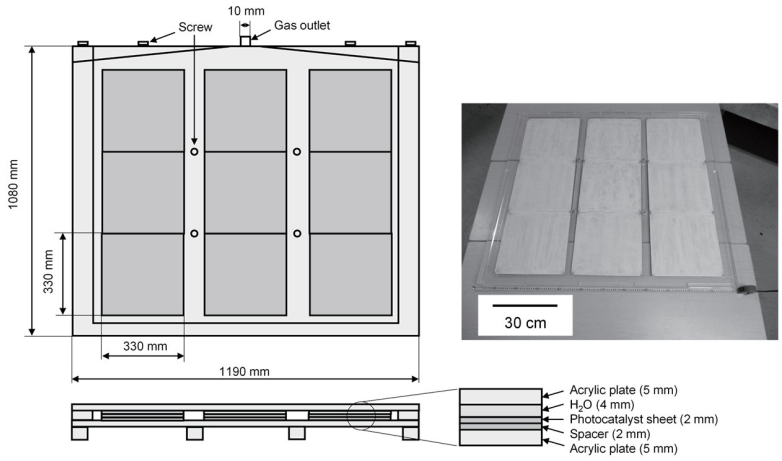

Fig. 1. A 1-m^2-sized photocatalyst panel reactor accommodating photocatalyst sheets. Reprinted with permission from ref. 2. Copyright © 2017 Elsevier Inc.

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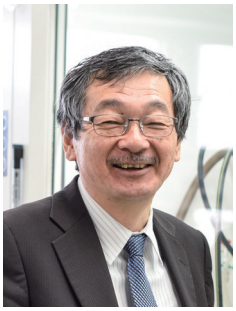
Curriculum Vitae:



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Research interests:

- Development of photocatalysts for water splitting and solar hydrogen production
- Study on reaction mechanisms of heterogeneous catalysis by Infrared Spectroscopy
- Surface reaction dynamics by nonlinear laser spectroscopy
- Development of new functional materials for catalysis

Academic Background:

- 1976 B.S. The University of Tokyo
- 1979 M.S. The University of Tokyo, School of Science
- 1982 Ph.D. The University of Tokyo, School of Science

Professional Career:

- 1982-1990 Associate Researchers, Chemical Resources Laboratory, Tokyo Institute of Technology
- 1990-1996 Associate Professor, Chemical Resources Laboratory, Tokyo Institute of Technology
- 1996-2004 Professor, Chemical Resources Laboratory, Tokyo Institute of Technology
- 2004-2019 Professor, Department of Chemical System Engineering, School of Engineering, The University of Tokyo
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- 2017-present Special Contract Professor, Cross appointment, Center for Energy & Environmental Science, Shinshu University
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- 2007; Catalysis Society of Japan Awards
- 2011; The Chemical Society of Japan Awards
- 2018; The Japan Petroleum Institute Award
- 2018; The Japanese Photochemistry Association Lectureship Award
- 2019; Lee Hsun Lecture Award
- 2019; Advance of Catalysis Award of APACS

HX-11-CLK02

Plasma Synthesis, Conversion, and Processing of Energetic Materials

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Keywords: gliding arcs, pulsed plasma, methane conversion, polymeric nitrogen

Presentation reviews latest experimental results obtained in Nyheim Plasma Institute of Drexel University on plasma-chemical material treatment processes, focused on liquid and gas fuel conversion and processing, as well as on plasma-chemical synthesis of novel energetic materials in non-thermal plasma discharges. Major discharges in focus are:

1. *Non-equilibrium gliding arcs stabilized in reverse vortex Tornado flow:*

Physics and plasma parameters of gliding arcs will be discussed in relation to their material processing abilities and effectiveness

2. *Micro- and nanosecond pulsed dielectric barrier discharges*

Physics and plasma parameters of pulsed DBD in gases and liquids will be discussed in relation to their material processing abilities and effectiveness

3. *Cold and transitional discharges in liquids*

Physics and plasma parameters of cold discharges in liquids without bubbles will be discussed in relation to their material processing abilities and effectiveness

Major specific plasma-chemical processes in focus are:

1. Methane conversion in mixture with different gases
2. Methane (natural gas) direct liquefaction process
3. Liquid-phase synthesis of polymeric nitrogen compounds

Mechanisms of the plasma-chemical processes and produced materials characterization are discussed in this presentation, as well as physical and plasma-chemical kinetics of the processes in strongly non-equilibrium conditions

Alexander Fridman received the B.S./M.S. and Ph.D. degrees in physics and mathematics from the Moscow Institute of Physics and Technology, Moscow, Russia, in 1976 and 1979, respectively, and the D.Sc. degree in mathematics from the Kurchatov Institute of Atomic Energy, Moscow, in 1987. He is the Nyheim Chair Professor of Drexel University, Philadelphia, PA, and the Director of the Drexel Plasma Institute, where he works on plasma approaches to material treatment, fuel conversion, and environmental control. He has more than 30 years of plasma research experience in national laboratories and universities of Russia, France, and USA. He has authored or coauthored five books and more than 350 papers. Prof. Fridman was a recipient of numerous awards, including the Stanley Kaplan Distinguished Professorship in Chemical Kinetics and Energy Systems, the George Soros Distinguished Professorship in Physics, and the State Prize of the U.S.S.R. for the discovery of selective stimulation of chemical processes in nonthermal plasma, ICRP Award, and Plasma Chemistry Award.

HX-11-CLK03

Gallia(Ga_2O_3) for Green and Efficient Energy applications

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Keywords : Gallium Oxide, Optoelectronic properties; Solar and Power Electronics;

Renewable **Solar energy** is becoming a mainstream source of energy, and **power electronics** is a key enabler of its' successful integration.
Recent breakthroughs in material quality have led to a "rediscovery" of Ga_2O_3 such as a high band gap (~5eV) transparent conductor, transparent field-effect transistors, photodetectors but also as a platform for power electronic devices.

An unexpectedly low 2D-like resistivity has been shown for n type Ga_2O_3/r-Al_2O_3 which is resistant to high dose proton irradiation and largely invariant (metallic) over temperatures from 2 to 850K.[1] The remarkable resilience and stability of the electrical properties under thermal and highly ionizing radiation stressing, combined with the extended transparency range and the known toughness under high electrical field could open up new perspectives for use as expanded spectral range transparent electrodes (e.g. for UV harvesting solar cells or UV LEDs/lasers) as well as robust Ohmic contacts for use in extreme environments/applications. As an example,we have showed the use of Ga_2O_3 electrodes has enabled, for the first time, an above-bandgap bulk photovoltaic effect on sandwich-like capacitors with transparent conducting electrodes (the architecture of solar cells) and under white light. These are crucial breakthroughs towards the implementation of the bulk photovoltaic effect in solar cells.[2]

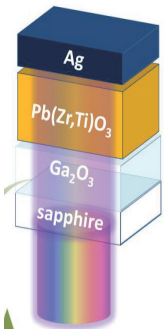

Fig. 1. Schematic of the sandwiched structure of the archetypical thin-film solar cell;

While there are several *n*-type transparent semiconductor oxides (TSO) for optoelectronic applications their required *p*-type counterparts oxides are known to be more challenging. We have demonstrated that Ga_2O_3 is also the intrinsic (or native) *p*-type TSO [3] with the largest bandgap for any reported *p*-type TSO (e.g. NiO, SnO, delafossites, oxychalcogenides). The achievement of hole mobility in excess of 10 cm^2/Vs and (high temperature) free hole concentrations in the ~10^{17} cm^{-3} range.[4] Fig.2

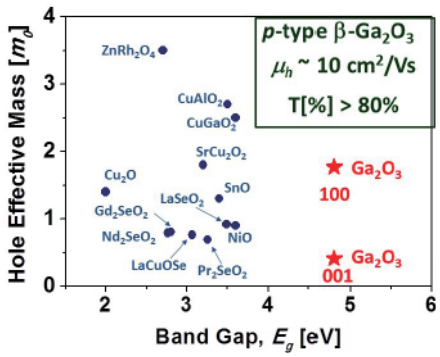

Fig.2 Hole Effective masses for different oxides. Insert: results for Ga_2O_3 from our experiment

Attaining p-type doping in gallium oxide may already be an important step for technological integration. Mainly, in power applications, the p-type demonstration is particularly important as the p-n junction could sustain larger voltages than any Schottky unipolar junction. In other words, the demonstration of Ga_2O_3 bipolarity represents a definitive step forward when considering this potentially low-cost oxide wide band gap semiconductor technology in power applications now dominated by the prohibitively expensive Silicon Carbide substrates.
Surprising optoelectronic properties of Gallia opens a new pathway for "Oxitronics" integration in Renewable energy technologies and electrical vehicles.

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Ekaterine Chikoidze 1992 Graduated with honour Faculty of Physics, Material Science Department at Tbilisi State University, Georgia; 1992- 1995 working as a translator (Russian, Italian, English) in editorial houses of journals /newspapers. 1996-1999 Doctorate student Material Science Department at Tbilisi State University, Georgia; 1999 PhD in the field of "semiconductors and dielectrics".From 2000-2006 Senior researcher in the lab of semiconductor material science. 2001-2003 Visiting Researcher in Politecnico di Milano, Department of Physics, centre of Ultrafast phenomenon and Biomedical Optics Optics, Italy. 2003–2006 Visiting Researcher in CNRS, France. 2007-present permanent researcher and scientific communication manager of the laboratory GEMaC, CNRS, Paris Saclay University, France. Coordinator of several bilateral, national and international projects, member of EU networks, Organizer of several workshops and member of scientific committees.

Having more than 20 years of experience of working in the field of physical properties of Wide band gap materials : ZnS, Diamond, ZnO, 3d magnetic oxides, Cu based transparent conducting oxides, Gallium Oxide. The one of the main focus activity is build up the specific instrumentation and study electrical and magneto transport properties of Oxides. In GEMaC/CNRS she has developed several home built experimental instrumentation dedicated to study highly resistive thin films: Seebeck Effect, Photoconductivity upgraded PPMS(Quantum design) set up, giving possibility to measure extremely high (up to 100GOhm) resistive materials in a very broad range of temperature and magnetic field. Having collaborations with researchers from 12 countries, author of 68 publications, 89 participations in Conferences, 10 invited talks.

Research Gate:https://www.researchgate.net/profile/E_Chikoidze

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Lead-free Piezoelectric Ceramics - Future perspectives –

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Keywords: Piezoelectric PZT lead-free sensor, actuator

Various lead free piezoelectric material families such as alkaline niobates, bismuth perovskites, bismuth layer structured ferroelectrics (BLSF) etc. have been researched for long time more than 60 years.

These lead free materials were almost discovered in the USA in processes of pursuing good piezoelectric materials for telecommunication devices in 1950's[1]. However, after the discovery of Pb(Ti, Zr)O_3 (PZT) family materials with high piezoelectric characteristics, the above researches on the lead free piezoelectric materials soon decreased.

Public concern for environmental pollution raised in 1970's, then researches on the lead free piezoelectric materials became active again in the USA and in Japan[1]. Basic data of characteristics of the lead free piezoelectric materials were taken at this time, however no lead free materials could not exceed the PZT, the researches on the lead free materials decreased.

Importance of Environments COnscious (ECO) technologies was widely recognized again in 1990's and the researches on lead free piezoelectric materials have become active again.
At this time, several lead free materials which partly exceed PZTs were discovered.
For example, some BLSF materials are better than PZTs as resonator materials[2], and Bi perovskites show better ultrasonic vibration characteristics than those of PZTs[3].

Furthermore, practical non-oxide piezoelectric materials; Sc doped AlN were developed in Japan for thin film resonator devices[4], and they have already made huge industries in the USA.

In the presentation these histories of researches on various lead free piezoelectric material are reviewed, and their current status and future perspectives are described.

References (Example: non-mandatory, 10 point):

1) Akira Ando; Shashank Priya ed. "Lead-Free Piezoelectrics" Chapter 6 pp. 177-208, Springer(2012)
2) Akira Ando; Shashank Priya ed. "Lead-Free Piezoelectrics" Chapter 13 pp. 373-403, Springer(2012)
3) Tonshaku Tou, et al.; Japanese Journal of Applied Physics 48 (2009) 07GM03
4) Morito Akiyama et al.; Adv. Mater., 21, 593–596 (2009).

Biography

Dr. Akira Ando is a general manager of material development department of Murata Mfg. Co., Ltd. He has joined Murata Mfg. Co., Ltd. soon after he graduated from Hiroshima University in 1983. He received doctoral degree from Tokyo Institute of Technology at 2003. He is in charge of research and development in new material technologies. His expertise is research and development on functional ceramics such as piezoelectric or other ferroelectric materials and applications. He received the Richard Fulrath award from the American ceramic society (2002), and the academic award from the ceramic society of Japan (2009).

IX-13-CLK01

Importance of strengthening “venous industry” for future plastics

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Keywords: Fossil-based plastics, Bioplastics, Circular Economy, Venous Industry

Plastics contribute to healthy and sound everyday life, but the chemical industry is facing new challenges from the viewpoints of resource depletion and environmental burden. Now is the time to explore the future direction of plastics. Merely pursuing cost and performance improvements of materials will not solve impending social, waste management, and environmental issues. A holistic approach, which includes raw material conversion and efficient after-use treatment, is necessary.

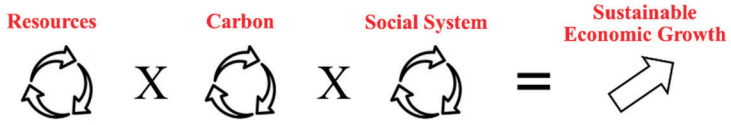

Fig. 1. Resilient and sustainable economic growth requires an integrated scheme among resource circulation, carbon neutrality, and social systems. This figure was prepared by the author (Kawashima).

Additionally, resource circulation alone will not realize resilient and sustainable economic growth. Instead a Circular Economy, which was initially suggested in Europe and involves resource circulation such as maintenance, repair, and reuse/recycle, should be expressed by an integrated scheme among resource circulation, carbon neutrality, and social systems (Fig. 1). This transition will be accelerated by digitalization and knowledge sharing such as artificial intelligence and robotics.

Figure 2 shows a plastics circulation model. Current plastics circulation tends to focus on resource circulation. However, the era of business models only considering materials is over. Future fossil-based plastics and bioplastics models must encompass raw materials, plastic products, applications, and waste management.

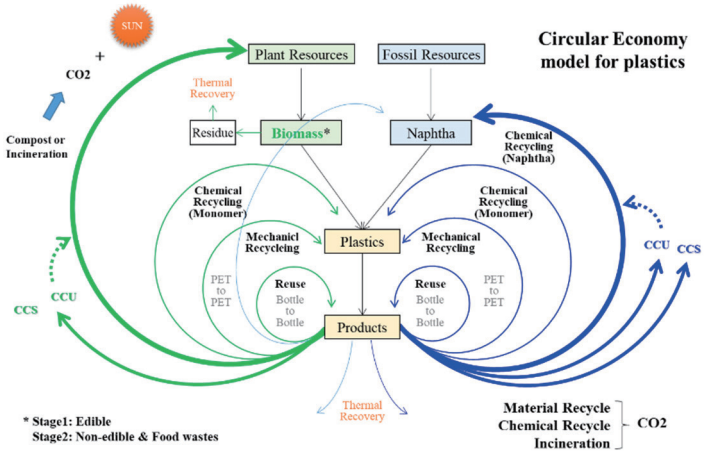

Fig. 2. Circular economy for plastics, including both fossil-based plastics and bioplastics. This figure was prepared by the author (Kawashima).

After utilization of fossil-based plastics, circulation will not be feasible if the collection and sorting quality is insufficient or economically unsustainable. Similarly, circulation of bioplastics will not be realized if biomass prices become higher or the dependency on edible resources increases. Even with recycling, a resilient, robust, and sustainable business will not be achieved unless an economical competitive business model is constructed considering the three elements described in Fig. 1. How can a circular economy model for plastics be strengthened? One way is to introduce new perspectives such as digital technologies and collaborating with other industries such as agriculture and CCUS.

A circular plastics economy is analogous to blood vessels in which linear flows from raw materials to products (Fig. 2, black lines) correspond to arteries, and circular arcs from products to various circulations (blue and green lines) correspond to veins. The future direction for plastics should include a circulating value chain. Similar to the harmonious relationship between arteries and veins in blood vessels, the venous industry should be strengthened in order to provide value to be sufficiently linked to the arterial industry.

Reference:
1) N. Kawashima, T. Yagi, K. Kojima, Macromolecular Materials and Engineering 1900383 (2019).
https://doi.org/10.1002/mame.201900383

Curriculum Vitae

Nobuyuki Kawashima holds a Masters' degree from the School of Science, Osaka University where he majored in organic chemistry. After joining Mitsui Chemicals in 1979, he worked in biochemistry and molecular biology at the Central Research Lab and the City of Hope National Medical Center in California. From 1990–2009, he focused on new business developments, including polylactic acid. He served as the Executive Director and the Secretary General of the Chemical Society of Japan from 2009–2016. Currently, he is the Chair of Energy and Climate Change Leadership Group, ICCA.

IX-13-CLK02

Ceramic Additive Manufacturing Technologies for Biomedical applications

*Hui-suk Yun[1, 2]
[1] Korea Institute of Materials Science (KIMS), Changwon, 51508, Republic of Korea, [2] University of Science & Technology (UST), Changwon, 51508, Republic of Korea
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Keywords: Additive manufacturing, 3D printing, Stereolithography, Material Extruding, Ceramics, Biomedical

3D printing, also called additive manufacturing (AM), is a fabrication process that used digital information from a computer-aided design file to stack 2D layers of various materials to produce a 3D object, without requiring any part-specific tooling. AM technologies have attracted much attention in various fields such as biomedical industry, automotive, aerospace, consumer, and other industrial application. AM technology especially offers significant advantages in the medical industry as it permits the on-demand manufacture of low-volume or one-of-a-kind parts based on patient-specific needs. AM in the medical industry, both actual and potential, can be organized into several broad categories, including tissue and organ fabrication, customized prosthetics, implants, anatomical models, and pharmaceuticals.

Synthetic materials that are clinically favored for bone tissue regeneration are mainly those based on bioceramics due to the chemical similarity of bioceramics to the mineral phase of bone. Nevertheless, the development of ceramics AM technology has been very slow when compared with other materials, due largely to the difficulty and complexity of the fabrication process, i.e. ceramics generally require both debinding and sintering steps after printing, which can lead to deformation and unstable mechanical properties of the printed 3D structure. However, successful cases for commercialization have been reported recently, and several new technologies now appear to overcome the limitations of ceramics AM.

Our group has developed a novel streolithography based AM system, which has been designed specifically to overcome the complications of typical vat-type stereolithography system. The fabrication system and processing has been successfully optimized for various types of materials for fine control over the end product. We could co-print multi-component in one structure using less amount of ceramic slurry with high resource efficiency. We have confirmed multi-material printability of both the functionally graded material (FGM) structures and the core-shell structure. We can expect various applications of our new technology in medical fields. For example, possibility of producing FGM structure using AM technique will make us possible to fabricate custom-made dental crown which can design not only controlling shape but also adjusting both color gradation and transparency. Possibility of fabricating core-shell structure will provide a chance to us for designing multi-functional medical device. Our group also has suggested unique ceramic AM process for creation of bioceramic scaffolds in bone tissue regeneration without sintering, to enhance the biofunctionality of scaffolds which retaining mechanical strength. Mechanical stability of the bioceramic scaffold was achieved by adapting a self-setting reaction after material extruding based AM process rather than using a sintering process. Both final crystal state and biodegradability of scaffolds were also controlled by adjusting self-setting reaction. This process could be applied to fabricate various types of bioceramic scaffolds with biofunctional materials, such as osteoblast cells, drugs, biomarkers, and proteins, thereby providing highly functional scaffolds for effective bone tissue regeneration. We believe that this new technology may provide big turning point to overcome limitation of traditional ceramic forming process.

Dr. Hui-Suk Yun
Korea Institute of Materials Science, Korea

Hui-Suk Yun has a Ph. D. on Materials Science Engineering from the University of Tokyo, Japan. She completed her post doc research at National Institute of Advanced Industrial Science and Technology (AIST, Japan) and then worked as a lecturer at the Consolidated Research Institute for Advanced Science and Medical Care at Waseda University, Japan. She is presently working as a principal researcher of Powder and Ceramics Division at Korea Institute of Materials Science (KIMS) and is a professor of Department of Materials Science in University of Science & Technology (UST). She is also working as a R&D Planner of Directorate for National Science and Engineering Programs at National Research Foundation of Korea. Her research field includes the nanoporous materials for both energy- and bio-applications, bioceramics, ceramic additive manufacturing (3D printing) systems & processes, and tissue engineering.

Cluster A

Fundamentals for Materials

Symposium

A-1 Local Atomic Structure Analysis on the Active Center of Functional Materials

A-2 Hydrogen in Functional Materials

A-3 Recent Advances in Computational Materials Science: Bridging Computations and Experiments

A-4 Neutrons for Materials Research

December 11–12, 2019

Symposium A-1

Local Atomic Structure Analysis on the Active Center of Functional Materials

[Organizers]

Hiroshi DAIMON (Nara Institute of Science and Technology)
Kouichi HAYASHI (Nagoya Institute of Technology)
Phil Woodruf (University of Warwick)
Ian McNulty (MAX IV)

December 11, 2019

Oral Session 1

Time 9:00–11:20 Room Mont-5

Chairperson Hiroshi DAIMON

A1-11-I01 ▸Invited 9:00–9:30

Observing Switching of Ferroelectric Materials by Operando Photoelectron Diffraction

Matthias MUNTWILER[1], Juraj KREMPASKY[1], Hugo DIL[1,2]
[1]Paul Scherrer Institut, [2]Ecole Polytechnique Fédérale de Lausanne

A1-11-I02 ▸Invited 9:30–10:00

Holography with Electrons at High Kinetic Energies: Chemical Selective Imaging of Structures at and below Surfaces

Carsten WESTPHAL
TU Dortmund

A1-11-O03 10:00–10:20

Atomic image reconstruction from x-ray fluorescence holography and photoelectron holography

Tomohiro MATSUSHITA[1,2], Takayuki MURO[1], Naohisa HAPPO[3], Koichi HAYASHI[2]
[1]Japan Synchrotron Radiation Research Institute, [2]Nara Institute of Science and Technology, [3]Hiroshima City University, [4]Nagoya Institute of Technology

A1-11-O04 10:20–10:40

Pressure Driven Superconductivity in Topological Insulators

Yoshihiro KUBOZONO
Research Institute for Interdisciplinary Science, Okayama University

A1-11-O05 10:40–11:00

Theory of resonant Auger electron diffraction for active site characterization

Peter KRÜGER[1], Godeung PARK[1], Fumihiko MATSUI[2]
[1]Chiba University, [2]Institute for Molecular Science

A1-11-O06 11:00–11:20

Analyses of 3D Atomic Arrangements of Dopants in Si Crystal Using Spectro-photoelectron Holography

Kazuo TSUTSUI[1], Kotaro NATORI[1], Tatsuhiro OGAWA[1], Takayuki MURO[2], Tomohiro MATSUSHITA[2], Yoshitada MORIKAWA[3], Takuya HOSHII[1], Kuniyuki KAKUSHIMA[1], Hitoshi WAKABAYASHI[1], Kouichi HAYASHI[4], Fumihiko MATSUI[5], Toyohiko KINOSHITA[2]
[1]Tokyo Institute of Technology, [2]Japan Synchrotron Radiation Research Institute, [3]Osaka University, [4]Nagoya Institute of Technology, [5]Institute of Molecular Science

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Mont-5

Chairperson Yoshitada MORIKAWA

A1-11-I07 ▸Invited 14:00–14:30

Electronically-driven surface restructuring investigated at the local scale

Karina MORGENSTERN
Ruhr-Universität Bochum

A1-11-I08 ▸Invited 14:30–15:00

How Local Structure Affects CO Binding in Model Ir1/Fe3O4 and Rh1/Fe3O4 Single-Atom Catalysts

Gareth PARKINSON
TU Wien

A1-11-O09 15:00–15:20

Concerted Catalysis of Designed Active Sites on Solid Surface for Highly Efficient Organic Synthesis

Ken MOTOKURA[1], Hiroto NODA[1], Yusuke WAKABAYASHI[2], Hiroo TAJIRI[3], Kyogo MAEDA[1], Marika IKEDA[1], Wang-Jae CHUN[4]
[1]Tokyo Institute of Technology, [2]Tohoku University, [3]Japan Synchrotron Radiation Research Institute/SPring-8, [4]International Christian University

A1-11-O10 15:20–15:40

Determining the dopant site structure in a Rh:$SrTiO_3$ photocatalyst by x-ray fluorescence holography

Mikk LIPPMAA
University of Tokyo

A1-11-O11 15:40–16:00

Middle-range ordering of multi-quantum well $(In_{0.1}Ga_{0.9}N/GaN)_{20}$ grown on c-face Sapphire Substrate

Tomoaki KAWAMURA[1], Koichi HAYASHI[2], Munehiko MIYANO[1], Atsushi SAKAKI[1], Akihide ICHIKAWA[1], Jun NAKAMURA[3]
[1]Nichia Corporation, [2]Nagoya Institute of Technology, [3]The University of Electro-Communications

December 12, 2019

Oral Session 4

Time 9:00–11:20 Room Mont-5

Chairperson Yoshihiro KUBOZONO

A1-12-I01 ▸Invited 9:00–9:30

The atomic and electronic structure of two-dimensional oxide quasicrystals

Stefan FÖRSTER[1], Sebastian SCHENK[1], Eva Maria ZOLLNER[1], Cheng-Tien CHIANG[1], Christian TUSCHE[2,3], Wolf WIDDRA[1,2]
[1]Martin-Luther-Universität Halle-Wittenberg, [2]Max-Planck-Insitut für Mikrostrukturphysik, [3]Peter-Grünberg-Institut (PGI-6), Forschungszentrum Jülich

A1-12-I02 ▸Invited 9:30–10:00

Novel 2D Artificial Forms of Elemental Si, Ge, Sn, and Pb : From Silicene to Plumbene

Guy LE LAY
Aix-Marseille University

A1-12-O03 10:00–10:20

Graphene's Latest Cousin: Plumbene Epitaxial Growth on a "Nano WaterCube"

Junji YUHARA
Nagoya University

A1-12-O04 10:20–10:40

Nanocrystal Dynamics using Time-resolved Diffracted X-ray Blinking

YUJI SASAKI[1,2,3], M. KURAMOCHI[1,2], H. SEKIGUCHI[3]
[1]The University of Tokyo, [2]Operand OIL, National Institute of Advanced Industrial Science & Technology, [3]SPring-8/ Japan Synchrotron Radiation Research Institute

A1-12-O05 10:40–11:00

Single-atom Dispersion of Platinum on Graphene using Plasma Sputtering

Kazutoshi GOHARA, Kenji YAMAZAKI
Hokkaido University

A1-12-O06 11:00–11:20

High-speed X-Ray Reciprocal Space Mapping for Dynamics of Molecular Beam Epitaxy

Masamitu TAKAHASI[1], Wolfgang VOEGELI[2], Etsuo ARAKAWA[2], Tetsuro SHIRASAWA[3], Takuo SASAKI[1], Tomohiro YAMAGUCHI[4], Tadashi MATSUSHITA[5]
[1]National Institutes for Quantum and Radiological Science and Technology, [2]Tokyo Gakugei University, [3]National Institute of Advanced Industrial Science and Technology, [4]Kogakuin University, [5]High-Energy Accelerator Research Organization

December 12, 2019

Oral Session 5

Time 14:00–15:50 Room Trade-1

Chairperson Tomohiro MATSUSHITA

A1-12-I07 ▸Invited 14:00–14:30

Large-scale DFT study of complex nano-structured materials with the CONQUEST code

Tsuyoshi MIYAZAKI
National Institute for Materials Science (NIMS)

A1-12-O08 14:30–14:50

Carrier Transport Calculations of Organic Semiconductors with Static and Dynamic Disorder

Nobuhiko KOBAYASHI[1], Hiroyuki ISHII[1], Kenji HIROSE[2]
[1]University of Tsukuba, [2]NEC

A1-12-O09 14:50–15:10

First-principles Theoretical Study on Electronically and Catalytically Active Sites at Graphene

Yoshitada MORIKAWA[1,3], Sasfan Arman WELLA[1,2], Fahdzi MUTTAQIEN[1], Suprijadi HARYONO[2], Kouji INAGAKI[1,3], Yuji HAMAMOTO[1,3], Ikutaro HAMADA[1,3]
[1]Osaka University, [2]Bandung Institute of Technology, [3]ESICB, Kyoto University

A1-12-O10 15:10–15:30

Statistical and Density-Functional Analysis of the Effect of Heme Porphyrin Distortion in Heme Proteins

Yu TAKANO[1,2], Yusuke KANEMATSU[1], Hiroko X. KONDO[1,3], Yasuhiro IMADA[2]
[1]Hiroshima City University, [2]Osaka University, [3]Kitami Institute of Technology

A1-12-O11 15:30–15:50

3D atomic-resolution holography around non-periodic active atoms

Hiroshi DAIMON
Toyota Physical and Chemical Research Institute

December 12, 2019

Poster Session

Time 16:30–18:00 Room Trade-0

A1-12-P01

Valence-selective x-ray fluorescence holographic study of $YbInCu_4$ valence transition material

Shinya HOSOKAWA[1], Naohisa HAPPO[2], Kouichi HAYASHI[3], Koji KIMURA[3], Tomohiro MATSUSHITA[4], Jens Rüdiger STELLHORN[1], Masaichiro MIZUMAKI[4], Motohiro SUZUKI[4], Hitoshi SATO[5], Koichi HIRAOKA[6]
[1]Kumamoto University, [2]Hiroshima City University, [3]Nagoya Institute of Technology, [4]JASRI, [5]Hiroshima University, [6]Ehime University

A1-12-P02

The molecular dynamics simulation on the mechanical properties of Ni glass with external pressure

Liwu JIANG, Peng SHI, Chuanhui ZHANG
University of Science and Technology Beijing

A1-12-P03

Spatiotemporal pattern of graphene ripple structure measured using aberration corrected TEM

Yuhiro SEGAWA, Kenji YAMAZAKI, Kazutoshi GOHARA
Hokkaido University

A1-12-P04

In-situ observation of the motion of single metal atoms on graphene using aberration corrected electron microscopy

Akio SUZUTA, Tsutomu UCHIDA, Kenji YAMAZAKI, Ryo SUGIMOTO, Kazutoshi GOHARA
Hokkaido University

A1-12-P05

K-means clustering based support construction for ptychography

Katsuya ICHIHASHI[1], Shota NOGAWA[1], Yosuke MAEHARA[1,2], Hiroyuki SHIOYA[1], Jun YAMASAKI[3], Kazutoshi GOHARA[4]
[1]Muroran Institute of Technology, [2]Dowell Co., Ltd., [3]Osaka University, [4]Hokkaido University

A1-12-P06

Fast Surface X-ray Diffraction for Monitoring of Interface Phenomena

Tetsuro SHIRASAWA
National Institute of Advanced Industrial Science and Technology

A1-12-P07

Evaluation of charge transport property of ethynylene-bridged anthracene oligomers

Juanjuan ZHU, Hironobu HAYASHI, Hiroko YAMADA
Nara Institute of Science and Technology (NAIST)

A1-12-P08

Efficient Hydrosilylation Reaction using Designed Rh Site on Silica Surface

Kyogo MAEDA, Ken MOTOKURA
Tokyo Institute of Technology

A1-12-P09

Fabrication of MoO_3 films on Si(001) by vapor deposition.

Yuya YOSHIE, Shinta KOBAYASHI, Sakura TAKEDA
Nara Institute of Science and Technology

A1-12-P10

Status of photoelectron holography at SPring-8: Experimental setup for time- and space-resolved technique and application to individual atomic imaging of multiple dopant sites

Toyohiko KINOSHITA[1], Tomohiro MATSUSHITA[1], Takayuki MURO[1], Takuo OHKOCHI[1], Hitoshi OSAWA[1], Masaru SHIMOMURA[2], Fumihiko MATSUI[3], Hiroyuki MATSUDA[3], Kazuo TSUTSUI[4], Munetaka TAGUCHI[5], Kensei TERASHIMA[6], Takanori WAKITA[6], Takayoshi YOKOYA[6], Hiroshi DAIMON[7]
[1]Japan Synchrotron Radiation Research Institute (JASRI), [2]Department of Engineering, Shizuoka University, [3]UVSOR, Institute for Molecular Science, [4]Institute of Innovative Research, Tokyo Institute of Technology, [5]Toshiba Nanoanalysis Corporation, [6]Graduate School of Natural Science and Technology, Okayama University, [7]Toyota Physical and Chemical Research Institute

A1-12-P11

Self-assembly Material Texture of β-Si_3N_4 /Stainless Steel Composites (2)—Effect of Kneading Process and Thermal Conductivity—

Mariko TAKEDA, Kazuya OKUBO, Yuka MIZUKAMI, Yoshihiro SATO, Satoko ABE, Ryota KOBAYASHI, Yue BAO, Fumio MUNAKATA
Tokyo City University

A1-12-P12

Self-assembly Material Texture of β-Si_3N_4 /Stainless Steel Composites (3)—Multifractal Analysis of the Aggregated Morphology Texture—

Mariko TAKEDA, Kazuya OKUBO, Yuka MIZUKAMI, Yoshihiro SATO, Satoko ABE, Ryota KOBAYASHI, Yue BAO, Fumio MUNAKATA
Tokyo City University

A1-12-P13

Investigation on Local Crystallographic Structure of ε-Ga_2O_3 with High Dielectric Constant

Daichi OKA[1], Subaru YUSA[1], Koji KIMURA[2], Artoni Kevin Roquero ANG[2], Naohisa HAPPO[3], Kouichi HAYASHI[2], Tomoteru FUKUMURA[1,4]
[1]Department of Chemistry, Graduate School of Science, Tohoku University, [2]Department of Physical Science and Engineering, Nagoya Institute of Technology, [3]Department of Computer and Network Engineering, Hiroshima City University, [4]WPI Advanced Institute for Materials Research and Core Research Cluster, Tohoku University

A1-12-P14

Synthesis and characterization of large acenes by using on-surface synthesis

Hironobu HAYASHI, Hiroko YAMADA
Nara Institute of Science and Technology

A1-12-P15

Analysis of Active Species in Molecular Vanadium Catalysis by Solution XAS Analysis

Kotohiro NOMURA
Tokyo Metropolitan University

A1-12-P16

Improved Phase Imaging by Electron Diffractive Imaging

Jun YAMASAKI[1,2], Yuki SHIMAOKA[1], Hirokazu SASAKI[3]
[1]Osaka University, [2]Nagoya University, [3]Furukawa Electric Co., Ltd

A1-12-P17

Benchmark Study on Bond Dissociation Energies for Large Systems

Toru SAITO, Hiroki KAMBARA, Seiya YAMAMOTO, Yu TAKANO
Hiroshima City University

A1-12-P18

Dehydrogenative Arene Coupling of Dimethyl Phthalate: The Role of Pd and Cu Catalysts

Masafumi HIRANO[1], Yuki KANAZAWA[1], Takato MITSUDOME[2], Kousuke SANO[1]
[1]Tokyo University of A & T, [2]Osaka University

A1-12-P19

Band Alignment of Lattice-Matched $ZnSnAs_2$/InP Heterostructures

Munetaka TAGUCHI[1], Naomi KURIHARA[1], Teruhiko SAZE[1], Kei KIYOKAWA[1], Hitoshi SATO[3], Naotaka UCHITOMI[2], Hiroto OOMAE[2]
[1]Toshiba Nanoanalysis Corporation, [2]Nagaoka University of Technology, [3]Hiroshima University

A1-12-P20

Formic Acid Adsorption and Decomposition on the Cu(111) Surface : Monomeric and Polymeric Structures Study

Septia Eka Marsha PUTRA[1], Fahdzi MUTTAQIEN[1], Yuji HAMAMOTO[1,2], Kouji INAGAKI[1,2], Ikutaro HAMADA[1,2], Yoshitada MORIKAWA[1,2,3]
[1]Department of Precision Science and Technology, Graduate School of Engineering, Osaka University, [2]Elements Strategy Initiative for Catalysts and Batteries (ESICB), Kyoto University, [3]Research Center for Ultra-Precision Science and Technology, Graduate School of Engineering, Osaka University

A1-12-P21

Pressure Dependence of Superconductivity in $SrIr_2$ and $BaIr_2$

Huan LI
Okayama University

A1-12-P22

Revealing the effect of Co loading on the morphology and activity of $Co/Co_{1-x-y}Al_{2+x}O_4$ catalysts for dry reforming of methane

Yee Jie WONG[1,2], Mei Kee KOH[2], Satoshi ICHIKAWA[1], Yoshitada MORIKAWA[1], Abdul Rahman MOHAMED[2]
[1]Osaka University, [2]Universiti Sains Malaysia

A1-12-P23

Preparation and Characterization of Superconducting $Ba_{1-x}M_xTi_2Sb_2O$ (M: Na, K, Rb and Cs)

Yanan WANG
Okayama University

A1-12-P24

Structural Isomerization of Phosphine-Protected Metal Clusters Induced by Polyoxometalates

Yu FUJIKI[1], Tomoki MATSUYAMA[1], Hikaru TAKAYA[2], Nobuhiro YASUDA[3], Naoki NAKATANI[1], Jun HIRAYAMA[4], Seiji YAMAZOE[1,4,5]
[1]School of Science, Tokyo Metropolitan University, [2]Institute for Chemical Research, Kyoto University, [3]Japan Synchrotron Radiation Research Institute, [4]Elements Strategy Initiative for Catalysts and Batteries, Kyoto University, [5]Core Research for Evolutional Science and Technology, Japan Science and Technology Agency

A1-12-P25

First principles study for electronic structure of Nitrogen-doped TiO_2(B)

Tomoki YUYAMA[1], Carla BITTENCOURT[2], Peter KRÜGER[1]
[1]Chiba University, [2]University of Mons

A1-12-P26

Comparative and Systematic Study of Doping Technology for 2D-Sputtered MoS_2 Film

Takuya HAMADA, Shimpei YAMAGUCHI, Taiga HORIGUCHI, Kuniyuki KAKUSHIMA, Kazuo TSUTSUI, Hitoshi WAKABAYASHI
Tokyo Institute of Technology

A1-12-P27

X-ray Fluorescence Holographic Imaging of Iron Environments in Heme Proteins

Ayana SATO-TOMITA
Jichi Medical University

A1-12-P28

QM/MM study of the ATPase mechanism of F-actin

Yusuke KANEMATSU[1], Yu TAKANO[1], Shuichi TAKEDA[2], Ryotaro KOIKE[2], Motonori OTA[2], Yuichiro MAEDA[2]
[1]Hiroshima City University, [2]Nagoya University

A1-12-P29

Self-assembly Material Texture of β-Si_3N_4 /Stainless Steel Composites (1)—Effect of Firing Process on the Formation of Agglomerated Texture—

Masashi KOGA, Mariko TAKEDA, Kazuya OKUBO, Yuka MIZUKAMI, Yoshihiro SATO, Satoko ABE, Ryota KOBAYASHI, Yue BAO, Fumio MUNAKATA
Tokyo City University

A1-12-P30

Study of graphene precipitation from Ni catalyst using in-situ X-ray diffraction measurement - Cooling rate dependence -

Jumpei YAMADA, Yuki UEDA, Daichi YAMAMOTO, Takahiro MARUYAMA, Shigeya NARITSUKA
Meijo University

A1-12-P31

Local Dynamics of bio-soft materials using synchrotron radiation X-ray and nanocrystals

Hiroshi SEKIGUCHI[1], Yuji C. SASAKI[2]
[1]Japan Synchrotron Radiation Research Institute, [2]The University of Tokyo

A1-12-P32

Modification of graphite energy analyzer for light elements on X-ray fluorescence holography

Naohisa HAPPO[1], Atsushi KUBOTA[1], Tomohiro MATSUSHITA[2], Shinya HOSOKAWA[3], Koji KIMURA[4], Kouichi HAYASHI[4]
[1]Hiroshima City University, [2]Japan Synchrotron Radiation Research Institute, [3]Kumamoto University, [4]Nagoya Institute of Technology

A1-12-P33

Observation of doping effect in Sm doped RB_6 (R: rare earth) by white neutron holography

Shoichi UECHI[1], Yuki KANAZAWA[1], Kazuya SUGIMOTO[1], Takayoshi YAMAMOTO[1], Kenji OHOYAMA[1], Naohisa HAPPO[2], Koichi HAYASHI[3], Masahide HARADA[4], Kenichi OIKAWA[4], Yasuhiro INAMURA[4], Wataru MATSUHRA[1], Fumitoshi IGA[1], Youhei FUKUMOTO[1]
[1]Ibaraki University, [2]Hiroshima City University, [3]Nagoya Institute of Technology, [4]J-PARC Center

A1-12-P34

Determination of dopant position of thermoelectric material B-doped Mg_2Si by white neutron holography

Kazuya SUGIMOTO[1], Syouichi UECHI[1], Yuki KANAZAWA[1], Yohei FUKUMOTO[1], Takayoshi YAMAMOTO[1], Kenji OHOYAMA[1], Kouichi HAYASHI[2], Naohisa HAPPO[3], Masahide HARADA[4], Kenichi OIKAWA[4], Yasuhiro INAMURA[4], Kei HAYASHI[5], Wataru SAITOU[5], Yuzuru MIYAZAKI[5]
[1]Ibaraki University, [2]Nagoya Institute of Technology, [3]Hiroshima City University, [4]Materials and Life Science Division, J-PARC Center, [5]Tohoku University

A1-12-P35

Valence sensitive X-ray fluorescence holography of the protein complex Photosystem II

Koichi HAYASHI[1], Artoni Kevin Roquero ANG[1], Yasushi UMENA[2], Ayana SATO-TOMITA[3], Naoya SHIBAYAMA[3], Yuji SASAKI[4], Naohisa HAPPO[5], Koji KIMURA[1]
[1]Nagoya Institute of Technology, [2]Okayama University, [3]Jichi Medical University, [4]The University of Tokyo, [5]Hiroshima City University

A1-12-P36

Atomic and electronic structure analysis of metallic nanoparticle catalysts by large-scale DFT calculations

Ayako NAKATA, Tsuyoshi MIYAZAKI
National Institute for Materials Science

A1-12-P37

Active/Inactive Dopant-site in Boron-doped Diamond in Diamond Power Device

Yukako KATO
National Institute of Advanced Industrial Science and Technology

A1-12-P38

Structural Evolution During Photo- and Thermal Conversion of Organic Semiconductor Precursor Thin Films

Wolfgang VOEGELI[1], Yuta TAMEIKE[1], Atsushi YAMAGUCHI[1], Ryoma TANAKA[1], Etsuo ARAKAWA[1], Toshio TAKAHASHI[1], Tetsuroh SHIRASAWA[2], Mitsuharu SUZUKI[3], Hiroko YAMADA[4]
[1]Tokyo Gakugei Univ., [2]AIST, [3]Osaka Univ., [4]NAIST

A1-12-P39

Convergent-Beam Optics for Time-Resolved X-Ray Diffraction From Thin Films and Surfaces

Wolfgang VOEGELI[1], Masamitu TAKAHASI[2], Takuo SASAKI[2], Seiji FUJIKAWA[2], Tetsuroh SHIRASAWA[3], Etsuo ARAKAWA[1], Tadashi MATSUSHITA[4]
[1]Tokyo Gakugei Univ., [2]QST, [3]AIST, [4]KEK

A1-12-P40

A Plan of Photoelectron Holography at MAX IV

Yusuke HASHIMOTO[1,2], Balasubramanian THIAGARAJAN[2], Conny SÅTHE[2], Oscar TJERNBERG[1]
[1]KTH Royal Institute of Technology, [2]Max IV Laboratory

A1-12-P41

Acceleration of Atomic Image Reconstruction from X-ray Fluorescence Holograms on Multiple Platforms

Atsushi KUBOTA[1], Tomohiro HARA[1], Tomohiro MATSUSHITA[2], Naohisa HAPPO[1], Tetsuo HIRONAKA[1]
[1]Hiroshima City University, [2]Japan Synchrotron Radiation Research Institute

A1-12-P42

Local Atomic Arrangement near Co and Ni in an Aged $Al_{0.3}CrFeCoNi$ High Entropy Alloy

Jumpei NIKI[1], Tatsuya HAYASHI[1], Tokujiro YAMAMOTO[1], Naohisa HAPPO[2], Kouichi HAYASHI[3], Koji KIMURA[3], Shinya HOSOKAWA[4], Hiroo TAJIRI[5]
[1]Utsunomiya University, [2]Hiroshima City University, [3]Nagoya Institute of Technology, [4]Kumamoto University, [5]Japan Synchrotron Radiation Research Institute

A1-12-P43

Time Dependence of Vickers Hardness and X-ray Fluorescence Holograms of an $Al_{0.3}CrFeCoNi$ High Entropy Alloy

Tokujiro YAMAMOTO[1], Jumpei NIKI[1], Tatsuya HAYASHI[1], Naohisa HAPPO[2], Kouichi HAYASHI[3], Koji KIMURA[3], Shinya HOSOKAWA[4], Hiroo TAJIRI[5]
[1]Utsunomiya University, [2]Hiroshima City University, [3]Nagoya Institute of Technology, [4]Kumamoto University, [5]Japan Synchrotron Radiation Research Institute

A1-12-P44

A Middle Energy-bandwidth Crystal Monochromator using Asymmetric Geometry for High-flux Synchrotron X-ray Diffraction

Hiroo TAJIRI[1], Hiroshi YAMAZAKI[1], Haruhiko OHASHI[1], Shunji GOTO[1], Osami SAKATA[2], Tetsuya ISHIKAWA[3]
[1]Japan Synchrotron Radiation Research Institute, [2]National Institute for Materials Science, [3]RIKEN SPring-8 Center

A1-12-P45

Development of High-Energy-Resolution Display-type Analyzer

Hiroshi DAIMON[1], Hiroyuki MATSUDA[1], Hiroki MOMONO[1], László TÓTH[2]
[1]Nara Institute of Science and Technology (NAIST), [2]University of Debrecen, [3]Toyota Physical and Chemical Research Institute

A1-12-P46

X-ray Fluorescence Holography Investigation on Sn in Sn: β-Ga_2O_3 widegap oxide semiconductor

Kazushi MIKI[1], N HAPPO[2], K KIMURA[3], K SASAKI[4], Y TANG[1], K NAWATA[1], Y MAEDA[1], S KITAMURA[1], H OZAKI[3], H HISATUNE[2], R YAMAGUCHI[2], H TAJIRI[5], S YAMAKOSHI[6], A KURAMATA[4]
[1]Univ. Hyogo, [2]Hiroshima City Univ., [3]Nagoya Institute of Technology, [4]Novel Crystal Technology, Inc., [5]JASRI, [6]Tamura Corp.

A1-12-P47

Experimental Investigation of the Local Atomic Structure in Decagonal Quasicrystals by X-Ray Fluorescence Holography

Jens STELLHORN
DESY

A1-12-P48

Molecular dynamics study of structural fluctuations in CDR-H3 of anti-HIV antibodies PG9 and PG16

NAOKI TANABE[1], RYO KIRIBAYASI[1], Hiroko.X KONDO[2], DAISUKE KURODA[3], TORU SAITO[1], JIRO KOHDA[1], AKIMITSU KUGIMIYA[1], YASUHISA NAKANO[1], KOUHEI TSUMOTO[3,4], YU TAKANO[1]
[1]Graduate School of Information Sciences, Hiroshima City University, [2]Faculty of Engineering, Kitami Institute of Technology, [3]Institute of Medical science, the University of Tokyo, [4]Graduate School of Engineering, the University of Tokyo

December 12–13, 2019

Symposium A-2

Hydrogen in Functional Materials

[Organizers]

Shin-ichi ORIMO (Tohoku University, Japan)
Hidenori HIRAMATSU (Tokyo Institute of Technology, Japan)
Bjørn C. HAUBACK (Institute for Energy Technology, Norway)
Truls NORBY (University of Oslo, Norway)
Chris G. Van de WALLE (University of California, Santa Barbara, USA)

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December 12, 2019

Oral Session 4

Time 9:30–12:15 Room Ken-2

Chairpersons Hiroshi KAGEYAMA, Tom AUTREY

A2-12-K01 ▸Keynote 9:30–10:15

Enabling Energy Technologies Using Hydride Materials

Rana MOHTADI
TOYOTA RESEARCH INSTITUTE OF NORTH AMERICA

A2-12-I02 ▸Invited 10:15–10:45

Complex Hydrides for Energy Device Research

Shin-ichi ORIMO
Tohoku University

A2-12-O03 10:45–11:05

Molecular Dynamics Study of Fast Li^+ Ion Transport in *closo*-Boranes.

Kartik SAU[1], Tamio IKESHOJI[1,2], Shigeyuki TAKAGI[3], Kazuto AKAGI[3], SHIN-ICHI ORIMO[2,3], Sangryun KIM[3]
[1]AIST-TohokuU Mathematics for Advanced Materials-OIL, [2]IMR, Tohoku University, [3]AIMR, Tohoku University

Break
11:05–11:15

A2-12-I04 ▸Invited 11:15–11:45

Hydride ion conduction

Truls NORBY, Xin LIU, Tor S. BJØRHEIM, Reidar HAUGSRUD
University of Oslo

A2-12-I05 ▸Invited 11:45–12:15

Size Flexibility of Hydride Anion: Structure and Property Control

Hiroshi KAGEYAMA
Kyoto University

December 12, 2019

Oral Session 5

Time 14:00–16:30 Room Ken-2

Chairpersons Anderson JANOTTI, Truls NORBY

A2-12-O06 14:00–14:20

H^-Conduction in the Rock-Salt Layer of K_2NiF_4-Type Oxyhydrides

Genki KOBAYASHI[1,2], Fumitaka TAKEIRI[1,2], Akihiro WATANABE[1,3], Haq NAWAZ[1,2], Akihide KUWABARA[4], Yumiko IMAI[1], Nur Ika Puji AYU[1,5], Masao YONEMURA[5], Ryoji KANNO[3]
[1]Institute for Molecular Science, [2]SOKENDAI, [3]Tokyo Institute of Technology, [4]Japan Fine Ceramics Center, [5]High Energy Accelerator Research Organization

A2-12-O07 14:20–14:40

Characteristic H^- Ion Conduction in Oxygen-Substituted Lanthanum Trihydride

Soshi IIMURA[1], Keiga FUKUI[1], Tomofumi TADA[1], Satoru FUJITSU[1], Masato SASASE[1], Hiromu TAMATSUKURI[2], Takashi HONDA[2], Kazutaka IKEDA[2], Toshiya OTOMO[2], Hideo HOSONO[1]
[1]Tokyo Institute of Technology, [2]High Energy Accelerator Research Organization (KEK)

A2-12-O08 14:40–15:00

Fast Hydride Ionic Conduction of Lanthanum Oxyhydride from First Principles Molecular Dynamics Simulation

Tomofumi TADA, Soshi IIMURA, Hideo HOSONO
Tokyo Institute of Technology

Break
15:00–15:10

A2-12-I09 ▸Invited 15:10–15:40

Catalytic Properties of Hydrides in Aqueous Media

Tom AUTREY
Pacific Northwest National Laboratory

A2-12-I10 ▸Invited 15:40–16:10

Inorganic Nanomaterials to Achieve Efficient Electrochemical Hydrogenation for Energy Storage and Materials Conversions

Miho YAMAUCHI
Kyushu University

A2-12-O11 16:10–16:30

Hydrogen storage behaviors and application for ammonia synthesis of LnNiSi (Ln = La–Nd)

Hiroshi MIZOGUCHI[1], Sang-Won PARK[1], Kazuhisa KISHIDA[1], Masaaki KITANO[1], Junghwan KIM[1], Masato SASASE[1], Takashi HONDA[2], Kazutaka IKEDA[2], Toshiya OTOMO[2], Hideo HOSONO[1]
[1]Tokyo Institute of Technology, [2]KEK

December 13, 2019

Oral Session 7

Time 9:30–11:45 Room Ken-2

Chairperson Miho YAMAUCHI

A2-13-K01 ▸Keynote 9:30–10:15

Investigation on Defect Structures in Oxides with Hydrogen Impurity

Naoki OHASHI[1,2,3]
[1]National Institute for Materials Science, [2]Tokyo Institute of Technology, [3]Kyushu University

A2-13-I02 ▸Invited 10:15–10:45

The hydrogen impurity in wide-band-gap oxides

Anderson JANOTTI
University of Delaware

A2-13-O03 10:45–11:05

Structures and Electronic States of Hydrogen in Inorganic Semiconductors with Different Anions

Toshio KAMIYA, Xinyi HE, Zewen XIAO, Keisuke IDE, Takayoshi KATASE, Hideo HOSONO
Tokyo Institute of Technology

A2-13-O04 11:05–11:25

Hydrogen Doping in Ultra-widegap Amorphous Oxide Semiconductor, Amorphous Ga-O

Keisuke IDE[1,2], Yurika KASAI[1], Takayoshi KATASE[1,3], Hidenori HIRAMATSU[1,2], Hideo HOSONO[1,2], Toshio KAMIYA[1,2]
[1]Laboratory for Materials and Structures, Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [3]PRESTO, Japan Science and Technology Agency

A2-13-O05 11:25–11:45

Activation energy of hydrogen effusion of high performance TiO_x/SiO_x/c-Si heterocontacts

Kazuhiro GOTOH[1], Takeya MOCHIZUKI[1], Tomohiko HOJO[2], Yasuyoshi KUROKAWA[1], Eiji AKIYAMA[2], Noritaka USAMI[1]
[1]Nagoya University, [2]Tohoku University

December 13, 2019

Oral Session 8

Time 14:00–15:40 Room Ken-2

Chairperson Genki KOBAYASHI

A2-13-O06 14:00–14:20

Kinetic Enhancement of Hydrogen Absorption by Pd through Surface Modification with Au

Shohei OGURA, Kazuhiro NAMBA, Koichi KATO, Katsuyuki FUKUTANI
Institute of Industrial Science, The University of Tokyo

A2-13-O07 14:20–14:40

Caught in the Act: Hydrogen Bond at Work in Asymmetric Synthesis Monitored by Modulation-Excitation Infrared Spectroscopy

Nobutaka MAEDA, Miho YAMAUCHI
Kyushu University, International Institute for Carbon-Neutral Energy Research (WPI-I2CNER)

A2-13-O08 14:40–15:00

Hydride Complexes with High Hydrogen Coordination and Their Novel Functionalities

Shigeyuki TAKAGI[1], Shin-ichi ORIMO[1,2]
[1]Institute for Materials Research, Tohoku University / Japan, [2]WPI-Advanced Institute for Materials Research (AIMR), Tohoku University / Japan

A2-13-O09 15:00–15:20

High-pressure and high-temperature synthesis of novel hydrides

Hiroyuki SAITOH[1,2], Mai TANIKAMI[1,2], Akihiko MACHIDA[1], Tetsu WATANUKI[1,2], Toyoto SATO[3], Shigeyuki TAKAGI[3], Shin-ichi ORIMO[3,4], Kazutaka IKEDA[4], Toshiya OTOMO[4]
[1]National Institutes for Quantum and Radiological Science and Technology, [2]Graduate School of Material Science, Univ. of Hyogo, [3]Institute for Materials Research, Tohoku University, [4]WPI-Advanced Institute for Materials Research (AIMR), Tohoku University, [5]Institute of Materials Structure Science, High Energy Accelerator Research Organization

A2-13-O10 15:20–15:40

Magnetic structure of heavily hydrogen-substituted 1111-type $LaMnPO_{1-x}H_x$

Satoru MATSUISHI[1], Toshiki KATO[1], Tomohiro INOUE[1], Maxim AVDEEV[2], Yusuke NAMBU[3]
[1]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [2]Bragg Institute, Australian Nuclear Science and Technology Organization, [3]Institute for Materials Research, Tohoku University

December 13, 2019

Oral Session 9

Time 16:30–17:30 Room Ken-2

Chairperson Hiroyuki SAITOH

A2-13-O11 16:30–16:50

First-principles calculations of hydrogen-related reactions in polymer electrolyte fuel cell

Yoshiyuki YAMAMOTO, Lei YAN, Osamu SUGINO
The Institute for Solid State Physics, The University of Tokyo

A2-13-O12 16:50–17:10

Proton conduction on hydrated oxide surface for “electrolyte” of metal/oxide catalysts

Ryuhei SATO[1], Yasushi SHIBUTA[1], Fuyuki SHIMOJO[2], Shu YAMAGUCHI[3]
[1]The University of Tokyo, [2]Kumamoto University, [3]National Institution for Academic Degrees and Quality Enhancement of Higher Education

A2-13-O13 17:10–17:30

Sulfonated Poly(arylene perfluoroalkylene) Terpolymers as Proton Exchange Membranes

Zhi LONG, Junpei MIYAKE, Kenji MIYATAKE
University of Yamanashi

December 13, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

A2-13-P01

Development of highly hydrogen-sensitive thermal desorption spectroscopy system for quantitative analysis of low hydrogen concentration (~1×10^{16} atoms/cm^3) in thin-film samples

Hidenori HIRAMATSU[1], Taku HANNA[1], Isao SAKAGUCHI[2], Hideo HOSONO[1]
[1]Tokyo Institute of Technology, [2]National Institute for Materials Science

A2-13-P02

Effective interaction for vanadium oxyhydrides $Sr_{n+1}V_nO_{2n+1}H_n$ (n = 1 and ∞): A constrained-RPA study

Masayuki OCHI, Kazuhiko KUROKI
Osaka University

A2-13-P03

Hydride ion in iron-based superconductors: Efficient electron dopant inducing high-T_c superconductivity and antiferromagnetism

Soshi IIMURA, Hideo HOSONO
Tokyo Institute of Technology

A2-13-P04

Crystal Structures and Photochromic Reactions of Hydrogen-Bonding Diarylethene Crystals

Masakazu MORIMOTO
Rikkyo University

A2-13-P05

Theoretical Study of Hydrogen/Deuterium Absorption Properties in Pd By Using Combined Plane Wave and Localized Basis Set Approach

Takayoshi ISHIMOTO
Yokohama City University

A2-13-P06

Research on Ammine Complex of Metal Borohydrides as Functional Material

Hiroki MIYAOKA, Keita NAKAJIMA, Takayuki ICHIKAWA, Yoshitsugu KOJIMA
Hiroshima University

A2-13-P07

Investigation of cathodic reaction of proton-conducting ceramics fuel cells by using model pattern electrodes

Takashi NAKAMURA[1], Katsuya NISHIDATE[2], Yuta KIMURA[1], Keiji YASHIRO[3], Tatsuya KAWADA[3], Yuichi MIKAMI[4], Tomohiro KUROHA[4], Yoichiro TSUJI[4], Koji AMEZAWA[1]
[1]IMRAM, Tohoku University, [2]Dept. Mech. Sys. Eng., Grad. School of Engineering, Tohoku University, [3]Grad. School of Environmental Studies, Tohoku University, [4]Panasonic Corp.

A2-13-P08

Theoretical study of H/D isotope effect on phase transition of hydrogen-bonded organic conductor κ-H_3(Cat-EDT-TTF)$_2$

Masanori TACHIKAWA
Yokohama City University

A2-13-P09

Control of electrical properties on transition metal oxides via protonic-electronic coupling

Hidekazu TANAKA, Azusa. N. HATTORI, Takashi YAMANAKA, Daiki KAWAMOTO, Keiichiro HAYASHI
Osaka University

A2-13-P10

Local electronic structure of interstitial hydrogen in manganese dioxide

Hirotaka OKABE[1], Ryosuke KADONO[1], Masatoshi HIRAISHI[1], Akihiro KODA[1], Soshi TAKESHITA[1], Kenji KOJIMA[2], Ichihiro YAMAUCHI[3], Hirohiko SATO[4]
[1]High Energy Accelerator Research Organization (KEK), [2]TRIUMF, [3]Saga University, [4]Chuo University

A2-13-P11

Moved

A2-13-P12

Lanthanide Oxyhydrides supported Ruthenium catalysts for ammonia synthesis

Masaaki KITANO[1], Kayato OOYA[1], Keiga FUKUI[1], Soshi IIMURA[1], Tomofumi TADA[1], Hideo HOSONO[1]
[1]Tokyo Institute of Technology, [2]Precursory Research for Embryonic Science and Technology

A2-13-P13

Heavy Hydrogen-doping of an Iron-based Superconductor SmFeAsO Epitaxial Film

Jumpei MATSUMOTO[1], Kota HANZAWA[1], Masato SASASE[2], Silvia HAINDL[3], Takayoshi KATASE[1], Hidenori HIRAMATSU[1,2], Hideo HOSONO[1,2]
[1]Laboratory for Materials and Structures, Institute of Innovative Research, Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [3]World Research Hub Initiative (WRHI), Institute of Innovative Research, Tokyo Institute of Technology

A2-13-P14

Carbon Doping of Hydrogen Boride Sheet Reduces H_2 Release Temperature

Takahiro KONDO[1,2], Yoshitaka FUJIMOTO[3], Ryota ISHIBIKI[4], Taiga GOTO[4], Shin-ichi ITO[1,2], Takeshi FUJITA[5], Akiyasu YAMAMOTO[2,6], Susumu SAITO[2,3], Hideo HOSONO[2]
[1]Faculty of Pure and Applied Sciences, University of Tsukuba, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [3]Department of Physics, Tokyo Institute of Technology, [4]Graduate School of Pure and Applied Sciences, University of Tsukuba, [5]School of Environmental Science and Engineering, Kochi University of Technology, [6]Institute of Engineering, Tokyo University of Agriculture and Technology

A2-13-P15

Hydrogenated Borophene Shows Catalytic Activity as Solid Acid

Takahiro KONDO[1,3], Asahi FUJINO[2], Shin-ichi ITO[1,3], Taiga GOTO[2], Ryota ISHIBIKI[2], Junko N KONDO[4], Tadahiro FUJITANI[1,5], Junji NAKAMURA[1], Hideo HOSONO[3]
[1]Faculty of Pure and Applied Sciences, University of Tsukuba, [2]Graduate School of Pure and Applied Sciences, University of Tsukuba, [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [4]IIR, Tokyo Institute of Technology, [5]Interdisciplinary Research Center, AIST

A2-13-P16

Fast H^- conduction in lanthanum oxyhydride $LaH_{3-2x}O_x$

Keiga FUKUI[1], Soshi IIMURA[1], Tomofumi TADA[1], Satoru FUJITSU[1], Masato SASASE[1], Hiromu TAMATSUKURI[2], Takashi HONDA[2], Kazutaka IKEDA[2], Toshiya OTOMO[2], Hideo HOSONO[1]
[1]MCES, Tokyo Institute of Technology, [2]High Energy Accelerator Research Organization (KEK)

A2-13-P17

The role of anion order/disorder in the hydrideconductivity in LnHO

Hiroki UBUKATA[1], Thibault BROUX[1], Fumitaka TAKEIRI[2,3], Kazuki SHITARA[3], Hiroki YAMASHITA[1], Akihide KUWABARA[5], Genki KOBAYASHI[2,3], Hiroshi KAGEYAMA[1]
[1]Kyoto University, [2]Institute for Molecular Science, [3]SOKENDAI (The Graduate University for Advanced Studies), [4]Osaka University, [5]Japan Fine Ceramics Center

A2-13-P18

Effect of cation size on hydride ion conduction in *Ln*$SrLiH_2O_2$(*Ln*= La, Pr, Nd, Sm, Gd) oxyhydrides

Naoki MATSUI[1], Yoyo HINUMA[2,3], Yuki IWASAKI[1], Kota SUZUKI[1], Jiang GUANGZHONG[1], Haq NAWAZ[4,5], Yumiko IMAI[4], Masao YONEMURA[6], Masaaki HIRAYAMA[1], Genki KOBAYASHI[4,5], Ryoji KANNO[1]
[1]Tokyo Institute of Technology, [2]Chiba University, [3]National Institute for Materials Science, [4]Institute for Molecular Science, [5]SOKENDAI (The Graduate University for Advanced Studies), [6]High Energy Accelerator Research Organization (KEK)

A2-13-P19

Hydrogen Anion and Subgap States in Amorphous In–Ga–Zn–O Thin Films

Joonho BANG, Satoru MATSUISHI, Hideo HOSONO
Tokyo Institute of Technology

A2-13-P20

Synthesis, local electronic structure and photoluminescence properties of rare earth-activated aluminate oxyhydride Sr_3AlO_4H.

Tong WU, Satoru MATSUISHI
Tokyo Institute of Technology

A2-13-P21

Adsorption of CO_2 on Hydrogen Boride Sheets with H-vacancy Defects

Taiga GOTO[1], Ryota ISHIBIKI[1], Shin-ichi ITO[2,3], Hideo HOSONO[2], Takahiro KONDO[3]
[1]Graduate School of Pure and Applied Sciences, University of Tsukuba, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [3]Faculty of Pure and Applied Sciences, University of Tsukuba

A2-13-P22

Structure and Electronic States Changes of Hydrogen Boride Sheets with Heating

Ryota ISHIBIKI[1], Iwao MATSUDA[2], Shin-ichi ITO[3,4], Hideo HOSONO[3], Takahiro KONDO[3,4]
[1]Graduate school of Pure and Applied Sciences, University of Tsukuba, [2]Institute for Solid State Physics, University of Tokyo, [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [4]Faculty of Pure and Applied Sciences, University of Tsukuba

A2-13-P23

Epitaxial growth of Ca_2NH thin films using reactive magnetron sputtering.

Seoungmin CHON[1], Shigeru KOBAYASHI[1], Kazunori NISHIO[1], Ryota SHIMIZU[1,2], Taro HITOSUGI[1]
[1]Tokyo Institute of Technology, [2]JST-PRESTO

A2-13-P24

Molecular Dynamics and Kinetic Monte Carlo Hybrid Method for Efficient Dynamics and Proton Conduction in Phosphoric Acid

Albert ISKANDAROV, Tomofumi TADA
Materials Research Center for Element Strategy, Tokyo Institute of Technology

A2-13-P25

Light-induced Large Electrical Resistivity Reduction in Yttrium Oxy-hydride Epitaxial Thin Films

Yuya KOMATSU[1], Ryota SHIMIZU[1,2], Kazunori NISHIO[1], Masahiro MIYAUCHI[1], Markus WILDE[3], Katsuyuki FUKUTANI[3], Taro HITOSUGI[1]
[1]Tokyo Institute of Technology, [2]JST-PRESTO, [3]Univ. of Tokyo

A2-13-P26

Passivation of Deep centers in Zinc Oxide Studied with Deep Level Transient Spectroscopy

Takeo OHSAWA
National Institute for Materials Science

A2-13-P27

Photo-induced color centers creation in Sr_2LiSiO_4H oxyhydride

Fauzin NAIMAH, Tong WU, Asako ISHIKAWA, Satoru MATSUISHI
Tokyo Institute of Technology

A2-13-P28

Low temperature synthesis of perovskite-type oxynitride-hydride as a catalyst for ammonia synthesis

Jun KUJIRAI, Masaaki KITANO, Kiya OGASAWARA, Tomofumi TADA, Hideo HOSONO
Tokyo Institute of Technology

December 11, 2019

Symposium A-3

Recent Advances in Computational Materials Science: Bridging Computations and Experiments

[Organizers]

Taisuke OZAKI
(Institute for Solid State Physics, The University of Tokyo)
Minoru OTANI
(National Institute of Advanced Inductrial Science and Technology)

December 11, 2019

Oral Session 1

Time 9:00–11:35 Room Mont-2

Chairperson Taisuke OZAKI

A3-11-I01 ▸Invited 9:00–9:40

Construction and exploitation of large ab initio data spaces to design materials with superior mechanical properties

Joerg NEUGEBAUER
Max-Planck-Institut fuer Eisenforschung

A3-11-O02 9:40–10:05

A Prototype First-Principles Only Phase Diagram: Al-Ni

Theresa DAVEY, Nguyen-Dung TRAN, Arkapol SAENGDEEJING, Ying CHEN
School of Engineering, Tohoku University

A3-11-O03 10:05–10:30

Python Framework for Direct Coupling of First-Principles Calculation with Replica Exchange Monte Carlo Sampling of Ion Disorder in Solids

Shusuke KASAMATSU[1,2], Yuichi MOTOYAMA[2], Yoshiyuki YAMAMOTO[2], Kazuyoshi YOSHIMI[2], Taisuke OZAKI[2], Osamu SUGINO[2]
[1]Yamagata University, [2]University of Tokyo

Break
10:30–10:45

A3-11-O04 10:45–11:10

First-principles prediction of structural phase transition temperature of $BaTiO_3$ based on finite-temperature phonon calculation

Daisuke HIRAI[1], Sakyo HIROSE[1], Terumasa TADANO[2]
[1]Murata Manufacturing Co., Ltd., [2]National Institute for Materials Science

A3-11-O05 11:10–11:35

Lattice thermal conductivity simulations by high-dimensional neural network potentials

Emi MINAMITANI[1], Masayoshi OGURA[2], Satoshi WATANABE[2,3]
[1]Institute for Molecular Science, [2]Department of Materials Engineering, the University of Tokyo, [3]Center for Materials Research by Information Integration, Research and Services Division of Materials Data and Integrated System, National Institute for Materials Science

December 11, 2019

Oral Session 2

Time 14:00–15:55 Room Mont-2

Chairperson Minoru OTANI

A3-11-O06 14:00–14:25

Insulator-Metal transition by non-adiabatic quantum lattice fluctuations

Norikazu TOMITA[1], Akira TAKAHASHI[2]
[1]Yamagata University, [2]Nagoya Institute of Technology

A3-11-O07 14:25–14:50

Structure map for AB_2 type 2D monolayers by high-throughput DFT calculations

Masahiro FUKUDA[1], Jingning ZHANG[2], Yung-Ting LEE[1], Taisuke OZAKI[1]
[1]University of Tokyo, [2]University of Science and Technology of China

Break
14:50–15:05

A3-11-O08 15:05–15:30

Niobium oxide dihalides $NbOX_2$: a new family of two-dimensional van der Waals layered materials with intrinsic ferroelectricity and antiferroelectricity

Gaoyang GOU
Xi'an Jiaotong University

A3-11-O09 15:30–15:55

Small Polarons in $BaTiO_3$: A First-Principles Study

Naoki TSUNODA[1], Yu KUMAGAI[2], Fumiyasu OBA[1,2]
[1]Laboratory for Materials and Structures, Institute of Innovative Research, Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

A3-11-P01

High-throughput Force Field Calculation towards the Search for Fast Ion Conductive Materials

Yasuhiro MIYAJI[1], Kouki NAKANO[1], Naoto TANIBATA[1,2], Ryo KOBAYASHI[1,3], Masanobu NAKAYAMA[1,2,3]
[1]Nagoya Institute of Technology, [2]Kyoto University ESICB of Elements Strategy Initiative for Catalysts and Battereis, [3]MaDiS/CMi2, NIMS of National Institute for Materials Science

A3-11-P02

Theoretical Study of Singlet Exciton Fission in Organic Materials

Hiroyuki TAMURA
The University of Tokyo

A3-11-P03

Temperature Dependent Grain Boundary Segregation in BCC-Fe – A Grand Canonical Monte Carlo – Molecular Dynamics Hybrid Study

Rodrigo Pinheiro CAMPOS[1], Shuhei SHINZATO[2], Akio ISHII[2], Shigenobu OGATA[2,3]
[1]School of Engineering Science, Osaka University, Osaka, 560-8531, Japan, [2]Graduate School of Engineering Science, Osaka University, Osaka, 560-8531, Japan, [3]Center for Elements Strategy Initiative for Structural Materials, Kyoto University, Kyoto, 606-8501, Japan

A3-11-P04

Dynamics of Rings and Polymer in Polyrotaxane Studied by Molecular Dynamics Simulations and Quasi-Elastic Neutron Scattering Experiments

Yusuke YASUDA[1], Yuta HIDAKA[1], Koichi MAYUMI[1], Takeshi YAMADA[2], Kazushi FUJIMOTO[3], Susumu OKAZAKI[3], Hideaki YOKOYAMA[1], Kohzo ITO[1]
[1]Department of Advanced Materials Science, School of Frontier Sciences, The University of Tokyo, 5-1-5 Kashiwa-noha, Kashiwa, Chiba 277-8561, Japan, [2]Neutron Science and Technology Center, Comprehensive Research Organization for Science and Society (CROSS), IQBRC Bldg., 162-1 Shirakata, Tokai, Naka, Ibaraki 319-1106, Japan, [3]Department of Materials Chemistry, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan

A3-11-P05

Forecasting of IrO_3 Desorbability from Iridium Alloys by First-Principles Study

Insung SEO[1], Syunsuke YOKOTA[2], Yousuke IMAI[2], Yoshihiro GOHDA[1]
[1]Tokyo Institute of Technology, [2]Ishifuku Metal Industry

A3-11-P06

Effects of Chemical Composition and Surface Reconstruction on Band Alignment of Perovskite Oxides

Ha-Jun SUNG[1], Yasuhide MOCHIZUKI[1], Fumiyasu OBA[1,2]
[1]Laboratory for Materials and Structures, Institute of Innovative Research, Tokyo Institute of Technology, [2]Center for Materials Research by Information Integration, Research and Services Division of Materials Data and Integrated System, National Institute for Materials Science

A3-11-P07

***Ab Initio* Local-Energy and Local-Stress Schemes and Application to Metallic Grain Boundaries**

Masanori KOHYAMA[1], Zhuo XU[1], Shingo TANAKA[1], Yoshinori SHIIHARA[2]
[1]National Institute of Advanced Industrial Science and Technology, [2]Toyota Technological Institute

A3-11-P08

Construction of machine learning atomic potential for investigation of lattice defects in BCC iron

Hideki MORI[1], Taisuke OZAKI[2]
[1]College of Industrial Technology, [2]Institute for Solid State Physics, University of Tokyo

A3-11-P09

***Ab initio* approaches for Green's functions of materials using coupled-cluster singles doubles (CCSD)**

Taichi KOSUGI, Yuichiro MATSUSHITA
Tokyo Institute of Technology

A3-11-P10

Stability of Self-Trapped Holes in Ga_2O_3 Polymorphs

Tomoya GAKE[1], Yu KUMAGAI[2], Fumiyasu OBA[1]
[1]Laboratory for Materials and Structures, Institute of Innovative Research, Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology

A3-11-P11

First Principles Study For A Quantitative Characterization Of Electrides Based On Many-Body Hamiltonian

Shu KANNO[1], Tomofumi TADA[1], Takeru UTSUMI[1], Kazuma NAKAMURA[2], Hideo HOSONO[1]
[1]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [2]Department of Basic Sciences, Kyushu Institute of Technology

A3-11-P12

Investigation of Au nanoparticles supported on ZnO for CO oxidation using density functional theory

Shih Hsuan HUNG
University of Tokyo

A3-11-P13

Benchmark of Density Functional Theory for Superconductors in Elemental Materials

Mitsuaki KAWAMURA, Taisuke OZAKI
Institute for Solid State Physics, The University of Tokyo

December 11–13, 2019

Symposium A-4

Neutrons for Materials Research

[Organizers]

Toshiji KANAYA (J-PARC MLF, KEK)
Jun-ichi SUZUKI (CROSS)
Anna PARADOWSKA (ANSTO)
Dongfen CHEN (CIAE)

December 11, 2019

Oral Session 1

Interface Science, Slow Dynamics of Polymers

Time 9:00–11:30 Room Miel-4

Chairpersons Hiroyuki AOKI, Tsukasa MIYAZAKI

A4-11-K01 ▸Keynote 9:00–9:35

Interfacial Structural Analysis on Polymer Thin Films by Neutron Reflectometry

Naoya TORIKAI
Mie University

A4-11-I02 ▸Invited 9:35–10:00

Neutron Reflectivity Study of Dynamic Polymer Brush

Hideaki YOKOYAMA
University of Tokyo

A4-11-I03 ▸Invited 10:00–10:25

Structure of Model Electrode-electrolyte Interfaces in Polymer Electrolyte Fuel Cells and Lithium-ion Batteries

Masashi HARADA[1], Kenji KUDO[1], Hiroyuki KAWAURA[1], Norifumi L YAMADA[2]
[1]Toyota Central R&D Labs., Inc., [2]High Energy Accelerator Research Organization

A4-11-I04 ▸Invited 10:25–10:50

Impact of Solid Interface on Ion Transport in Polyelectrolyte Thin Films

Daisuke KAWAGUCHI
Kyushu University

A4-11-O05 10:50–11:10

Structure and Dynamics of Rubbers Reinforced with Metallic Diacrylate Studied by Quantum Beams

Toshiji KANAYA
KEK, J-PARC

A4-11-O06 11:10–11:30

Dynamics of Polyrotaxane Glass Investigated by Quasi-elastic Neutron Scattering

Koichi MAYUMI[1], Yuta HIDAKA[1], Takeshi YAMADA[2], Masayuki TANIGUCHI[1], Kazuaki KATO[1,3], Hideaki YOKOYAMA[1], Tatsuya KIKUCHI[4], Maiko KOFU[5], Kenji NAKAJIMA[5], Toshiji KANAYA[5], Kohzo ITO[1]
[1]The University of Tokyo, [2]CROSS, [3]NIMS, [4]Sumitomo Rubber Industries, [5]J-PARC MLF

December 11, 2019

Oral Session 2

Diffraction and Imaging, New Technology

Time 14:00–15:55 Room Miel-4

Chairperson Kazuya AIZAWA

A4-11-I07 ▸Invited 14:00–14:25

Development and Applications of the Neutron Grating Interferometer for Material Research

Seung Wook LEE
Pusan National University

A4-11-I08 ▸Invited 14:25–14:50

Contrast Variation Small Angle Neutron Scattering Using Proton Spin Polarization at SANS Spectrometer iMATERIA (BL20), J-PARC

Yohei NODA[1], Tomoki MAEDA[1], Takayuki OKU[1,2], Satoshi KOIZUMI[1], Tomomi MASUI[3], Hiroyuki KISHIMOTO[3]
[1]Ibaraki University, [2]J-PARC Center, [3]Sumitomo Rubber Industries, Ltd.

A4-11-I09 ▸Invited 14:50–15:15

Structural Response of Piezoelectric Material Studied by Stroboscopic Neutron Diffraction under Cyclic Electric Field

Takuro KAWASAKI, Stefanus HARJO, Kazuya AIZAWA
Japan Atomic Energy Agency

A4-11-O10 15:15–15:35

Martensitic Transformation in Metastable Steels Monitored by Neutron Diffraction

Stefanus HARJO[1], Takuro KAWASAKI[1], Noriyuki TSUCHIDA[2], Satoshi MOROOKA[1], Kazuya AIZAWA[1]
[1]Japan Atomic Energy Agency, [2]University of Hyogo

A4-11-O11 15:35–15:55

Observation of Breaking and Recombination of Dihydrogen Bonds in Ammonia Borane by High Pressure Neutron Diffraction

Satoshi NAKANO[1], Asami SANO-FURUKAWA[2], Takanori HATTORI[2], Kazuki KOMATSU[3], Hiroshi FUJIHISA[4], Hiroshi YAMAWAKI[4], Yoshito GOTOH[4], Takumi KIKEGAWA[5]
[1]National Institute for Materials Science, [2]J-PARC Center, Japan Atomic Energy Agency, [3]University of Tokyo, [4]National Institute of Advanced Industrial Science and Technology, [5]Institute of Materials Structure Science, High Energy Accelerator Research Organization

December 12, 2019

Oral Session 4

Time Division Measurements

Time 9:00–11:15 Room Mont-2

Chairperson Jun-ichi SUZUKI

A4-12-K01 ▸Keynote 9:00–9:35

Stroboscopic Small-angle Neutron Scattering for Metastable Magnetic Skyrmion Lattice in MnSi

Taro NAKAJIMA

The University of Tokyo

A4-12-I02 ▸Invited 9:35–10:00

Development and Application of Pulsed Magnet System up to 30 Tesla for Neutron Scattering Experiment

Masao WATANABE[1], Takumi KIHARA[2], Hiroyuki NOJIRI[2]

[1]J-PARC Center / JAEA, [2]Institute for Materials Research / Tohoku University

A4-12-I03 ▸Invited 10:00–10:25

Study of Deformation Mechanism of Rock Samples Using Simultaneous Measurements of AE Signal and Neutron Diffraction Pattern

Jun ABE[1], Kotaro SEKINE[2], Stefanus HARJO[3], Takuro KAWASAKI[3], Wu GONG[4], Kazuya AIZAWA[3]

[1]Comprehensive Research Organization for Science and Society (CROSS), [2]Japan Oil, Gas and Metals National Corporation (JOGMEC), [3]Japan Atomic Energy Agency (JAEA), [4]Kyoto University

A4-12-I04 ▸Invited 10:25–10:50

High-Pressure and Temperature Neutron Radiography for Measuring Interdiffusion of H and D in Brucite

Hiroshi ARIMA[1], Takanori HATTORI[2], Asami SANO-FURUKAWA[2], Shinichi MACHIDA[1], Jun ABE[1], Kenichi FUNAKOSHI[1]

[1]CROSS, [2]JAEA

A4-12-I05 ▸Invited 10:50–11:15

Microstructure of Vanishing Foam Investigated by Time-of-flight at SANS Spectrometer iMATERIA (BL20) J-PARC

Satoshi KOIZUMI[1], Shiho YADA[2], Toshikazu YOSHIMURA[2], Hiroshi SHIMOSEGAWA[3], Hiroya FUJITA[3], Yukako MATSUE[4], Yohei NODA[1]

[1]Ibaraki University, [2]Nara Women's University, [3]NOF Corporation, [4]Kracie Home Products, Ltd

December 12, 2019

Oral Session 5

Conduction and Dispersion

Time 14:00–16:15 Room Mont-2

Chairperson Yukinobu KAWAKITA

A4-12-K06 ▸Keynote 14:00–14:35

Structural Study of Hydrides by High Intensity Neutron Total Diffractometer (NOVA)

Kazutaka IKEDA

High Energy Accelerator Research Organization (KEK)

A4-12-I07 ▸Invited 14:35–15:00

Ion Migration Mechanism for $Li_{10}GeP_2S_{12}$-type Lithium Conductors Investigated by Neutron Diffraction Measurements

Satoshi HORI[1], Kota SUZUKI[1], Masaaki HIRAYAMA[1], Ryoji KANNO[1], Takeshi YAJIMA[2], Zenji HIROI[2], Yoyo HINUMA[3], Takashi OHHARA[4], Takashi KAMIYAMA[5]

[1]Tokyo Institute of Technology, [2]University of Tokyo, [3]Chiba University, [4]Japan Atomic Energy Agency, [5]Institute of Materials Structure Science

A4-12-I08 ▸Invited 15:00–15:25

Local Structure Analysis on Crystalline Electrode Materials for Rechargeable Batteries by Reverse Monte Carlo Modelling

Naoto KITAMURA

Tokyo University of Science

A4-12-I09 ▸Invited 15:25–15:50

Insights into Caloric Materials: a Neutron Scattering Study

Bing LI

Institute of Metal Research, Chinese Academy of Sciences

A4-12-I10 ▸Invited 15:50–16:15

Structure and Dynamic Properties of Water at Extreme Conditions – in a Nano-space and under High Pressures

Koji YOSHIDA, Toshio YAMAGUCHI

Fukuoka University

December 13, 2019

Oral Session 7

Structure and Dynamics of Magnetic and Superconducting Materials

Time 9:00–11:35 Room Miel-5

Chairperson Takashi KAMIYAMA

A4-13-I01 ▸Invited 9:00–9:25

Combined Neutron Diffraction and X-ray Absorption Spectroscopy Study on the Spin Structures in Cobaltite Double Perovskites

Deok-Yong CHO

Chonbuk National University

A4-13-I02 ▸Invited 9:25–9:50

Magnetic Structure Analysis Using Z-Rietveld Program

Masato HAGIHALA

High Energy Accelerator Research Organization (KEK)

A4-13-I03 ▸Invited 9:50–10:15

Development and Application of Magnetic Pair Distribution Function (mPDF) Analysis

Katsuaki KODAMA

Japan Atomic Energy Agency

A4-13-O04 10:15–10:35

Neutron Scattering Experiments to Understand the Multiferroicity in the Molecular Magnet $(ND_4)_2FeCl_5{\cdot}D_2O$

Javier CAMPO[1], Oscar FABELO[2], Jose Alberto RODRIGUEZ-VELAMAZAN[2], Juan RODRIGUEZ-CARVAJAL[2], Laurent CHAPON[3]

[1]Aragon Materials Science Institute (CSIC-UZ), [2]Institute Laue Langevin, [3]Diamond Light Source Ltd

A4-13-O05 10:35–10:55

Systematic Study of a New Ferrite Family, 114 Ferrites $RBaFe_4O_7$ (R = Y, Rare Earth, and etc.) - Neutron Scattering Measurements -

Kazuya KAMAZAWA

Comprehensive Research Organization for Science and Society (CROSS)

A4-13-O06 10:55–11:15

Spin Glass Dynamics in a Structural Glass of $C4mimFeCl_4$

Maiko KOFU[1], Ryuta WATANUKI[2], Toshiro SAKAKIBARA[3], Seiko OHIRA-KAWAMURA[1], Kenji NAKAJIMA[1], Takeshi UEKI[4], Kazuhiro AKUTSU[5], Osamu YAMAMURO[3]

[1]J-PARC Center, [2]Yokohama National University, [3]Institute for Solid State Physics, University of Tokyo, [4]National Institute for Materials Science, [5]Comprehensive Research Organization for Science and Society

A4-13-O07 11:15–11:35

Quantum Dynamics of Hydrogen in Iron-based Superconductor

Jun-ichi YAMAURA

Materials Research Center for Element Strategy, Tokyo Institute of Technology

December 12, 2019

Poster Session

Time 16:30–18:00 Room Trade-0

A4-12-P01

Elastic and Dynamical Structural Properties of La and Mn-doped $SrTiO_3$ Studied by Neutron Scattering and Their Relation with Thermal Conductivities

Ryoichi KAJIMOTO[1], Mitsutaka NAKAMURA[1], Naoki MURAI[1], Shin-ichi SHAMOTO[1], Takashi HONDA[2], Kazutaka IKEDA[2], Toshiya OTOMO[2], Hiroto HATA[3], Takahiro ETO[3], Masaaki NODA[4], Hideki KUWAHARA[4], Tetsuji OKUDA[3]

[1]Japan Atomic Energy Agency, [2]High Energy Accelerator Research Organization, [3]Kagoshima University, [4]Sophia University

A4-12-P02

Structural Instability-assisted Li-migration in Solid-state Electrolyte $(La,Li)TiO_3$

Masato MATSUURA[1], Hiroki MORIWAKE[2], Yasuyuki FUJIWARA[3], Ryoichi KAJIMOTO[4], Mitsutaka NAKAMURA[4], Koji OHARA[5], Yukinobu KAWAKITA[4]

[1]Comprehensive Research Organization for Science and Society, [2]Nanostructures Research Laboratory, Japan Fine Ceramics Center, [3]Faculty of Engineering, Shinshu University, [4]J-PARC Center, Japan Atomic Energy Agency, [5]Japan Synchrotron Radiation Research Institute

A4-12-P03

Q-dependence of the Resonance Mode on Iron-based Superconductor $Fe(Te_{0.5}Se_{0.5})$

Motoyuki ISHIKADO[1], Katsuaki KODAMA[2], Ryoichi KAJIMOTO[3], Mitsutaka NAKAMURA[3], Yasuhiro INAMURA[3], Kazuhiko IKEUCHI[1], Masatoshi ARAI[3], Shin-ichi SHAMOTO[4]

[1]CROSS, [2]Materials Sciences Research Center, JAEA, [3]J-PARC, JAEA, [4]Advance Science Research Center JAEA

A4-12-P04

Semimetal and Superconductivity in Chiral-structure Phase of $R_3T_4Sn_{13}$ (R = Ce, La and T = Co, Rh, Ir)

Kazuaki IWASA[1], Yuka OTOMO[2], Kazuya SUYAMA[2], Ryoga KARINO[1], Kango MIYAKAWA[1], Seiya NAKAZATO[1], Daisuke HASHIMOTO[1], Mami SHIOZAWA[1], Keitaro KUWAHARA[1], Motoyuki ISHIKADO[3], Hajime SAGAYAMA[4], Hironori NAKAO[4], Seiko OHIRA-KAWAMURA[5], Tatsuya KIKUCHI[5], Kenji NAKAJIMA[5], Takashi OHHARA[5], Akiko NAKAO[3], Koji MUNAKATA[3], Ryoji KIYANAGI[5], Jean-Michel MIGNOT[6], Françoise DAMAY[6], Arsen GUKASOV[6]

[1]Ibaraki University, [2]Tohoku University, [3]Comprehensive Research Organization for Science and Society, [4]Institute of Materials Structure Science, High Energy Accelerator Research Organization, [5]J-PARC Center, [6]Laboratoire Léon Brillouin, CEA-CNRS

A4-12-P05

Monochiral Helimagnetism in Homochiral Crystals of $CsCuCl_3$ Probed by Polarized Neutron Diffraction and Muon Spin Rotation

Kazuki OHISHI[1], Yusuke KOUSAKA[2], Kazuhisa KAKURAI[1], Jun-ichi SUZUKI[1], Vladimir HUTANU[3], Javier CAMPO[4], Akihiro KODA[5], Kenji M KOJIMA[6], Hubertus LUETKENS[7], Alex AMATO[7], Katsuya INOUE[8], Jun AKIMITSU[9]

[1]Comprehensive Research Organization for Science and Society (CROSS), [2]Osaka Prefecture University, [3]RWTH Aachen University and Julich Centre for Neutron Science (JCNS) at Heinz Maier-Leibnitz Zentrum, [4]Aragon Materials Science Institute (CSIC-University of Zaragoza), [5]High Energy Accelerator Research Organization (KEK), [6]TRIUMF, [7]Paul Scherrer Institute, [8]Hiroshima University, [9]Okayama University

A4-12-P06

Direct Observation of Ferromagnetic Moment of Potassium Nanoclusters Arrayed in Zeolite A by Polarized Neutron Diffraction

Takehito NAKANO
Ibaraki University

A4-12-P07

Distributions of Water inside Nafion Thin Films on Different Substrates Analyzed by Neutron Reflectometry under Controlled Temperature and Humidity

Teppei KAWAMOTO[1], Makoto AOKI[2], Taro KIMURA[3], Takako MIZUSAWA[4], Norifumi L. YAMADA[5], Junpei MIYAKE[6], Kenji MIYATAKE[1,6], Junji INUKAI[1,6]

[1]Fuel Cell Nanomaterials Center, University of Yamanashi, [2]Division of Life, Medical, Natural Sciences and Technology, Organization for Advanced and Integrated Research, Kobe University, [3]Integrated Graduate School of Medicine, Engineering, and Agricultural Sciences, University of Yamanashi, [4]Comprehensive Research Organization for Science and Society, [5]Institute of Materials Structure Science, High Energy Accelerator Research Organization, [6]Clean Energy Research Center, University of Yamanashi

A4-12-P08

Quasi-elastic and Inelastic Neutron Scattering Spectrometer DNA in MLF, J-PARC and its Application to Materials Science

Yukinobu KAWAKITA[1], Masato MATSUURA[2], Taiki TOMINAGA[2], Takeshi YAMADA[2], Makoto KOBAYASHI[2], Hiroshi NAKAGAWA[1]

[1]J-PARC Center, Japan Atomic Energy Agency, [2]Comprehensive Research Organization for Science and Society

A4-12-P09

Small and Wide Angle Neutron Scattering Technique for Materials Research

Jun-ichi SUZUKI
Comprehensive Research Organization for Science and Society (CROSS)

A4-12-P10

Current Status of the New Compact Accelerator-based Neutron Facility at AIST

Koichi KINO[1,2], Takeshi FUJIWARA[1,2], Michihiro FURUSAKA[1,2], Noriyosu HAYASHIZAKI[1,2,3], Hidetoshi KATO[1,2], Ryunosuke KURODA[1,2], Koji MICHISHIO[1,2], Takemi MUROGA[1], Hiroshi OGAWA[1,2], Brian E OROURKE[1,2], Nagayasu OSHIMA[1,2], Daisuke SATO[1,2], Norihiro SEI[1,2], Tamao SHISHIDO[1], Ryoichi SUZUKI[1,2], Masahito TANAKA[1,2], Hiroyuki TOYOKAWA[1,2], Akira WATAZU[1,2]

[1]Innovative Structural Materials Association (ISMA), [2]National Institute of Advanced Industrial Science and Technology (AIST), [3]Tokyo Institute of Technology (Tokyo Tech)

Cluster B

New Trend of Materials Research

Symposium

B-1 Data-Centric Science for Materials Research

B-2 Materials Integration: Fusion of Materials Science and Experiments through Data Science

B-3 Mathematical Materials Science
-Mathematical Approaches for Materials Designs in the Data Driven Society-

B-4 Topological Materials Science for Innovative Functions

December 11–12, 2019

Symposium B-1

Data-Centric Science for Materials Research

[Organizers]

Shinji TSUNEYUKI (Department of Physics, the University of Tokyo)
Satoshi ITOH (National Institute for Materials Science)
Fumiyasu OBA (Tokyo Institute of Technology)
Jason HATTRICK-SIMPERS (National Institute of Standards and Technology)
Matthias SCHEFFLER (Fritz Haber Institute of the Max Planck Society)
Jian-xin XIE (University of Science and Technology Beijing)

[Sponsor]

STAM Science and Technology of Advanced Materials

Science and Technology of Advanced Materials(STAM)

December 11, 2019

Oral Session 1

Time 9:00–11:30 Room Miel-1

Chairpersons Shinji TSUNEYUKI, Matthias SCHEFFLER

B1-11-I01 ▸Invited 9:00–9:30

Data-driven Materials Design and Machine Learning using the Materials Project

Kristin PERSSON
University of California at Berkeley

B1-11-I02 ▸Invited 9:30–10:00

Building a Foundation for Autonomous Materials Research Systems at an International Scale

Zachary Tim TRAUTT
National Institute of Standards and Technology

B1-11-O03 10:00–10:15

Prediction of Material Properties from Its Chemical Formula Using Novel Descriptor "*Elemental Fingerprints*" with Neural Networks

Jaekyun HWANG[1], Satoshi WATANABE[1,2]
[1]The University of Tokyo, [2]National Institute for Materials Science

B1-11-O04 10:15–10:30

Structural feature extraction on chemical space by clustering and network analysis

Mariko ITO, Takaaki OHNISHI
The University of Tokyo

B1-11-I05 ▸Invited 10:30–11:00

Breaking the Curse of Small Data in Materials Informatics

Ryo YOSHIDA
The Institute of Statistical Mathematics

B1-11-O06 11:00–11:15

Hybrid Algorithm of Bayesian Optimization and Evolutionary algorithm in Crystal Structure Prediction

Tomoki YAMASHITA[1,2], Shinichi KANEHIRA[2], Nobuya SATO[3], Hiori KINO[1,4], Koji TSUDA[1,5,6], Takashi MIYAKE[1,3,4], Tamio OGUCHI[1,2]
[1]Research and Services Division of Materials Data and Integrated System, National Institute for Materials Science, [2]Institute of Scientific and Industrial Research, Osaka University, [3]Research Center for Computational Design of Advanced Functional Materials, National Institute of Advanced Industrial Science and Technology, [4]Elements Strategy Initiative Center for Magnetic Materials, National Institute for Materials Science, [5]Graduate school of Frontier Sciences, The University of Tokyo, [6]RIKEN Center for Advanced Intelligence Project

B1-11-O07 11:15–11:30

Fast Prediction of Crystal Structure Stability by Machine Learning

Yuki INADA
The University of Tokyo

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Miel-1

Chairpersons Satoshi ITOH, Youhei YAMAJI

B1-11-I08 ▸Invited 14:00–14:30

Verification and Error Estimates for *Ab Initio* Data

Claudia DRAXL
HU Berlin

B1-11-O09 14:30–14:45

High-Throughput Calculations and Machine-Learning Prediction of Oxygen Vacancy Formation Energies

Yu KUMAGAI[1], Akira TAKAHASHI[2], Fumiyasu OBA[1,2,3]
[1]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [2]Laboratory for Materials and Structures, Tokyo Institute of Technology, [3]CMI2, MaDIS, National Institute for Materials Science

B1-11-O10 14:45–15:00

Machine learning and ab initio calculations for proton-conducting oxides

Yoshihiro YAMAZAKI
Kyushu University

B1-11-I11 ▸Invited 15:00–15:30

Unavoidable Disorder and Entropy in Multi-Component Systems

Stefano CURTAROLO
Center of Materials Genomics, Duke University

B1-11-O12 15:30–15:45

Systematic generation of tight-binding Hamiltonians for ferromagnets and its application

Takashi KORETSUNE
Tohoku University

B1-11-O13 15:45–16:00

Construction of Neutral Network Potential to Investigate Interface Structures of Au(111)/Li_3PO_4

Koji SHIMIZU[1], Wei LIU[1], Wenwen LI[2], Yasunobu ANDO[2], Emi MINAMITANI[3], Satoshi WATANABE[1,4]
[1]The University of Tokyo, [2]National Institute of Advanced Industrial Science and Technology, [3]Institute for Molecular Science, [4]National Institute for Materials Science

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Miel-1

Chairpersons Yu KUMAGAI, Takashi KORETSUNE

B1-11-I14 ▸Invited 16:30–17:00

Screening materials from high-throughput ab initio calculations and machine learning

Gian-Marco RIGNANESE
Université catholique de Louvain

B1-11-O15 17:00–17:15

Discovery of Oxide Ion Conductors by ensemble-scope descriptor

Nobuko OHBA, Seiji KAJITA, Akitoshi SUZUMURA, Shin TAJIMA, Ryoji ASAHI
Toyota Central R&D Laboratories Inc.

B1-11-O16 17:15–17:30

Computational screening of novel solid electrolyte candidates for all-solid-state battery by high-throughput DFT and data science techniques

Randy JALEM[1], Yoshitaka TATEYAMA[1,2,4], Ichiro TAKEUCHI[2,5], Masanobu NAKAYAMA[1,2,4,5]
[1]Center for Green Research on Energy and Environmental Materials & Global Research Center for Environment and Energy based on Nanomaterials Science (GREEN), National Institute for Materials Science (NIMS), Tsukuba, Japan, [2]Center for Materials research by Information Integration (CMI^2), Research and Services Division of Materials Data and Integrated System (MaDIS), NIMS, Tsukuba, Japan, [3]PRESTO, Japan Science and Technology Agency (JST), Saitama, Japan, [4]Elements Strategy Initiative for Catalysts & Batteries, Kyoto University, Kyoto, Japan, [5]Nagoya Institute of Technology (NITech), Nagoya, Japan

B1-11-I17 ▸Invited 17:30–18:00

Data-Driven Computational Design of Emerging Microstructural Material Systems

Wei CHEN
Northwestern University

B1-11-O18 18:00–18:15

Origin of High-Temperature Superconductivity Revealed by Boltzmann Machine

Youhei YAMAJI[1], Teppei YOSHIDA[2], Atsushi FUJIMORI[3], Masatoshi IMADA[3,4]
[1]The University of Tokyo, [2]Kyoto University, [3]Waseda University, [4]Toyota Physical and Chemical Research Institute

B1-11-O19 18:15–18:30

Design of oil molecules by high-throughput molecular dynamics simulations

Seiji KAJITA, Tomoyuki KINJO, Tomoki NISHI
Toyota Central R&D Labs., Inc.

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Port-1

Chairpersons Fumiyasu OBA, Isao OHKUBO

B1-12-I01 ▸Invited 16:30–17:00

Machine learning assisted composition design of Copper-base alloys with high strength and high electrical conductivity

Huadong FU, Hongtao ZHANG, Jianxin XIE
University of Science and Technology Beijing

B1-12-O02 17:00–17:15

Development of layered complex nitrides accelerated by the combination of first-principles calculation, machine learning, and experiments

Isao OHKUBO, Takao MORI
National Institute for Materials Science (NIMS)

B1-12-O03 17:15–17:30

Understanding of diffraction pattern and homology in disordered materials

Yohei ONODERA[1,2], Shinji KOHARA[3,2,4,5], Shuta TAHARA[6,2], Atsunobu MASUNO[7,2], Hiroyuki INOUE[8], Motoki SHIGA[5,9,16], Akihiko HIRATA[10,11,12,13], Koichi TSUCHIYA[14], Yasuaki HIRAOKA[15,2,13], Ippei OBAYASHI[16,13], Koji OHARA[17], Osami SAKATA[3]
[1]Institute for Integration Radiation and Nuclear Science, Kyoto University, [2]Center for Materials research by Information Integration (CMI2), Research and Services Division of Materials Data and Integrated System (MaDIS), National Institute for Materials Science (NIMS), [3]Research Center for Advanced Measurement and Characterization, NIMS, [4]Research and Utilization Division, Japan Synchrotron Radiation Research Institute, [5]PRESTO, Japan Science and Technology Agency, [6]Faculty of Science, University of the Ryukyus, [7]Graduate School of Science and Technology, Hirosaki University, [8]Institute of Industrial Science, The University of Tokyo, [9]Department of Electrical, Electronic and Computer Engineering, Faculty of Engineering, Gifu University, [10]Graduate School of Fundamental Science and Engineering, Waseda University, [11]Kagami Memorial Research Institute for Materials Science and Technology, Waseda University, [12]Mathematics for Advanced Materials-OIL, AIST-Tohoku University, [13]WPI Advanced Institute for Materials Research, Tohoku University, [14]Design and Producing Field, Corrosion Resistant Alloy Group, Research Center for Structural Materials, NIMS, [15]Kyoto University Institute for Advanced Study, Kyoto University, [16]Center for Advanced Intelligence Project, RIKEN, [17]Diffraction and Scattering Division, Center for Synchrotron Radiation Research, Japan Synchrotron Radiation Research Institute

B1-12-I04 ▸Invited 17:30–18:00

Data-Driven Science for X-Ray Absorption Fine Structure Spectra Measured in Synchrotron Radiation Facilities

Ichiro AKAI[1,2], Yoshiki SENO[2], Masaichiro MIZUMAKI[3], Toru AONISHI[4]
[1]Kumamoto University, [2]Kyushu Synchrotron Light Research Center, [3]Japan Synchrotron Radiation Research Institute, [4]Tokyo Institute of Technology

B1-12-O05 18:00–18:15

Sparse modeling of extended x-ray absorption fine structures (EXAFS)

Yasuhiko IGARASHI[1,2,3], Hiroyuki SETOYAMA[4], Toshihiro OKAJIMA[4], Ichiro AKAI[4,5], Masato OKADA[1,3]
[1]Graduate School of Frontier Science, The University of Tokyo, [2]Japan Science and Technology Agency, PRESTO, [3]Research and Services Division of Materials Data and Integrated System, National Institute for Material Science, [4]Kyushu Synchrotron Light Research Center, [5]Institute of Pulsed Power Science, Kumamoto University, Kumamoto

B1-12-O06 18:15–18:30

Statistical Machine Learning for Spectrum Imaging Data Analysis

Motoki SHIGA[1,2,3], Shunsuke MUTO[4]
[1]Gifu University, [2]Japan Science and Technology Agency, [3]RIKEN, [4]Nagoya University

December 12, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

B1-12-P01

Descriptor for Efficient Crystal Structure Prediction Using the Bayesian Optimization

Nobuya SATO[1], Tomoki YAMASHITA[2,3], Tamio OGUCHI[2,3], Koji HUKUSHIMA[2,4], Takashi MIYAKE[1,2]
[1]National Institute of Advanced Industrial Science and Technology, [2]National Institute for Materials Science, [3]Institute of Scientific and Industrial Research, Osaka University, [4]Department of Basic Science, University of Tokyo

B1-12-P02

Testing Procedure Anomaly Detection Method for Materials Big Data

Peng SHI, Zhen ZHAO
University of Science and Technology Beijing

B1-12-P03

Predicted High-yield Synthesis Of Manganese-oxide Nanosheets Through Exfoliation Of The Layered Composites

Kyohei NODA[1], Yasuhiko IGARASHI[2,3], Hiroaki IMAI[1], Yuya OAKI[1,3]
[1]Keio University, [2]The University of Tokyo, [3]JST PRESTO

B1-12-P04

Crystal structure simulation by assimilating incomplete experimental data

Seiji YOSHIKAWA[1], Naoto TSUJIMOTO[1], Daiki ADACHI[1], Ryosuke AKASHI[1], Synge TODO[1,2,3], Shinji TSUNEYUKI[1,2]
[1]Department of Physics, The University of Tokyo, [2]Institute for Solid State Physics, The University of Tokyo, [3]Research and Services Division of Materials Data and Integrated System, National Institute for Materials Science

B1-12-P05

3D Phase-Field Modeling of Solid-State Sintering: The Diffusion Mechanism Dependence of Grain-Boundary Formation

Yuki OKADA, Akiyasu YAMAMOTO, Akimitsu ISHII, Akinori YAMANAKA
Tokyo University of Agriculture and Technology

B1-12-P06

Modeling the normal-state current transport in iron-based superconducting polycrystalline materials

Takuya OBARA, Akiyasu YAMAMOTO
Tokyo University of Agriculture and Technology

B1-12-P07

Prediction of X-ray Absorption Spectra from Crystal Structures: Machine Learning Approaches

Hidekazu IKENO[1,2], Naoyuki MIYAMOTO[1]
[1]Osaka Prefecture University, [2]PRESTO, JST

B1-12-P08

Deep Neural Network Approach to the X-ray Absorption Spectroscopy

Naoyuki MIYAMOTO[1], Hidekazu IKENO[1,2]
[1]Department of Materials Science, Osaka Prefecture University, [2]Precursory Research for Embryonic Science and Technology (PRESTO), Japan Science and Technology Agency (JST)

B1-12-P09

Uncovering new stable Fe-Nd-X structures with machine learning

Duong Nguyen NGUYEN
Japan Advanced Institute of Science and Technology

B1-12-P10

Machine-Learning Guided Discovery of a New Thermoelectric Material

Yuma IWASAKI
NEC

B1-12-P11

Machine-Learned Kinetic Energy Functional in Isolated Systems and its Combination with Orbital-Free Density Functional Theory

Junji SEINO[1,2], Ryo KAGEYAMA[3], Mikito FUJINAMI[3], Yasuhiro IKABATA[1], Hiromi NAKAI[1,3,4]
[1]Waseda Research Institute for Science and Engineering, Waseda University, [2]PRESTO, Japan Science and Technology Agency, [3]School of Advanced Science and Engineering, Waseda University, [4]ESICB, Kyoto University

B1-12-P12

Machine-Learning-Assisted Exploration for Novel Lanthanide Based Metal-Organic Frameworks

Yu KITAMURA[1], Daisuke TANAKA[1,2]
[1]Kwansei Gakuin University, [2]JST PRESTO

B1-12-P13

Novel Material Search Method of Lithium Ion Conductors Using Machine Learning

Kota SUZUKI[1,2], Kosei OHURA[1], Atsuto SEKO[2,3], Masaaki HIRAYAMA[1], Isao TANAKA[3], Ryoji KANNO[1]
[1]Tokyo Institute of Technology, [2]JST, PRESTO, [3]Kyoto University

B1-12-P14

First-principles prediction of magnetic structures in crystal

Michi-To SUZUKI
Institute for Materials Research

B1-12-P15

Machine Learning Assisted Synthesis of Novel Coordination Polymer

Takuma WAKIYA[1], Yoshinobu KAMAKURA[1], Daisuke TANAKA[1,2]
[1]Kwansei Gakuin University, [2]JST PRESTO

B1-12-P16

Machine learning quantum Monte Carlo simulations for strongly correlated electron materials

Naoto TSUJI
RIKEN Center for Emergent Matter Science (CEMS)

B1-12-P17

Prediction of Fibrinogen Adsorption on Self-Assembled Monolayers (SAM) from Chemical Structures and Quantification of Structures' Importance using Artificial Neural Network (ANN)

Rudolf JASON[1], Hayashi TOMOHIRO[1,2]
[1]Tokyo Institute of Technology, [2]JST-PRESTO

B1-12-P18

AI-Robot-driven Materials Research for Inorganic Materials

Ryota SHIMIZU[1,2], Shigeru KOBAYASHI[1], Yasunobu ANDO[3], Taro HITOSUGI[1]
[1]Tokyo Institute of Technology, [2]PRESTO, Japan Science and Technology Agency, [3]National Institute of Advanced Industrial Science and Technology

B1-12-P19

Machine Learning-Based Analysis for High-throughput Peak Detection in Synchrotron X-ray Spectromicroscopy

Naoka NAGAMURA[1], Tarojiro MATSUMURA[3], Shotaro AKAHO[3], Kenji NAGATA[1,2], Yasunobu ANDO[3]
[1]National Institute of Materials Science, [2]Japan Science and Technology Agency, PRESTO, [3]National Institute of Advanced Industrial Science and Technology

B1-12-P20

Material Parameter Estimation for Phase-field Simulation of Solid-state Sintering using Data Assimilation

Akinori YAMANAKA[1], Akimitsu ISHII[1], Yuki OKADA[1], Yusuke SHIMADA[2], Akiyasu YAMAMOTO[1]
[1]Tokyo University of Agriculture and Technology, [2]Tohoku University

B1-12-P21

First-Principles Study and Descriptor Selection of Site Preference of Hydride Anions in Hexagonal $BaVO_{3-x}H_x$

Kazuki SHITARA[1,2,3], Takafumi YAMAMOTO[4], Hiroshi KAGEYAMA[5], Hiroki MORIWAKE[2,3], Akihide KUWABARA[2,3]
[1]Joint and Welding Research Institute, Osaka University, [2]Nanostructures Research Laboratory, Japan Fine Ceramics Center, [3]Laboratory for Materials and Structures, Tokyo Institute of Technology, [4]Graduate School of Engineering, Kyoto University

B1-12-P22

Development of thermophysical property database for materials informatics

Tetsuya BABA, Erina FUJITA, Yibin XU
National Institute for Materials Science

December 12–13, 2019

Symposium B-2

Materials Integration: Fusion of Materials Science and Experiments through Data Science

[Organizers]

Junya INOUE (The University of Tokyo)
Irina ROSLYAKOVA (Ruhr-Universität Bochum)
Masahiko DEMURA (National Institute for Materials Science)

December 12, 2019

Oral Session 5

Time 14:00–16:10 Room Port-3

Chairperson Junya INOUE

B2-12-K01 ▸Keynote 14:00–14:40

3-D Phase-Field Simulations to machine-learn 3-D Features from 2-D Microstructures

Ingo STEINBACH, Mansur AHMED, Muhammad Adil ALI, Irina ROSLYAKOVA
Ruhr University Bochum

B2-12-I02 ▸Invited 14:40–15:10

Network Theory Meets Materials Science

Christopher WOLVERTON[1], Vinay HEGDE[1], Murat AYKOL[2]
[1]Northwestern University, [2]Toyota Research Institute

B2-12-I03 ▸Invited 15:10–15:40

Data management for atomistic simulation: design and case studies

Yury LYSOGORSKIY, Thomas HAMMERSCHMIDT, Matous MROVEC, Ralf DRAUTZ
Ruhr University Bochum

B2-12-I04 ▸Invited 15:40–16:10

Workflow control APIs for inverse problem analysis

Satoshi MINAMOTO[1], Kaita ITO[1], Takuya KADOHIRA[1], Junya INOUE[1,2], Masahiko DEMURA[1]
[1]National Institute for Materials Science, [2]The University of Tokyo

December 12, 2019

Oral Session 6

Time 16:30–18:20 Room Port-3

Chairperson Masahiko DEMURA

B2-12-I05 ▸Invited 16:30–17:00

On the consideration of inverse problem analysis for performance of structural materials

Manabu ENOKI
The University of Tokyo

B2-12-I06 ▸Invited 17:00–17:30

Artificial Materials Intelligence

Irina ROSLYAKOVA
Ruhr University Bochum

B2-12-I07 ▸Invited 17:30–18:00

Accelerating Materials Innovation: ICME, Materials Design, Data and the Underlying Workforce Training

E. Begum GULSOY[1], Juan J. DE PABLO[2], Gregory B. OLSON[1], Peter W. VOORHEES[1]
[1]Northwestern University, [2]University of Chicago

B2-12-O08 18:00–18:20

Starrydata: an open database of published plot data for materials informatics

Yukari KATSURA
The University of Tokyo

December 13, 2019

Oral Session 7

Time 9:30–11:30 Room Port-3

Chairperson Makoto WATANABE

B2-13-K01 ▸Keynote 9:30–10:10

Data-scientific Approaches in Materials Integration

Masahiko DEMURA
National Institute for Materials Science

B2-13-O02 10:10–10:30

Physical-based data-driven modeling strategy for creep behavior of Co-base superalloys

Setareh ZOMORODPHOOSH, Irina ROSLYAKOVA, Ingo STEINBACH
Ruhr University Bochum

B2-13-O03 10:30–10:50

Prediction of Creep Rupture Time for Weld Joints of 2 1/4Cr-1Mo Steel

Hitoshi IZUNO[1], Masahiko DEMURA[1], Masayoshi YAMAZAKI[1], Masaaki TABUCHI[2], Daisuke ABE[3], Keisuke TORIGATA[3]
[1]Research and Services Division of Materials Data and Integrated System (MaDIS), National Institute for Materials Science (NIMS), [2]Research Center for Structural Materials, National Institute for Materials Science (NIMS), [3]Corporate Research & Development, IHI Corporation

B2-13-O04 10:50–11:10

Universal Framework of Bayesian Creep Model Selection for Steel

Yoh-ichi MOTOTAKE[1], Hitoshi IZUNO[2], Kenji NAGATA[2], Masahiko DEMURA[2], Masato OKADA[3]
[1]Institute of Statistical Mathematics, [2]National Institute for Materials Science, [3]University of Tokyo

B2-13-O05 11:10–11:30

Identification of the transformation kinetics of steels from a dilatometric curve using a machine learning method

Hoheok KIM[1], Junya INOUE[1,2], Masato OKADA[3], Kenji NAGATA[3]
[1]Graduate School of Materials Engineering, The University of Tokyo, [2]Research Center for Advanced Science and Technology, The University of Tokyo, [3]Graduate School of Frontier Science, The University of Tokyo

December 13, 2019

Oral Session 8

Time 14:00–15:50 Room Port-3

Chairperson Satoshi MINAMOTO

B2-13-I06 ▸Invited 14:00–14:30

PRISMS-Plasticity: An Open-Source Crystal Plasticity Finite Element Software

Mohammadreza YAGHOOBI[1], Sriram GANESAN[2,6], Srihari SUNDAR[2], Aaditya LAKSHMANAN[2], Aeriel MURPHY-LEONARD[1,5], Shiva RUDRARAJU[3,4], John E. ALLISON[1], Veera SUNDARARAGHAVAN[2]
[1]Materials Science and Engineering, University of Michigan, Ann Arbor, [2]Aerospace Engineering, University of Michigan, Ann Arbor, [3]Mechanical Engineering, University of Michigan, Ann Arbor, MI, [4]Mechanical Engineering, University of Wisconsin-Madison, WI, [5]U.S. Naval Research Laboratory, Washington, DC, [6]Intel, Hillsboro, OR

B2-13-O07 14:30–14:50

Observation and crystal plasticity simulation of microstructurally short crack propagation in rolled Ti-6Al-4V alloy

Fabien BRIFFOD, Takayuki SHIRAIWA, Manabu ENOKI
The University of Tokyo

B2-13-O08 14:50–15:10

Prediction of defect-induced fatigue failures using physical model and data assimilation techniques

Takayuki SHIRAIWA, Ryota SAKAGUCHI, Fabien BRIFFOD, Pornthep CHIVAVIBUL, Manabu ENOKI
The University of Tokyo

B2-13-O09 15:10–15:30

Observation of fatigue crack initiation and crystal plasticity analysis of flame-resistant Mg alloy

Seiya NAKAJIMA
University of Tokyo

B2-13-O10 15:30–15:50

Autonomous generation of process-structure linkages for two-phase composites from simulation data obtained from micromechanical finite element models

A.F. MARSHALL, Surya R. KALIDINDI
Georgia Institute of Technology

December 13, 2019

Oral Session 9

Time 16:30–18:30 Room Port-3

Chairperson Manabu ENOKI

B2-13-I11 ▸Invited 16:30–17:00

Materials Integration for Carbon Fiber reinforced composites

Tomonaga OKABE[1]
[1]Tohoku University, [2]University of Washington

B2-13-O12 17:00–17:20

Evaluation of Reduction of Stress Concentration around a Circular Hole by Fiber Steering Placement Technique

Hiroshi SUEMASU, Yuichiro AOKI
Japan Aerospace Exploration Agency

B2-13-O13 17:20–17:40

Simulation of Phase Separated Polymer Matrix for an Applicatoin to a Composite

Yutaka OYA[1], Naofumi UMEMOTO[1], Tomonaga OKABE[1], Toshihiro KAWAKATSU[2]
[1]Department of Aerospace Engineering, Tohoku University, [2]Department of Physics, Tohoku University

B2-13-I14 ▸Invited 17:40–18:10

Materials Integration for powder-based metal manufacturing processes

Makoto WATANABE[1,2]
[1]National Instiute for Materials Science, [2]Research Center for Advanced Science and Technology, The University of Tokyo

B2-13-O15 18:10–18:30

Image analysis tensile test method at elevated temperature to obtain true stress-true strain curves up to large strain in Ti alloy

Shiro TORIZUKA
University of Hyogo

December 11–13, 2019

Symposium B-3

Mathematical Materials Science -Mathematical Approaches for Materials Designs in the Data Driven Society-

[Organizers]

Motoko KOTANI (Tohoku University)
Kazuto AKAGI (Tohoku University)
Yasumasa NISHIURA (Tohoku University)
Shin'ichi OISHI (Waseda University)
Stephen Hyde (Australian National University)
Christian Ratsch (UCLA)

December 11, 2019

Oral Session 1

Time 9:00–11:20 Room Work-3

Opening
9:00–9:10

B3-11-K01 ▸Keynote 9:10–9:40

Mathematics in Topological Materials for Quantum Computing

Zhenghan WANG
Microsoft Station Q anf UCSB

B3-11-O02 9:40–10:00

Crystallographic T-duality as the Baum-Connes isomorphism

Yosuke KUBOTA
RIKEN

B3-11-O03 10:00–10:20

Anomaly Matching and Symmetry-protected Critical Phases in SU(*N*) Spin Systems in 1+1 Dimensions

Yuan YAO[1], Chang-Tse HSIEH[1,2], Masaki OSHIKAWA[1]
[1]Institute for Solid State Physics, Univ. of Tokyo, [2]Kavli Institute for the Physics and Mathematics of the Universe

Break
10:20–10:30

B3-11-I04 ▸Invited 10:30–11:00

Neural network as a discrete geometry for materials through holographic principle

Koji HASHIMOTO
Osaka University

B3-11-O05 11:00–11:20

Nuclear states and spectra in holographic QCD

Koji HASHIMOTO[1], Yoshinori MATSUO[1], Takeshi MORITA[2,3]
[1]Department of Physics, Osaka University, [2]Department of Physics, Shizuoka University, [3]Graduate School of Science and Technology, Shizuoka University

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Work-3

B3-11-K06 ▸Keynote 14:00–14:30

The Atiyah-Patodi-Singer index theorem and domain walls

Mikio FURUTA
University of Tokyo

B3-11-O07 14:30–14:50

Second-order topological phases realized by chiral symmetry

Ryo OKUGAWA
Tohoku University

B3-11-O08 14:50–15:10

A Generalized Boundary Condition Applied on Lieb-Schultz-Mattis Type Ingappabilities and Many-body Chern Numbers

Yuan YAO, Masaki OSHIKAWA
Institute for Solid State Physics, University of Tokyo

B3-11-O09 15:10–15:30

Emergent Flat Bands in Fermionic Honeycomb Networks

Chenhua GENG
Institute for Solid State Physics, University of Tokyo

Break
15:30–15:40

B3-11-O10 15:40–16:00

Synchronized Dynamics of Carbon Nanotubes Dispersed in Solution

Masahito SANO
Yamagata University

December 11, 2019

Oral Session 3

Time 16:30–18:40 Room Work-3

B3-11-I11 ▸Invited 16:30–17:00

Structure-Property Relationship of Heterogeneous Elastomers Investigated by Network Centrality

Yoshifumi AMAMOTO[1], Ken KOJIO[3], Atsushi TAKAHARA[3], Yuichi MASUBUCHI[2], Takaaki OHNISHI[1]
[1]The University of Tokyo, [2]Nagoya University, [3]Kyushu University

B3-11-O12 17:00–17:20

Smooth Dependence with Respect to Delay: Temporal Order of Reaction

Junya NISHIGUCHI
Tohoku University

B3-11-O13 17:20–17:40

Model Selection of Phase-Field Crystal Models for Targeted Crystalline Patterns

Natsuhiko YOSHINAGA
Tohoku University

B3-11-O14 17:40–18:00

Study of Grain Boundary Structures using Topological Data Analysis and Simple Evaluation with Local Energy

Fumiko OGUSHI
National Institute for Materials Science

B3-11-O15 18:00–18:20

Topological data analysis of the magnetic domain for the automated visualization of the origin of coercivity

Masato KOTSUGI[1], Takumi YAMADA[1,2], Yuta SUZUKI[1], Chiharu MITSUMATA[2], Kanta ONO[2,3], Tetsuro UENO[4], Ippei OBAYASHI[5,6], Kazuto AKAGI[2,5], Yasuaki HIRAOKA[2,5,6,7]
[1]Tokyo University of Science, [2]MI2I-NIMS, [3]High Energy Accelerator Research Organization(KEK), [4]National Institutes for Quantum and Radiological Science and Technology (QST), [5]Tohoku Univ. AIMR, [6]RIKEN AIP, [7]Kyoto Univ. KUIAS

B3-11-O16 18:20–18:40

Fractal dimension, persistent homology dimension, and fractal dynamics in the terahertz region: the case of protein lysozyme

Tatsuya MORI[1], Yasuhiro FUJII[2], Suguru KITANI[3], Yohei YAMAMOTO[1], Kentaro SHIRAKI[1], Akitoshi KOREEDA[2], Seiji KOJIMA[1]
[1]University of Tsukuba, [2]Ritsumeikan University, [3]Tokyo Institute of Technology

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Port-2

B3-12-K01 ▸Keynote 16:30–17:00

Machine-Learned Interatomic Potentials For Alloy Modeling

Gus Lewis Warren HART
Brigham Young University

B3-12-I02 ▸Invited 17:00–17:30

Optimization Problems in Data Driven Science -Fundamentals and Applications in Materials Informatics-

Akihisa ICHIKI
Nagoya University

B3-12-O03 17:30–17:50

Applied-math approaches for filler-filled polymer nanocomposites

Katsumi HAGITA
National Defense Academy

B3-12-O04 17:50–18:10

Natural Computing with Light-Activated Colloidal Crystals

Toshiharu SAIKI[1], Okuto IKEDA[1], Yuka TAKAMATSU[1], Bokusui NAKAYAMA[1], Eiji YAMAMOTO[1], Masashi KUWAHARA[2]
[1]Keio University, [2]National Institute of Advanced Industrial Science and Technology

B3-12-O05 18:10–18:30

Developments of Molecular Spin Gyroids

Kunio AWAGA
Nagoya University

December 13, 2019

Oral Session 7

Time 9:30–11:40 Room Port-2

B3-13-K01 ▸Keynote 9:30–10:00

Soft Crystals: Minimal Froths versus Generalized Quantizers

Gregory GRASON
University of Massachusetts Amherst

B3-13-I02 ▸Invited 10:00–10:30

Computational Study of the Microphase-Separated Structure and Elastic Property of Block Copolymers

Takeshi AOYAGI
National Institute of Advanced Industrial Science and Technology

B3-13-O03 10:30–10:50

Modeling of Entangled Polymer Dynamics

Yuichi MASUBUCHI, Takashi UNEYAMA
Nagoya University

B3-13-I04 ▸Invited 10:50–11:20

3-Dimensional Topology and Poly-continuous Pattern

Koya SHIMOKAWA
Saitama University

B3-13-O05 11:20–11:40

Rouse Dynamics of Topological Polymers and Polymer Networks Through Gaussian Random Graph Embeddings

Tetsuo DEGUCHI
Ochanomizu University

December 13, 2019

Oral Session 8

Time 14:00–15:50 Room Port-2

B3-13-I06 ▸Invited 14:00–14:30

Carbon Structures and a Discrete Surface Theory

Hisashi NAITO[1], Toshiaki OMORI[2], Chen TAO[3], Motoko KOTANI[4]
[1]Graduate School of Mathematics, Nagoya University, [2]Cifra Co., Ltd, [3]Mathematical Institute, Tohoku University, [4]AIMR, Tohoku University

B3-13-O07 14:30–14:50

Eigenvalues of the Laplacian on the Goldberg-Coxeter Constructions for 3- and 4-valent Graphs

Toshiaki OMORI[1], Hisashi NAITO[2], Tatsuya TATE[3]
[1]Cifra Co., Ltd., [2]Nagoya University, [3]Tohoku University

B3-13-O08 14:50–15:10

Mathematically-designed graphene in electrochemical water splitting

Yoshikazu ITO
University of Tsukuba

B3-13-O09 15:10–15:30

Bond Twist and Curvature in Three-Dimensional Carbon Networks

Andreas DECHANT
Advanced Institute for Materials Research, Tohoku University

B3-13-O10 15:30–15:50

Mathematical Approach for Molecular Conduction

Yuta TSUJI, Kazunari YOSHIZAWA
Kyushu University

December 13, 2019

Oral Session 9

Time 16:30–18:00 Room Port-2

B3-13-I11 ▸Invited 16:30–17:00

Challenge with mathematics to fabricate microstructures using minimal surfaces

Seiichi TAKAMI[1], Rikuto TAKAI[1], Toshiaki TAIRA[2], Akira ENDO[2]
[1]Nagoya University, [2]National Institute of Advanced Industrial Science and Technology

B3-13-O12 17:00–17:20

Variational problem for anisotropic surface energy

Miyuki KOISO, Yoshiki JIKUMARU
Kyushu University

B3-13-O13 17:20–17:40

Comparison inequalities on directed graphs under a lower Ollivier Ricci curvature bound

Yohei SAKURAI
Tohoku University

B3-13-O14 17:40–18:00

Development of Metal Coordinate Surfactants (MCSs) as Functional Nanomaterials

Toshiaki TAIRA, Tomohiro IMURA, Akira ENDO
National Institute of Advanced Industrial Science and Technology

December 12, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

B3-12-P01

Gapless states on topological defects

Minoru ETO
Yamagata University

B3-12-P02

Nanoscale Heat Engines Based on Magnon-Phonon Coupled States

Koji SATO
Tohoku University

B3-12-P03

First-principles study of the Chern insulator induced by spin chirality

Hikaru SAWAHATA[1], Naoya YAMAGUCHI[1], Fumiyuki ISHII[2]
[1]Graduate School of Natural Science and Technology, Kanazawa University, [2]Nanomaterials Research Institute, Kanazawa University

B3-12-P04

Photocleavable Regenerative Star Poly(dimethyl siloxane) Networks for the Tuning of Viscoelasticity

Satoshi HONDA, Minami OKA, Taro TOYOTA
The University of Tokyo

B3-12-P05

Rheology of Cholesteric Blue Phases

Shuji FUJII
Hokkaido University

B3-12-P06

Physical Implementation of Swarm Intelligence in Colloidal Particle Systems

Bokusui NAKAYAMA[1], Toshiharu SAIKI[1], Eiji YAMAMOTO[1], Masashi KUWAHARA[2]
[1]Keio University, [2]National Institute of Advanced Industrial Science and Technology

B3-12-P07

Upgrade Design of the Diffractometer for Small Angle Scattering using tender X-ray at BL-15A2 at the Photon Factory

Hideaki TAKAGI[1], Noriyuki IGARASHI[1], Yasuko NAGATANI[1], Hiromasa OHTA[2], Nobutaka SHIMIZU[1]
[1]High Energy Accelerator Organization, [2]Mitsubishi Electric System & Service Co., Ltd

B3-12-P08

Fluid Mechanical Duality for Minimal Surfaces in Euclidean Space and Maximal Surfaces in Spacetime

Shintaro AKAMINE
Nagoya University

B3-12-P09

Graphene Encapsulation Effects on NiMo Alloy in Oxygen Evolution Reaction

Samuel JEONG[1], Kailong HU[1], Tatsuhiko OHTO[2], Yuki NAGATA[3], Hideki MASUDA[1], Jun-ichi FUJITA[1], Yoshikazu ITO[1,4]
[1]University of Tsukuba, [2]Osaka University, [3]Max Plank Institute, [4]PRESTO

B3-12-P10

Preparation of Metal-Organic Framework Templated Carbons and Applications to Electrode Materials

Hirofumi YOSHIKAWA
Kwansei Gakuin University

B3-12-P11

Topological Data Analysis of Amorphous Carbon at High-Temperature

Kazuto AKAGI
Tohoku University

December 11, 2019

Symposium B-4

Topological Materials Science for Innovative Functions

[Organizer]

Shuichi MURAKAMI (Tokyo Institute of Technology)

[Sponsor]

国立研究開発法人 科学技術振興機構
Japan Science and Technology Agency

国立研究開発法人科学技術振興機構
Japan Science and Technology Agency

December 11, 2019

Oral Session 1

Time 9:00–11:30 Room Work-8

Chairperson Akio KIMURA

Preparation
9:00–9:20

B4-11-O01 9:20–9:40

Anomalous dielectric response in insulators with the π Zak phase

Shuichi MURAKAMI[1], Motoaki HIRAYAMA[2], Yusuke AIHARA[1]
[1]Tokyo Institute of Technology, [2]RIKEN

B4-11-O02 9:40–10:00

Symmetry indicators for topological superconductors

Haruki WATANABE
University of Tokyo

B4-11-I03 ▸Invited 10:00–10:30

Real-space recipes of topological crystalline states

Chen FANG
Chinese Academy of Sciences

B4-11-O04 10:30–10:50

Variants of symmetry-based indicators in the band theory

Ken SHIOZAKI
Kyoto University

B4-11-O05 10:50–11:10

Electrides as a New Platform of Topological Materials

Motoaki HIRAYAMA[1], Satoru MATSUISHI[2], Hideo HOSONO[2], Shuichi MURAKAMI[3]
[1]RIKEN, Center for Emergent Matter Science, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [3]Department of Physics, Tokyo Institute of Technology

B4-11-O06 11:10–11:30

Predicting topological materials by symmetry-based indicators

Tiantian ZHANG[1,2]
[1]Institute of Physics, CAS, [2]Tokyo Institute of Technology

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Work-8

Chairperson Motoaki HIRAYAMA

B4-11-I07 ▸Invited 14:00–14:30

Incorporating Magnetism into Topological Materials for Innovative Functions

Akio KIMURA
Hiroshima University

B4-11-O08 14:30–14:50

Flexible Hall sensor using the anomalous Hall effect of nanocrystalline Fe-Sn films

Kohei FUJIWARA[1], Yosuke SATAKE[1], Junichi SHIOGAI[1], Takeshi SEKI[1,2], Atsushi TSUKAZAKI[1,2]
[1]IMR, Tohoku University, [2]CSRN, Tohoku University

B4-11-O09 14:50–15:10

High-resolution angle-resolved photoemission study of topological heterostructures

Kosuke NAKAYAMA
Tohoku University

B4-11-I10 ▸Invited 15:10–15:40

Exploring Topological States Coupled to Charge Density Wave

Kyoko ISHIZAKA
The University of Tokyo

B4-11-O11 15:40–16:00

Ab initio calculation of surface states and ARPES of Weyl semimetal candidate material $MoTe_2$

Ryota ONO[1], Alberto MARMODORO[2], Jan MINÁR[3], Yoshitaka NAKATA[1], Hubert EBERT[2], Jürgen BRAUN[2], Kazuyuki SAKAMOTO[4], Peter KRÜGER[1]
[1]Chiba University, [2]Ludwig-Maximilians-Universität München, [3]University of West Bohemia, [4]Osaka University

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Work-8

Chairperson Shuichi MURAKAMI

B4-11-O12 16:30–16:50

Quantized Surface Transport Observed in Cd_3As_2 Films

Masaki UCHIDA[1,2], Shinichi NISHIHAYA[1], Yusuke NAKAZAWA[1], Ryosuke KURIHARA[3], Kazuto AKIBA[3], Markus KRIENER[4], Atsushi MIYAKE[3], Yasujiro TAGUCHI[4], Masashi TOKUNAGA[3], Masashi KAWASAKI[1,4]
[1]Department of Applied Physics, University of Tokyo, [2]PRESTO, JST, [3]ISSP, University of Tokyo, [4]RIKEN CEMS

B4-11-I13 ▸Invited 16:50–17:20

Topological Properties of Complex Magnetic Materials from Ab-Initio Theory

Jan-Philipp HANKE
Peter Gruenberg Institut, Forschungszentrum Juelich

B4-11-O14 17:20–17:40

Magnetic skyrmions in centrosymmetric materials

Shinichiro SEKI
University of Tokyo

B4-11-I15 ▸Invited 17:40–18:10

Exploration of Topological Quantum Materials

Takao SASAGAWA
Tokyo Institute of Technology

B4-11-O16 18:10–18:30

Single Crystal Thin Films of Three-Dimensional Topological Insulators via Non-catalytic Vapor Phase Epitaxial Crystal Growth and Applications

Katsumi TANIGAKI, Yu Stephane MATSUSHITA, Khuong K. HUYNH
Tohoku University

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

B4-11-P01

Helicoid and Catenoid Surfaces in a Liquid Crystalline Dimer Driven by Surface Tension

Khoa LE
Tokyo University of Science

B4-11-P02

Chirality Imaging Using X-ray Wave Front With Topological Defects

Yoshiki KOHMURA[1], Kei SAWADA[1], Masaichiro MIZUMAKI[2], Kenji OHWADA[3], Tetsu WATANUKI[3], Tetsuya ISHIKAWA[1]
[1]RIKEN, [2]Japan Synchrotron Radiation Research Institute, [3]National Institutes for Quantum and Radiological Science and Technology (QST)

Cluster C

Novel Structural Materials Based on New Principles

Symposium

C-1 Fundamental Issues of Structural Materials

C-2 Mille-feuille Structured Light-weight Materials

C-3 Hard and Tough Ceramics

C-4 Tough Polymers

December 11–12, 2019

Symposium C-1

Fundamental Issues of Structural Materials

[Organizers]

Isao TANAKA (Kyoto University)
Haruyuki INUI (Kyoto University)
Nobuhiro TSUJI (Kyoto University)
Hyoung Seop KIM (Pohang University of Science and Technology)
Guillaume LAPLANCHE (Ruhr-Universität Bochum)

December 11, 2019

Oral Session 1

Time 9:00–11:20 Room Mont-1

Chairpersons Nobuhiro TSUJI, Cem TASAN

C1-11-K01 ▸Keynote 9:00–9:40

Overcoming the limits of the TRIP-effect utilizing reverse transformations

Cem TASAN, Shaolou WEI

Department of Materials Science and Engineering, Massachusetts Institute of Technology

C1-11-O02 9:40–10:00

Preferential Ultra Fine Grain Formation in Harmonic Structure Designed SUS304L Austenitic Stainless Steel

Kei AMEYAMA[1], Masashi NAKATANI[2], Bhupendra SHARMA[1], Mie KAWABATA[1]

[1]Department of Mechanical Engineering, Faculty of Science and Engineering, Ritsumeikan University, [2]Graduate School of Science and Engineering, Ritsumeikan University

Break 10:00–10:10

C1-11-I03 ▸Invited 10:10–10:40

Multiple Strengthening and Microstructure Optimization of Heterostructured High-Entropy Alloy

Hyoung Seop KIM

Department of Materials Science and Engineering, Pohang University of Science and Technology

C1-11-O04 10:40–11:00

Effect Of Microalloying On Microstructure And Mechanical Properties Of Cast $Al_{0.6}CoCrFeNi$ Compositionally Complex Alloys.

Alex ASABRE[1], Aleksander KOSTKA[2], Janine PFETZING-MICKLICH[2], Oleg STRYZHYBORODA[3], Ulrike HECHT[3], Guillaume LAPLANCHE[1]

[1]Ruhr-Universität Bochum (RUB), Bochum, D-44780, Germany, [2]Zentrum für Grenzflächendominierte Höchstleistungswerkstoffe (ZGH), RUB, Bochum D-44780, Germany, [3]ACCESS e.V., Aachen, D-52072, Germany

C1-11-O05 11:00–11:20

In-situ characterization of heterogeneous deformation behavior in a Fe-Ni-C alloy using neutron diffraction, DIC and thermography

Wu GONG[1,2], Stefanus HARJO[2], Wenqi MAO[3], Takayuki YAMASHITA[2], Nobuhiro TSUJI[1,3]

[1]Elements Strategy Initiative for Structural Materials, Kyoto University, [2]J-PARC Center, Japan Atomic Energy Agency, [3]Department of Materials Science and Engineering, Kyoto University

December 11, 2019

Oral Session 2

Time 14:00–16:10 Room Mont-1

Chairpersons Haruyuki INUI, John LEWANDOWSKI

C1-11-K06 ▸Keynote 14:00–14:40

Pressure/Stress State Effects on Fundamental Mechanisms of Plastic Deformation in Structural Materials

John LEWANDOWSKI

Department of Materials Science and Engineering, Case Western Reserve University

C1-11-I07 ▸Invited 14:40–15:10

The Atomic Structure and Dynamic Behavior of Twinning Dislocation of Rhombohedral Twinning in α-Al_2O_3

Eita TOCHIGI[1], Bin MIAO[1], Naoya SHIBATA[1,2], Yuichi IKUHARA[1,2,3]

[1]Institute of Engineering Innovation, The University of Tokyo, [2]Japan Fine Ceramic Center, [3]ESISM, Kyoto University

Break 15:10–15:20

C1-11-I08 ▸Invited 15:20–15:50

Room Temperature Deformation Behavior of Hard Intermetallic Compounds Investigated by Micropillar Compression Method

Kyosuke KISHIDA, Haruyuki INUI

Department of Materials Science and Engineering, Kyoto University

C1-11-O09 15:50–16:10

Interdiffusion In Quaternary Cr-Fe-Co-Ni High-Entropy Alloys

Adeline DURAND[1], Linqing PENG[2,3], Ying YANG[2], Guillaume LAPLANCHE[1], James R MORRIS[2,4], Gunther EGGELER[1], Easo P GEORGE[2,4]

[1]Institut für Werkstoffe, Ruhr-Universität Bochum (RUB), [2]Materials Science and Technology Division, Oak Ridge National Laboratory, [3]Grinnell College, Iowa, [4]Department of Materials Science and Engineering, University of Tennessee

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Mont-1

Chairpersons Kyosuke KISHIDA, Guillaume LAPLANCHE

C1-11-I10 ▸Invited 16:30–17:00

Kinetics of phase decomposition in high-entropy alloys and effects on mechanical properties

Guillaume LAPLANCHE[1], Sondre BERGLUND[1], Christian REINHART[1], Aleksander KOSTKA[2], Easo P. GEORGE[3,4]

[1]Institut für Werkstoffe, Ruhr-Universität Bochum, [2]Zentrum für Grenzflächendominierte Höchstleistungswerkstoffe (ZGH), Ruhr-Universität Bochum, [3]Materials Science and Technology Division, Oak Ridge National Laboratory, [4]Department of Materials Science and Engineering, University of Tennessee

C1-11-O11 17:00–17:20

Deformation behavior and microstructure evolution in equi-atomic CoCrFeMnNi high-entropy alloy highly deformed by torsion at elevated temperatures

Reza GHOLIZADEH[1], Yu BAI[1,2], Akinobu SHIBATA[1,2], Nobuhiro TSUJI[1,2]

[1]Department of Materials Science & Engineering, Kyoto University, [2]ESISM (Elements Strategy Initiative for Structural Materials), Kyoto University

Break
17:20–17:30

C1-11-O12 17:30–17:50

Microstructure and mechanical properties of equimolar TiZrNbHfTa High-Entropy Alloy Prepared via Powder Metallurgy

Bhupendra SHARMA[1], Eri AKADA[2], Naoto TOGAWA[2], Mie KAWABATA[3], Kei AMEYAMA[3]

[1]Ritsumeikan University Research Organization of Science and Technology, Kusatsu City, 525-8577, Japan, [2]Graduate School of Science and Engineering, Ritsumeikan University, Kusatsu City, 525-8577, Japan., [3]Faculty of Science and Engineering, Ritsumeikan University, Kusatsu City, 525-8577, Japan

C1-11-O13 17:50–18:10

Formation of the thermal vacancy in high entropy alloys

Taichi ABE[1], Ikuo OHNUMA[1], Toshiyuki KOYAMA[2]

[1]Research Center for Structural Materials, National Institute for Materials Science, [2]Department of Materials Design Innovation Engineering, Graduate School of Engineering, Nagoya University

C1-11-O14 18:10–18:30

Experimental determination and thermodynamic evaluation of Cr-Mn-Ni system

Katsunari OIKAWA

Department of Metallurgy, Graduate School of Engineering, Tohoku University

December 12, 2019

Oral Session 4

Time 9:00–11:20 Room Mont-1

Chairpersons Shigenobu OGATA, Yunzhi WANG

C1-12-K01 ▸Keynote 9:00–9:40

Uncovering the deformation mechanisms of ordered intermetallic phases in Ni-base superalloys

Yunzhi WANG

Department of Materials Science and Engineering, The Ohio State University

C1-12-O02 9:40–10:00

Deformation mechanism and mechanical properties of mixed amorphous-crystalline system through atomic simulations

Tomotsugu SHIMOKAWA

Department of Mechanical Systems Engineering, Kanazawa University

Break
10:00–10:10

C1-12-I03 ▸Invited 10:10–10:40

Modeling of pop-ins in nanoindentation

Shigenobu OGATA[1,2], Takahito OHMURA[3,2], Yuji SATO[1], Shuhei SHINZATO[1]

[1]Graduate School of Engineering Science, Osaka University, [2]ESISM, Kyoto University, [3]National Institute for Materials Science

C1-12-O04 10:40–11:00

Bidirectional Stability Breaking in Thermodynamic Average for Multicomponent Alloys

Koretaka YUGE

Department of Materials Science and Engineering, Kyoto University

C1-12-O05 11:00–11:20

Reactive Molecular Dynamics Simulation of Intergranular Stress Corrosion Cracking Process of FeNiCr-based High Entropy Alloy

Narumasa MIYAZAKI, Chang LIU, Qian CHEN, Momoji KUBO

Institute for Materials Research, Tohoku University

December 12, 2019

Oral Session 5

Time 14:00–15:55 Room Mont-1

Chairperson Takahito OHMURA

C1-12-006 14:00–14:15

Microscopic mechanism of hydrogen-related fracture in 2Mn-0.1C steel with ferrite microstructure

Kazuho OKADA[1], Akinobu SIBATA[1,2], Wu GONG[2,3], Nobuhiro TSUJI[1,2]
[1]Department of Materials Science and Engineering, Kyoto University, [2]Elements Strategy Initiative for Structural Materials (ESISM), Kyoto University, [3]J-PARC Center, Japan Atomic Energy Agency

C1-12-007 14:15–14:30

Effect of serration on deformation behavior in high-Mn austenitic steel

SUK YOUNG HWANG[1], Myeong-Heom PARK[2], Yu BAI[1], Akinobu SHIBATA[1,2], Nobuhiro TSUJI[1,2]
[1]Department of Materials Science and Engineering, Kyoto University, [2]Elements Strategy Initiative for Structural Materials (ESISM), Kyoto University

C1-12-008 14:30–14:45

Microstructural origin of high work-hardenability in ultrafine-grained CoCrNi medium entropy alloy

Shuhei YOSHIDA[1], Genki YAMASHITA[1], Takuto IKEUCHI[1], Yu BAI[1,2], Akinobu SHIBATA[1,2], Nobuhiro TSUJI[1,2]
[1]Department of Materials Science and Engineering, Kyoto University, [2]Element Strategy Initiative for Structural Materials (ESISM), Kyoto University

C1-12-009 14:45–15:00

Mechanical properties and strengthening mechanism of ultrafine grained Al-Mg alloys

Xiaodong LAN[1], Si GAO[1], Myeong-heom PARK[1,2], Akinobu SHIBATA[1,2], Nobuhiro TSUJI[1,2]
[1]Department of Materials Science and Engineering, Kyoto University, [2]Element Strategy Initiative for Structural Materials (ESISM), Kyoto University

Break
15:00–15:10

C1-12-010 15:10–15:25

Influence of Deformation Temperature on Mechanical Properties of Harmonic Structure Designed SUS316L Austenitic Stainless Steel

Koki YAGI[1], Masashi NAKATANI[1], Bhupendra SHARMA[2], Mie KAWABATA[3], Cinzia MENAPACE[4], Kei AMEYAMA[3]
[1]Graduate School of Science and Engineering, Ritsumeikan University, [2]Ritsumeikan University Research Organization of Science and Technology, [3]Faculty of Science and Engineering, Ritsumeikan University, [4]Faculty of Industrial Engineering, University of Trento

C1-12-011 15:25–15:40

Harmonic Structure Design of Fe-0.3wt% Carbon Steel with Outstanding Strength and Toughness

Ryohei IRITANI[1], Kenta HORI[1], Bhupendra SHARMA[2], Mie KAWABATA[3], Kei AMEYAMA[3]
[1]Graduate School of Science and Engineering, Ritsumeikan University, Kusatsu City, 525-8577, Japan., [2]Ritsumeikan University Research Organization of Science and Technology, Kusatsu City, 525-8577, Japan., [3]Faculty of Science and Engineering, Ritsumeikan University, Kusatsu City, 525-8577, Japan.

C1-12-012 15:40–15:55

Mechanical Properties of Harmonic Structure Designed CrMnFeCoNi High Entropy Alloy

Naoto TOGAWA[1], Bhupendra SHARMA[2], Zhang ZHE[3], Mie KAWABATA[4], Xu CHEN[3], Kei AMEYAMA[4]
[1]Graduate School of Science and Engineering, Ritsumeikan University, Kusatsu City, 5258577, Japan, [2]Ritsumeikan University Research Organization of Science and Technology, Kusatsu City, 5258577, Japan, [3]Tianjin University, Tianjin, 300072, China, [4]Facility of Science and Engineering, Ritsumeikan University, Kusatsu City, 5258577, Japan

December 12, 2019

Oral Session 6

Time 16:30–17:30 Room Mont-1

Chairperson Kaneaki TSUZAKI

C1-12-013 16:30–16:45

Unique deformation structure evolution in a harmonic structure designed Ti-24Nb-25Zr alloy

Kentaro NAGANO[1], Sharma BHUPENDRA[2], Mie KAWABATA[3], Kei AMEYAMA[3]
[1]Ritsumeikan University of Mechanical Engineering, [2]Ritsumeikan University Research Organization of Science and Technology, [3]Faculty of Mechanical Engineering, Ritsumeikan University

C1-12-014 16:45–17:00

Influences of Multi-Thermo-Mechanical Process on Ti Harmonic Structured compacts

Akito SHIMAMURA[1], Motoki MIYAKOSHI[1], Bhupendra SHARMA[2], Mie KAWABATA[3], Kei AMEYAMA[3]
[1]Graduate School of Science and Engineering, Ritsumeikan University, Japan, [2]Ritsumeikan University Research Organization of Science and Technology, Japan, [3]Faculty of Science and Engineering, Ritsumeikan University, Japan

C1-12-015 17:00–17:15

Effect of Thermo-mechanical Processing on Fatigue Properties of Commercially Pure Titanium with Harmonic Structure

Kohei OSAKI[1], Shoichi KIKUCHI[2], Yoshikazu NAKAI[1], Mie KAWABATA[3], Kei AMEYAMA[3]
[1]Department of Mechanical Engineering, Graduate School of Engineering, Kobe University, [2]Department of Mechanical Engineering, Faculty of Engineering, Shizuoka University, [3]Department of Mechanical Engineering, Faculty of Science and Engineering, Ritsumeikan University

C1-12-O16 17:15–17:30

Effect of Microstructures on Mechanical and Electrical Properties of Aluminum-Carbon Nanotube (Al-CNT) composites

Kazuaki AOI[1], Fumio OGAWA[2], Mie KAWABATA[2], Takamoto ITOH[2], Kei AMEYAMA[2]
[1]Graduate school of Science and Engineering, Ritsumeikan University, [2]College of Science and Engineering, Ritsumeikan University

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

C1-11-P01

The Coadsorption Effect of Cl- and H_2O on the Various Defect Al_2O_3 Film Surface

Chuan-Hui ZHANG
University of Science and Technology Beijing

C1-11-P02

Overcoming the strength-ductility trade-off dilemma in TRIP-assisted multiphase steel with lean alloy composition

Avala LAVAKUMAR
Kyoto University

C1-11-P03

Effect of Texture Change on Strain-Induced Martensitic Transformation of Semi-Austenitic Stainless Steel SUS304

Taku MATSUO, Tatsuya GOTOH, Kyoichi ISHIDA, Muneyuki IMAFUKU
Tokyo City University

C1-11-P04

Influence of Atomic Size Difference on Dislocation Emission from Grain Boundaries in High-Entropy Alloys

Kohei SHIOTANI, Tomoaki NIIYAMA, Tomotsugu SHIMOKAWA
Kanazawa University

C1-11-P05

Study of thermodynamic stability of HEA alloy using first principles calculation

Masanori ENOKI, Hiroshi OHTANI
Institute of Multidisciplinary Research for Advanced Materials , Tohoku University

C1-11-P06

Vacancy migration behavior in a CoCrFeMnNi high entropy alloy

Kazuki SUGITA[1], Ryusei OGAWA[1], Masataka MIZUNO[1], Hideki ARAKI[1], Atsushi YABUUCHI[2], Atsushi KINOMURA[2]
[1]Graduate School of Engineering, Osaka University, [2]Institute for Integrated Radiation and Nuclear Science, Kyoto University

C1-11-P07

Excellent Mechanical Behavior with Anomalous Glassy State of High-Pressure Heat-Treated Zr-Based Bulk Metallic Glass

Yasuto ABE[1], Rui YAMADA[2], Yuki SHIBAZAKI[3], Wookha RYU[2], Junji SAIDA[2]
[1]Graduate Scool of Engineering, Tohoku Unversity, [2]Frontier Research Institute for Interdisciplinary Sciences (FRIS), Tohoku University, [3]National Institute for Materials Science (NIMS)

December 12–13, 2019

Symposium C-2

Mille-feuille Structured Light-weight Materials

[Organizers]

Eiji ABE (University of Tokyo)
Yoshihito KAWAMURA (Kumamoto University)
Hiromu SAITO (Tokyo University of Agriculture and Technology)

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Work-8

Chairperson Eiji ABE

C2-12-001 9:00–9:30

Strengthening of Mg-based LPSO-phase alloys induced by the formation of deformation kink band, and its development to other Mille-feuille structured materials

Koji HAGIHARA[1], Michiaki YAMASAKI[2], Yoshihito KAWAMURA[2], Takayoshi NAKANO[1]
[1]Osaka University, [2]Magnesium Research Center & Department of Materials Science, Kumamoto University

C2-12-002 9:30–9:50

Fatigue in Extruded Mg/LPSO two-phase alloys: a Combined Experimental-Numerical Study

Fabien BRIFFOD, Takayuki SHIRAIWA, Manabu ENOKI
The University of Tokyo

C2-12-003 9:50–10:10

Hardness properties and microstructures of caliber rolled Mg-Y-Zn alloy

Hidetoshi SOMEKAWA[1], Daisuke ANDO[2]
[1]National Institute for Materials Science, [2]Tohoku University

[Break 10:10–10:20]

C2-12-004 10:20–10:50

Influence of Multimodal Microstructure Evolution on Corrosion Behavior of Extruded Mg-Zn-Y Alloys with Mille-feuille Structure of α-Mg and LPSO phases

Michiaki YAMASAKI[1], Tomohiro KAWAKAMI[1], Zhiming SHI[2], Andrej ATRENS[2], Yoshihito KAWAMURA[1]
[1]Kumamoto University, [2]The University of Queensland

C2-12-005 10:50–11:10

Effects of Pre-Straining and Heat-Treatment on Compression Strength in a Directionally Solidified Long Period Stacking Ordered Type Mg-Zn-Y Alloy

Mayumi SUZUKI[1], Tatsuya YAMAGUCHI[2], Yuki TAKAHASHI[3], Koji HAGIHARA[4]
[1]Toyama Prefectural University, [2]Graduate Student, Toyama Prefectural University, [3]Undergraduate Student, Toyama Prefectural University (Now with Toyama Murata Manufacturing Co., Ltd), [4]Department of Adaptive Machine Systems, Graduate School of Engineering, Osaka University

C2-12-006 11:10–11:30

***In Situ* Neutron Diffraction during Compression or Tension of $Mg_{97}Zn_1Y_2$consisting of LPSO phase and αMg phase**

Stefanus HARJO[1], Kazuya AIZAWA[1], Wu GONG[1,2], Takuro KAWASAKI[1]
[1]Japan Atomic Energy Agency, [2]Kyoto University

December 12, 2019

Oral Session 5

Time 14:00–16:00 Room Work-8

Chairperson Toshiyuki FUJII

C2-12-007 14:00–14:30

Formation and Annihilation of Disclination in Kink Microstructure

Tomonari INAMURA
Tokyo Institute of Technology

C2-12-008 14:30–15:00

FTMP-based Descriptions of Rotational Field Evolutions

Tadashi HASEBE
Kobe University

C2-12-009 15:00–15:20

FTMP-based Kink Deformation and Strengthening Mechanisms for Mille-feuille Structures

Yuta NAWA, Tadashi HASEBE
Kobe University

C2-12-010 15:20–15:40

Solute Segregation at Kink Boundaries in Mille-feuille Structured Mg Alloys

Daisuke EGUSA[1], Eiji ABE[1,2]
[1]The University of Tokyo, [2]National Institute for Materials Science

C2-12-011 15:40–16:00

Mechanical Properties of two-phase Nb-TiNi alloys with Mille-feuille Structure

Kazuhiro ISHIKAWA[1], Toyoaki SUZUKI[2], Kiyoshi AOKI[2]
[1]Kanazawa University, [2]Kitami Institute of Technology

December 13, 2019

Oral Session 7

Time 9:00–11:30 Room Work-8

Chairperson Hiromu SAITO

C2-13-O01 9:00–9:30

Nanostructure control of organic-silica nanocomposite by using block copolymers as templates

Reiko SAITO
Tokyo Institute of Technology

C2-13-O02 9:30–9:50

Lamellar Microdomain Structures of Liquid Crystal Block Copolymers under Uniaxial Elongation

Masatoshi TOKITA, Jumpei KURIBAYASHI
Tokyo Institute of Technology

C2-13-O03 9:50–10:10

Fabrication and Mechanical Properties of Metal Flake Particles/Epoxy Resin Composite

Takashi KUROSE, Yurato SAKO, Hiroshi ITO
Yamagata University

C2-13-O04 10:10–10:30

Depth-resolved nanostructure analysis of thin block copolymer films undergoing microphase separation examined by tender X-rays

Hiroshi OKUDA[1], Shin-ichi SAKURAI[2], Noriyuki IGARASHI[3], Nobutaka SHIMIZU[3], Yusuke TAMENORI[4], Michiaki YAMASAKI[5], Yoshihito KAWAMURA[5]
[1]Kyoto University, [2]Kyoto Inst. Technol., [3]KEK PF, [4]JASRI, [5]Kumamoto University

C2-13-O05 10:30–10:50

The origin of structural stability and solute clustering in Mg-*M*-Y (*M*= Ni, Cu, Co, and Zn) alloys with long-period stacking ordered structure

Takao TSUMURAYA[1], Tamio OGUCHI[2]
[1]Magnesium Research Center, Kumamoto University, [2]Institute of Scientific and Industrial Research, Osaka University

C2-13-O06 10:50–11:10

Local Structural Analysis of Mille-feuille Structured Mg-Zn-Y Alloy using X-ray Fluorescence Holography

Koji KIMURA[1], Takumi NISHIOKA[1], Yuta YAMAMOTO[1], Koji HAGIHARA[2], Hitoshi IZUNO[3], Naohisa HAPPO[4], Shinya HOSOKAWA[5], Eiji ABE[6], Motohiro SUZUKI[7], Tomohiro MATSUSHITA[7], Kouichi HAYASHI[1]
[1]Nagoya Institute of Technology, [2]Osaka University, [3]National Institute for Materials Science, [4]Hiroshima City University, [5]Kumamoto University, [6]The University of Tokyo, [7]Japan Synchrotron Radiation Research Institute

C2-13-O07 11:10–11:30

Microstructure Evolution of MgYTM (TM=Zn,Cu,Ni) glass ribbons under constant rate heating

Hiroshi OKUDA[1], Mikihito ITO[1], Shan LIN[1], Michiaki YAMASAKI[2], Yoshihito KAWAMURA[2]
[1]Kyoto University, [2]Kumamoto University

December 12, 2019

Poster Session

Time 16:30–18:00 Room Trade-0

C2-12-P01

High-Strength Polymer through a Microstructure Control

Kentaro MUKUMOTO[1], Koji OKUMA[2], Daisuke EGUSA[1], Hiromu SAITO[2], Eiji ABE[1,3]
[1]The Univ. of Tokyo, [2]Tokyo University of Agriculture and Technology, [3]National Institute for Material Science

C2-12-P02

Hybrid *in situ* neutron diffraction of Mg-based 18R LPSO alloy under compressive deformation

Kazuya AIZAWA[1], Wu GONG[2], Stefanus HARJO[1], Takuro KAWASAKI[1]
[1]Japan Atomic Energy Agency, [2]Kyoto University

C2-12-P03

Nanostructure distribution analysis in multilayered aluminum alloys by combined use of scalar tomography and scanning small-angle scattering

Shan LIN[1], Hiroshi OKUDA[1], Yukihiro NISHIKAWA[2]
[1]Kyoto University, [2]Kyoto Inst. Technol. Kyoto

C2-12-P04

Local Strains around Kinks in Mille-feuille Structured Mg Alloys

Yutaka URAKAWA[1], Daisuke EGUSA[1], Mitsuhiro ITAKURA[2], Eiji ABE[1,3]
[1]The University of Tokyo, [2]Japan Atomic Energy Agency, [3]National Institute for Material Science

C2-12-P05

Two-directional Micro-Laue Diffraction Mapping under Compression for Investigation of Kink Deformation Behaver in LPSO Mg Alloys

Shigeru KIMURA, Kazushi SUMITANI, Kentaro KAJIWARA
Japan Synchrotron Radiation Research Institute

C2-12-P06

Dependence of Vickers Hardness on Layer Thickness in Electrodeposited Ni-Co-Cu / Cu Multilayered Films

Hiroyuki HAGIWARA
Osaka City University

C2-12-P07

Influence of microstructure evolution on fracture toughness of a rapidly solidified ribbon-consolidated Mg-Zn-Y-Al alloy

Soya NISHIMOTO[1], Michiaki YAMASAKI[2], Shin-ichi INOUE[2], Yoshihito KAWAMURA[2]
[1]Graduate Student, Graduate School of Science and Technology, Kumamoto University, [2]Magnesium Research Center/Department of Materials Science, Kumamoto University

C2-12-P08

Study on the Two-phase Materials with Mille-feuille Structures with a Stacking of Hard and Soft Phases

Atsushi ISHIZAKA
Hokkaido University

C2-12-P09

Evaluation Of The Relationship Between Internal Structures And Mechanical Properties In Mulutilayer Films

Yuki WATANABE[1], Akira ISHIGAMI[1], Shoutaro NISHITUJI[1], Takashi KUROSE[2], Hiroshi ITO[1,2]
[1]Yamagata University, [2]Reserch Center for GREEN Materials and Advanced Prosessing (GMAP)

C2-12-P10

Localized Deformation of Electrodeposited Ni-Co-Cu/Cu Multilayered Films Subjected to Compressive Straining

Yoshihisa KANEKO
Osaka City University

C2-12-P11

Preparation and Mechanical Properties of Metal Flake Particles/Epoxy Resin Composites

Yutaro SAKO, Takashi KUROSE, Hiroshi ITO
Yamagata University

December 11–13, 2019

Symposium C-3

Hard and Tough Ceramics

[Organizers]

Junichi TATAMI (Yokohama National University)
Norimasa NISHIYAMA (Tokyo Institute of Technology)
Satoshi KITAOKA (Japan Fine Ceramics Center)
Fumihiro WAKAI (Tokyo Institute of Technology)

December 11, 2019

Oral Session 2

Time 14:00–16:05 Room Work-6

Chairperson Norimasa NISHIYAMA

C3-11-I01 ▸Invited 14:00–14:30

Size Dependent Hardness and Mechanical Energy Accommodation in Nanocrystalline Ceramics

James WOLLMERSHAUSER, Boris FEIGELSON, Heonjune RYOU, Edward GORZKOWSKI, Kathryn WAHL
U.S. Naval Research Laboratory

C3-11-I02 ▸Invited 14:30–14:55

Synthesis of Transparent Nano-ceramics under Ultrahigh Pressure

Tetsuo IRIFUNE
Geodynamics Research Center, Ehime University

C3-11-I03 ▸Invited 14:55–15:20

Continuous Strengthening in Nanotwinned Diamond

Bo XU
Yanshan University

C3-11-I04 ▸Invited 15:20–15:45

Nanopolycrystalline diamond: strength and mechanisms of plastic deformation

Yanbin WANG[1], Feng SHI[1], Hiroaki OHFUJI[2], Julien GASC[1], Norimasa NISHIYAMA[3], Tony YU[1], Toru SHINMEI[2], Tetsuo IRIFUNE[2]
[1]CARS, Univ Chicago, [2]GRC, Ehime Univ, [3]LMS, Institute of Innovative Research, TIT

C3-11-O05 15:45–16:05

Mechanical properties of transparent birefringent aluminosilicate nanoceramics

Nico Alexander GAIDA[1,2], Norimasa NISHIYAMA[3], Oliver BEERMANN[4], Atsunobu MASUNO[5], Ulrich SCHÜRMANN[2], Christopher GIEHL[4], Ken NIWA[1], Masashi HASEGAWA[1], Shrikant BHAT[6], Robert FARLA[6], Lorenz KIENLE[2]
[1]Department of Materials Physics, Nagoya University, [2]Institute for Materials Science, Kiel University, [3]Laboratory for Materials and Structures, Tokyo Institute of Technology, [4]Institute of Geosciences, Kiel University, [5]Graduate School of Science and Technology, Hirosaki University, [6]Deutsches Elektronen-Synchrotron (DESY)

December 11, 2019

Oral Session 3

Time 16:30–18:25 Room Work-6

Chairperson James WOLLMERSHAUSER

C3-11-I06 ▸Invited 16:30–16:55

Highly Distinctive Mechanical Properties of Ultrafine Nano-polycrystalline Diamond and cBN

Hitoshi SUMIYA
Sumitomo Electric Industries, Ltd.

C3-11-I07 ▸Invited 16:55–17:20

Complex atomic structure and three-dimensional single dopant distribution in Ce-doped cubic boron nitride

Ryo ISHIKAWA[1,2], Naoya SHIBATA[1,3], Takashi TANIGUCHI[3], Yuichi IKUHARA[1,3]
[1]University of Tokyo, [2]JST PRESTO, [3]Japan Fine Ceramics Center, [4]National Institute for Materials Science

C3-11-I08 ▸Invited 17:20–17:45

Crack-resistant and High Elastic Modulus Oxide Glasses Prepared by a Levitation Technique

Atsunobu MASUNO
Hirosaki University

C3-11-O09 17:45–18:05

Fabrication of Transparent Ceramics by Colloidal Processing and SPS

Tohru S. SUZUKI
National Institute for Materials Science

C3-11-O10 18:05–18:25

Nanopolycrystalline β-Si_3N_4 and γ-Si_3N_4: their mechanical and physical properties

Norimasa NISHIYAMA, Fumihiro WAKAI
Tokyo Institute of Technology

December 12, 2019

Oral Session 4

Time 9:00–11:25 Room Work-6

Chairpersons Jun-ichi TATAMI, Koji MORITA

C3-12-K01 ▸Keynote 9:00–9:30

Polymer-Derived Ceramics --- 40 Years of Research and Innovation in Advanced Ceramics

Ralf Peter RIEDEL
TU Darmstadt

C3-12-I02 ▸Invited 9:30–9:55

Novel Metal Nitrides Synthesized under High Pressures - Compression Behaviors, Crystal Chemistry and Electronic States -

Masashi HASEGAWA
Nagoya University

C3-12-O03 9:55–10:15

High-pressure Synthesis of Nitride Hard-materials.

Fumio KAWAMURA, Hitoshi YUSA, Takashi TANIGUCHI
National Institute for Materials Science

Break
10:15–10:25

C3-12-O04 10:25–10:45

High pressure synthesis and compression behavior of hexagonal CrN_2

Ken NIWA, Takurou YAMAMOTO, Takuya SASAKI, Masashi HASEGAWA
Nagoya University

C3-12-O05 10:45–11:05

Breakdown characteristics of silicon nitrides

Chika MATSUNAGA[1], You ZHOU[1], Dai KUSANO[2], Hideki HYUGA[1], Kiyoshi HIRAO[1]
[1]National Institute of Advanced Industrial Science and Technology, [2]Japan Fine Ceramics Co., Ltd.

C3-12-O06 11:05–11:25

High-pressure synthesis and crystal structure of MoC-type WN_x

Takuya SASAKI[1], Takahide IKOMA[1], Kazuki SAGO[1], Zheng LIU[2], Ken NIWA[1], Tetsu OHSUNA[1], Masashi HASEGAWA[1]
[1]Nagoya University, [2]National Institute of Advanced Industrial Science and Technology

December 12, 2019

Oral Session 5

Time 14:00–15:45 Room Work-6

Chairperson Ken NIWA

C3-12-I07 ▸Invited 14:00–14:25

Room-temperature plastic deformation behavior of ZnS crystals under controlled light conditions

Atsutomo NAKAMURA[1], Yu OSHIMA[1], Katsuyuki MATSUNAGA[1,2]
[1]Nagoya University, [2]Japan Fine Ceramics Center

C3-12-O08 14:25–14:45

Fabrication of Transparent ZnS by Spark-Plasma-Sintering (SPS) Technique

Koji MORITA, Lihong LIU, Tohru S SUZUKI, Byung-Nam KIM
National Institute for Materials Science (NIMS)

C3-12-O09 14:45–15:05

Evaluation of Microstructure and Interfacial Strength of Titanium/Oxide Ceramics Sintered Bonding for Biomaterial Application

Naritoshi AOYAGI, Ryusuke KOIZUMI, Osamu KATAGIRI
National Institute of Technology, Nagaoka College

C3-12-O10 15:05–15:25

Combustion synthesis of submicron B_4C with induction heating assistance

Anna GUBAREVICH
Tokyo Institute of Technology

C3-12-O11 15:25–15:45

Control of coarse defects in ceramics formed by dry-pressed granules

Satoshi TANAKA
Nagaoka University of Technology

December 13, 2019

Oral Session 7

Time 9:30–11:50 Room Port-1

Chairpersons Satoshi KITAOKA, Satoshi TANAKA

C3-13-K01 ▸Keynote 9:30–10:00

Nanoscale Dynamic Observations of Grain Boundary Fracture, Deformation and Twin Formation in Ceramics

Yuichi IKUHARA
University of Tokyo/JFCC

C3-13-I02 ▸Invited 10:00–10:25

ULTRA HIGH TEMPERATURE CERAMICS (UHTC) FOR HYPERSONIC SPACE VEHICLES: OPPORTUNITIES AND CHALLENGES

Bikramjit BASU
Indian Institute of Science

C3-13-O03 10:25–10:45

Electric Field-activated Superplastic Deformation in Tetragonal Zirconia Polycrystals

Hidehiro YOSHIDA[1], Yamato SASAKI[2], Takahisa YAMAMOTO[3]
[1]The University of Tokyo, [2]Tokyo University of Science, [3]Nagoya University

C3-13-I04 ▸Invited 10:45–11:10

Extremely Large Room Temperature Strain Tolerant Mechanism of Ceramics

Yutaka KAGAWA
Tokyo University of Technology

C3-13-O05 11:10–11:30

Evaluation of Delamination Toughness of Atmospheric Pressure Plasma Sprayed RTa_3O_9 Thermal Barrier Coatings by Simple Shear-loading Method

Makoto TANAKA[1], Shusui OGAWA[1], Daisaku YOKOE[1], Satoshi KITAOKA[1], Yuhei OHIDE[2], Kaito TAKAGI[2], Yoichiro HABU[2]
[1]Japan Fine Ceramics Center, [2]TOCALO Co., Ltd.

C3-13-O06 11:30–11:50

Criteria of interface crack initiation and propagation in environmental barrier coating with columnar layer under thermal stress

Emi KAWAI[1], Hideki KAKISAWA[2], Norio YAMAGUCHI[1], Taishi YOKOI[1], Atsushi KUBO[3], Satoshi KITAOKA[1], Yoshitaka UMENO[3]
[1]Japan Fine Ceramics Center, [2]National Institute for Materials Science, [3]The University of Tokyo

December 13, 2019

Oral Session 9

Time 16:30–18:25 Room Port-1

Chairperson Hidehiro YOSHIDA

Preparation
16:30–16:45

C3-13-I07 ▸Invited 16:45–17:05

Mechanical properties of silicon carbide in mesoscale measured by bending test using microcantilever beam specimens

Junichi TATAMI[1], Yumi IMOTO[1], Tsukaho YAHAGI[2], Takuma TAKAHASHI[2], Motoyuki IIJIMA[1,2]
[1]Yokohama National University, [2]Kanagawa Institute of Industrial Science and Technology

C3-13-O08 17:05–17:25

Microstructure Control of Al_2O_3-ZrO_2 Composites by Electrostatic Nano-Assembly Technique

Wai Kian TAN, Atsushi YOKOI, Go KAWAMURA, Atsunori MATSUDA, Hiroyuki MUTO
Toyohashi University of Technology

C3-13-O09 17:25–17:45

Theoretical Analysis of Densification Kinetics in Final Sintering Stage of Nano-Sized Zirconia

Byungnam KIM[1], Tohru S. SUZUKI[1], Koji MORITA[1], Hidehiro YOSHIDA[1], Ji-Guang LI[1], Hideaki MATSUBARA[2]
[1]National Institute for Materials Science, [2]Tohoku University

C3-13-O10 17:45–18:05

Observation of internal structure of Al_2O_3 ceramics by optical coherence tomography

Takuma TAKAHASHI[1], Junichi TATAMI[1,2], Fumika SAKAMOTO[2], Hidetaka ITO[1], Isamu TAGUCHI[1], Motoyuki IIJIMA[1,2]
[1]Kanagawa Institute of Industrial Science and Technology, [2]Yokohama National University

C3-13-O11 18:05–18:25

Micromechanics of Sintering: Pinch-off of Pore Channel, Formation and Disappearance of a Closed Pore

Fumihiro WAKAI[1], Gaku OKUMA[1], Norimasa NISHIYAMA[1], Olivier GUILLON[2]
[1]Tokyo Institute of Technology, [2]Forschungzentrum Julich

December 12, 2019

Poster Session

Time 16:30–18:00 Room Trade-0

C3-12-P01

Synchrotron X-ray CT imaging of processing-induced defects formed during sintering of alumina

Gaku OKUMA[1], Shuhei WATANABE[1], Kan SHINOBE[1], Norimasa NISHIYAMA[1], Akihisa TAKEUCHI[2], Kentaro UESUGI[2], Satoshi TANAKA[3], Fumihiro WAKAI[1]
[1]Tokyo Institute of Technology, [2]Japan Synchrotron Radiation Research Institute, JASRI/SPring-8, [3]Nagaoka University of Technology

C3-12-P02

Microstructural Design of Composite Materials using Spherical Composite Aggregate Obtained by Electrostatic Nano-assembly Technique

Souta INOUE, Atsushi YOKOI, Wai Kian TAN, Go KAWAMURA, Atsunori MATSUDA, Hiroyuki MUTO
Toyohashi University of Technology

C3-12-P03

Development of thermal conductive PMMA based h-BN composite via electrostatic nano-assembly technique

Atsushi YOKOI, Wai Kian TAN, Go KAWAMURA, Atsunori MATSUDA, Hiroyuki MUTO
Toyohashi University of Technology

C3-12-P04

Phase Transformation and Conducting fluid of Silicon Nitride at High Pressure and Temperature

Yuji KAMISHIMA
Tokyo Institute of Technology

C3-12-P05

Prediction of fracture from various shaped defects by XFEM

Shuhei WATANABE[1], Gaku OKUMA[1], Yosuke SATO[2], Tomoki SEKIYA[1], Norimasa NISHIYAMA[1], Fumihiro WAKAI[1]
[1]Laboratory for Materials and Structures Laboratory, Institute of Innovative Research, Tokyo Institute of Technology, [2]Mitsubishi Material Corporation Metalworking Solutions Company

C3-12-P06

Fabrication of polycrystalline cotunnite-type zirconia under high pressure and temperature and its mechanical properties.

Palakrit TINNAKORN, Kouki KANATANI, Norimasa NISHIYAMA, Fumihiro WAKAI
Tokyo Institute of Technology

C3-12-P07

Fabrication of transparent polycrystalline MgO by combination of spark plasma sintering and high pressure–high temperature synthesis

Masaya ENDO, Gaku OKUMA, Norimasa NISHIYAMA, Fumihiro WAKAI
Tokyo Institute of Technology

C3-12-P08

Synthesis of Single Phase Polycrystals of ω-Titanium and ω-Zirconium under High Pressure and Mechanical Characterization

Takashi SAWAHATA[1], Norimasa NISHIYAMA[1], Makoto ARITA[2], Fumihiro WAKAI[1], Zenji HORITA[2]
[1]Tokyo Institute of Technology, [2]Kyushu University

C3-12-P09

Preparation Of Nitride Phosphor Particle Dispersed Glass Composites

Natsumi TORASE[1], Junichi TATAMI[1,2], Motoyuki IIJIMA[1,2], Takuma TAKAHASHI[2]
[1]Yokohama National University, [2]Kanagawa Institute of Industrial Science and Technology

C3-12-P10

Observation of Internal Structure of Al_2O_3 Slurry under Shearby Optical Coherence Tomography

Hiroki TAKABA
Yokohama National University

C3-12-P11

Phase relationship of Si_2N_2O

Kota FUKUCHI
Tokyo Institute of Technology

C3-12-P12

Influence of rare earth oxide as a sintering aid on translucency of aluminum nitride (AlN) ceramics

Hayato AKIMOTO[1], Junichi TATAMI[1,2]
[1]Yokohama National University, [2]Kanagawa Institute of Industrial Science and Technology

C3-12-P13

Evolution of anisotropic microstructures in free sintering and constrained sintering of Au sub-micron particles observed by FIB-SEM tomography

Ryo MIYAKI[1], Kan SHINOBE[1], Gaku OKUMA[1], Anna SCIAZKO[2], Takaaki SHIMURA[3], Shotaro HARA[4], Toshinori OGASHIWA[5], Naoki SHIKAZONO[2], Norimasa NISHIYAMA[1], Fumihiro WAKAI[1]
[1]Tokyo Institute of Technology, [2]The University of Tokyo, [3]Tokyo University of Agriculture and Technology, [4]Chiba Institute of Technology, [5]Tanaka Kikinzoku Kogyo

C3-12-P14

Evaluation of rotation behavior of multilayer graphene coated glass fibers in magnetic field via in situ three-dimensional dynamic observation

Ibuki AIHARA[1], Takuma TAKAHASHI[2], Junichi TATAMI[1,2], Motoyuki IIJIMA[1,2]
[1]Yokohama National University, [2]Kanagawa Institute of Industrial Science and Technology

C3-12-P15

Crystal Structure and Mechanical Properties of Cr doped Mo_2NiB_2

Junya WATANABE, Toshiki OTA, Satofumi MARUYAMA
Tokyo City University

C3-12-P16

Metal Doping effects on the microstructure and mechanical properties of boron carbide

Toshiki OTA, Ryuichiro KOYAMA, Koga NAKAMURA, Junya WATANABE, Satofumi MARUYAMA
Tokyo City University

C3-12-P17

Mechanical properties of single crystal $BaTiO_3$ measured using microcantilever beam specimen

Hiroshi YAMAGUCHI[1], Junichi TATAMI[1,2], Motoyuki IIJIMA[1,2]
[1]Yokohama National University, [2]Kanagawa Institute of Industrial Science and Technology

C3-12-P18

In-situ observation of dewaxing process of ceramic powder compacts by optical coherence tomography

Mayu KATO[1], Junichi TATAMI[1,2], Motoyuki IIJIMA[1,2], Takuma TAKAHASHI[2]
[1]Yokohama National University, [2]Kanagawa Institute of Industrial Science and Technology

C3-12-P19

Mechanical and Optical Properties of Jadeite/Stishovite and Jadeite/Coesite Ceramic Composites

Eleonora KULIK[1], Alena KRUPP[1,2], Astrid HOLZHEID[1], Norimasa NISHIYAMA[3], Tetsuo IRIFUNE[4], Christian RUESSEL[5], Hiroaki OHFUJI[4], Youmo ZHOU[4]
[1]Institute of Geosciences, Kiel University, Kiel, 24118, Germany, [2]Bayerisches Geoinstitut, University of Bayreuth, Bayreuth, 95447, Germany, [3]Laboratory for Materials and Structures, Institute of Innovative Research, Tokyo Institute of Technology, Yokohama, 226-8503, Japan, [4]Geodynamics Research Center, Ehime University, Matsuyama, 790-8577, Japan, [5]Friedrich-Schiller-University Jena, Jena, 07743, Germany

C3-12-P20

Preparation of HfO_2–Al_2O_3 composite films using chemical vapor deposition and their nanostructures

Shogen MATSUMOTO, Akihiko ITO
Yokohama National University

December 12–13, 2019

Symposium C-4

Tough Polymers

[Organizer]

Kohzo ITO (The University of Tokyo)

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Work-4

Chairpersons Hideyuki OTSUKA, Zhaomin HOU

C4-12-K01 ▸Keynote 9:00–9:40

Fiber Reinforced Hydrogels With Extra-Ordinarily High Toughness

Jian Ping GONG

Hokkaido University

C4-12-O02 9:40–10:00

Crack Propagation of Slide-Ring Gels

Koichi MAYUMI, Chang LIU, Hideaki YOKOYAMA, Kohzo ITO

The University of Tokyo

C4-12-O03 10:00–10:20

Reinforcement of Slide-Ring Hydrogel via Strain-induced Crystallization

Chang LIU[1], Lan JIANG[1], Koichi MAYUMI[1], Takamasa SAKAI[2], Hideaki YOKOYAMA[1], Kohzo ITO[1]

[1]Department of Advanced Materials Science, Graduate School of Frontier Sciences, The University of Tokyo, [2]Department of Bioengineering, Graduate School of Engineering, The University of Tokyo

C4-12-I04 ▸Invited 10:20–10:50

Velocity Jump in Crack Propagation on Sheet Samples: Nano Scale Glass Transition at a Crack Tip and the Effect of Boundary Condition

Ko OKUMURA

Ochanomizu University

C4-12-O05 10:50–11:10

Multi-scale Energy Dissipation Mechanism in Tough and Self-healing Hydrogels

Kunpeng CUI[1], Xueyu LI[1], Xiaobin LIANG[2], Ken NAKAJIMA[2], Jian Ping GONG[1]

[1]Hokkaido University, [2]Tokyo Institute of Technology

C4-12-O06 11:10–11:30

Fatigue Behaviors of Phase Separation Hydrogels: the Effect of Phase Contrast

Xueyu LI[1], Cuipeng CUI[2], Tao Lin SUN[1,3], Takayuki KUROKAWA[1,3], Jian Ping GONG[1,2,3]

[1]Soft Matter GI-CoRE, Hokkaido University, [2]WPI-ICReDD, Hokkaido University, [3]Laboratory of Soft & Wet Matter, Faculty of Advanced Life Science, Hokkaido University

December 12, 2019

Oral Session 5

Time 14:00–16:10 Room Work-4

Chairpersons Yoshinori TAKASHIMA, Jian Ping GONG

C4-12-I07 ▸Invited 14:00–14:30

Synthesis and Remarkable Self-Healing Properties of Ethylene–Anisylpropylene Copolymers

Zhaomin HOU

RIKEN Center for Sustainable Resource Science

C4-12-O08 14:30–14:50

Synthesis of Poly(methyl methacrylate) Based Polyrotaxane via Reversible Addition-Fragmentation Chain Transfer Polymerization

YuCheng WANG[1], Rina MAEDA[1], Gergely KALI[2], Gerhard WENZ[2], Hideaki YOKOYAMA[1], Kohzo ITO[1]

[1]Graduate School of Frontier Science, University of Tokyo, [2]Organische Makromolekulare Chemie, Universität des Saarlandes

C4-12-I09 ▸Invited 14:50–15:20

Mechanofunctional Polymers for Self-healing and Stress Visualization Based on Dynamic Covalent Chemistry

Hideyuki OTSUKA, Daisuke AOKI

Tokyo Institute of Technology

C4-12-I10 ▸Invited 15:20–15:50

Design and Functions of Supramolecular Materials Formed by Reversible and Movable Cross-Linkers

Yoshinori TAKASHIMA

Osaka University

C4-12-O11 15:50–16:10

Polybutadienes with Urethane Linkages for Rubber Application

Yasuhiro SHODA[1,2], Daisuke AOKI[2], Katsuhiko TSUNODA[1], Hideyuki OTSUKA[2]

[1]Bridgestone Corporation, [2]Tokyo Institute of Technology

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Work-4

Chairpersons Kohzo ITO, Hiroshi ITO

C4-12-I12 ▸Invited 16:30–17:00

Fracture Behaviors of Amorphous Polymer Blends Fabricated by high Shear Kneading Processing

Hiroshi ITO, Akira ISHIGAMI, Kazuki WATANABE, Yuki KODAMA, Takashi KUROSE, Shotaro NISHITSUJI

Yamagata University

C4-12-O13 17:00–17:20

The Change of the Density Fluctuations of Amorphous Polymer under Deformation by Using in situ Small Angle X-ray Scattering

SHOTARO NISHITSUJI
Yamagata University

C4-12-I14 ▸Invited 17:20–17:50

Polyrotaxane Blend Toughened by Movable Crosslinked Structure

Sadayuki KOBAYASHI
Chemicals Research Laboratories / Japan

C4-12-O15 17:50–18:10

Polymer Crystallization under Shear Flow

Go MATSUBA, Kun LI
Yamagata University

C4-12-O16 18:10–18:30

Evaluation of Mechanical Property of Fiber Reinforced Plastics with Extremely Soft Matrix (Soft FRP) from the Perspective of Rehabilitation

Masaki NARISAWA[1], Takahiro KINUGASA[1], Fumihiro INOUE[1], Manabu YAMAGATA[2], Akiyoshi SAITO[3], Junya SUZUKI[3], Ryo YONETSU[4]
[1]Osaka Prefecture University, [2]Kitamura Chemical Co. Ltd., [3]Kawamura Gishi Co. Ltd., [4]Kanagawa University of Human Services

December 13, 2019

Oral Session 7

Time 9:00–11:40 Room Work-4

Chairpersons Keiji TANAKA, Taiki HOSHINO

C4-13-I01 ▸Invited 9:00–9:40

Synchrotron Radiation X-ray Scattering Study of Multiphase Polymers under Mechanical Deformation

Atsushi TAKAHARA, Ken KOJIO, Nattanee DECHNARONG, Chao-Hung CHENG
Kyushu University

C4-13-I02 ▸Invited 9:40–10:10

Building a New Range of Synchrotron Radiation Application to the Research of Tough Polymers

Taiki HOSHINO[1], Yusuke TAMENORI[2], Shuji GOTO[2], Masaki TAKATA[3]
[1]RIKEN SPring-8 Center, [2]JASRI, [3]Tohoku University

C4-13-O03 10:10–10:30

Structural Analysis in Nanocomposite Elastomer with Block Copolymer-Grafted Silica Particles by Synchrotron Radiation X-ray Scattering and Spectroscopy under Various Mechanical Deformation

Chao-Hung CHENG[1], Shuhei NOZAKI[1], Shiori MASUDA[1], Nattanee DECHNARONG[1], Kiyu UNO[1], Kazutaka KAMITANI[2], Ken KOJIO[1,2,3], Atsushi TAKAHARA[1,2,3]
[1]Graduate School of Engineering, Kyushu University, [2]IMCE, Kyushu University, [3]WPI-I2CNER, Kyushu University

C4-13-I04 ▸Invited 10:30–11:00

Innovative Tough Rubber Compound for Environmental Friendly Tire

Katsuhiko TSUNODA
Bridgestone Corporation

C4-13-O05 11:00–11:20

Aggregation States and Thermal Molecular Motion of Fluororubber Chains Adsorbed onto Model Carbon Interfaces

Daiki SAITO[1], Kazuki SASAHARA[2], Yoshihisa TAKEYAMA[3], Mitsugi UEJIMA[3], Daisuke KAWAGUCHI[2], Satoru YAMAMOTO[2], Keiji TANAKA[1,2]
[1]Department of Automotive Science, Kyushu University, [2]Department of Applied Chemistry, Kyushu University, [3]Zeon Corporation

C4-13-O06 11:20–11:40

Change in Molecular Aggregation State and Rupture Mechanism of Poly(methyl methacrylate) and Polycarbonate Films during Bulge Testing

Ken KOJIO[1,2,3], Aya FUJIMOTO[1], Tomoko KAJIWARA[1], Chigusa NAGANO[2], Chao-Hung CHENG[2], Shuhei NOZAKI[2], Shiori MASUDA[2], Nattanee DECHNARONG[2], Kazutaka KAMITANI[1], Atsushi TAKAHARA[1,2,3]
[1]Institute for Materials Chemistry and Engineering, Kyushu University, [2]Graduate School of Engineering, Kyushu University, [3]International Institute for Carbon-Neutral Energy Research, Kyushu University

December 13, 2019

Oral Session 9

Time 16:30–18:30 Room Miel-5

Chairpersons Susumu OKAZAKI, Atsushi TAKAHARA

C4-13-I07 ▸Invited 16:30–17:00

Showered Dynamics of Polymer Dynamics at Inorganic-filler Interface

Keiji TANAKA[1], Hung K. NGUYEN[1], Manabu INUTSUKA[2], Daisuke KAWAGUCHI[1]
[1]Kyushu University, [2]Kanagawa University

C4-13-O08 17:00–17:20

Characterization of Tough Polymer Interfaces by Interface-Sensitive Spectroscopy

Daisuke KAWAGUCHI[1], Shin SUGIMOTO[2], Satoru YAMAMOTO[1], Keiji TANAKA[1,2]
[1]Department of Applied Chemistry, Kyushu University, [2]Department of Automotive Science, Kyushu University

C4-13-I09 ▸Invited 17:20–17:50

All-Atomistic Molecular Dynamics Study of Impact Fracture of Glassy Polymers

Susumu OKAZAKI, Kazushi FUJIMOTO, Zhiye TANG
Nagoya University

C4-13-O10 17:50–18:10

Network Heterogeneity and Fracture Behavior in Epoxy Resin

Satoru YAMAMOTO, Mika AOKI, Atsuomi SHUNDO, Keiji TANAKA
Kyushu University

C4-13-O11 18:10–18:30

Stress Relaxation Mechanism of Slide-Ring gels: A Coarse-Grained Molecular Dynamics Simulation Study.

Yusuke YASUDA[1], Koichi MAYUMI[1], Masatoshi TODA[2], Hideaki YOKOYAMA[1], Hiroshi MORITA[2], Kohzo ITO[1]
[1]Department of Advanced Materials Science, School of Frontier Sciences, The University of Tokyo, 5-1-5 Kashiwa-noha, Kashiwa, Chiba 277-8561, Japan., [2]National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1, Umezono, Tsukuba, Ibaraki 305-8568, Japan.

December 13, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

C4-13-P01

One-pot synthesis of polyrotaxane with different host coverage and its slide-ring materials

Lan JIANG, Chang LIU, Koichi MAYUMI, Hideaki YOKOYAMA, Kohzo ITO
The University of Tokyo

C4-13-P02

The Synthesis of the Polycyclooctadiene-based Polyrotaxane with Thermally Resistant

Randi ZHANG[1], Lan JIANG[1], Hideaki YOKOYAMA[1], Wen-hua SUN[2], Kohzo ITO[1]
[1]University of Tokyo, [2]University of Chinese Academy of Sciences

C4-13-P03

Photoregulation of the Heat Resistance in Network Polymers with Diarylethene-conjugated Diels–Alder Cross-links

Jumpei KIDA, Daisuke AOKI, Hideyuki OTSUKA
Tokyo Institute of Technology

C4-13-P04

Preparation of Materials with Supramolecular Cross-linking and Their Physical Properties

Ryohei IKURA[1], Junsu PARK[1], Motofumi OSAKI[1], Hiroyasu YAMAGUCHI[1], Akira HARADA[2], Yoshinori TAKASHIMA[1,3]
[1]Department of Macromolecular Science, Graduate School of Science, Osaka University, [2]The Institute of Scientific and Industrial Research, Osaka University, [3]Institute for Advanced Co-Creation Studies, Osaka University

C4-13-P05

Synthesis of Reactive Polymer/silica Nanocomposites with Dynamic Covalent Bonds at the Filler-matrix Interface

Shimon KATAOKA
Department of Chemical Science and Engineering, Tokyo Institute of Technology

C4-13-P06

Modification of Amine-Cured Epoxy Resins by Boronic Acids

Yumiko ITO, Daisuke AOKI, Hideyuki OTSUKA
Tokyo Institute of Technology

C4-13-P07

Tough and Functional Supramolecular Materials from Polymer Mixtures with Host-guest Interaction between Cyclodextrin and Adamantane

Junsu PARK[1], Motofumi OSAKI[1], Yoshinori TAKASHIMA[1,2], Akira HARADA[3], Hiroyasu YAMAGUCHI[1]
[1]Graduate School of Science, Osaka University, [2]IACS, Osaka University, [3]ISIR, Osaka University

C4-13-P08

Toughening Polymer Networks via Freezing-Induced Radical Generation Based on Mechanocleavable Fluorescent Dynamic Covalent Bonds

Sota KATO, Daisuke AOKI, Hideyuki OTSUKA
Tokyo Institute of Technology

C4-13-P09

Facile Visualization of Molecular-level Slide-ring Effect via Mechanochromic Chemistry

Yi LU, Daisuke AOKI, Hideyuki OTSUKA, Toshikazu TAKATA
Tokyo Institute of Technology

C4-13-P10

Force-induced Cross-linking Reaction in a Radical-Type Mechanochromic Polyurethane with Polymerizable Side Chains

Kota SESHIMO, Hio SAKAI, Daisuke AOKI, Hideyuki OTSUKA
Tokyo Institute of Technology

C4-13-P11

Supramolecular Ionic Liquid Elastomer based on Host-Guest Interactions

Garry SINAWANG[1], Yuichiro KOBAYASHI[1], Yoshinori TAKASHIMA[1,2], Akira HARADA[3], Hiroyasu YAMAGUCHI[1]
[1]Graduate School of Science, Osaka University, [2]Institute for Advanced Co-Creation Studies, Osaka University, [3]The Institute of Scientific and Industrial Research, Osaka University

C4-13-P12

Designed Polymer Network Structure Using 4-arm and 2-arm PEGs in Ionic Liquid-Based Electrolytes for Lithium-Ion Batteries

Asumi ISHIKAWA, Kenta FUJII
Yamaguchi University

C4-13-P13

Chromonic Aggregates-Incorporated Tough Hydrogels

Khoa LE
Tokyo University of Science

C4-13-P14

Relationship between the Dissociation Energy of Reversible Cross-links and Mechanical Properties of Supramolecular Hydrogels with Inculusion Complexes.

Subaru KONISHI[1], Yoshinori TAKASHIMA[1,2], Akira HARADA[3], Hiroyasu YAMAGUCHI[1]
[1]Graduate School of Science, Osaka University, [2]Institute for Advanced Co-Creation Studies, Osaka University, [3]Institute of Scientific and Industrial Research, Osaka University

C4-13-P15

Evaluation of Toughness and Failure Mode of PA6/mSEBS/PS Ternary Blends with and Oil Extended Viscoelastic Controlled Interface

Akira ISHIGAMI
Yamagata University

C4-13-P16

Elastomeric Nanocomposites Composed of Silica Nanoparticles with End-Functionalized Rubbery Polymer Brush

Kiyu UNO[1], Atsushi TAKAHARA[1,2,3], Yuji HIGAKI[4], Ken KOJIO[1,2,3], Hitoshi SHIMAMOTO[1], Kazutaka KAMITANI[2], Masaru MUKAI[2], Chao-Hung CHENG[1]
[1]graduate school of engineering, Kyushu University, [2]IMCE, [3]WPI-I2CNER, [4]Faculty of Science technology, Oita University

C4-13-P17

Structural Analysis of Japanese Sweets -Warabi-mochi-

Akane NAGASAKI, Go MATSUBA
Yamagata University

C4-13-P18

Precise Structural Analysis Bi-axially Stretched Films

Keisuke SOTOYAMA, Go MATSUBA
Yamagata University

C4-13-P19

In Situ Small-Angle X-Ray Scattering Investigation on Mesoscopic Deformation of Thermoplastic Elastomer under Cyclic Elongations

Nattanee DECHNARONG[1], Kazutaka KAMITANI[2], Chao-Hung CHENG[1], Shiori MASUDA[1], Shuhei NOZAKI[1], Chigusa NAGANO[1], Ken KOJIO[1,2,3], Atsushi TAKAHARA[1,2,3]
[1]Graduate School of Engineering, Kyushu University, [2]Institute for Materials Chemistry and Engineering, Kyushu University, [3]International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University

C4-13-P20

Quasi-two-dimensional coalescence of liquid in another liquid

Yukina Margaret KOGA
Ochanomizu University

C4-13-P21

Molecular Dynamics Study of Compressive Fracture of Glassy Polymers

Hiroaki ISHIKAWA, Kazushi FUJIMOTO, Zhiye TANG, Susumu OKAZAKI
Graduate School of Engineering, Nagoya University

C4-13-P22

All-atom Molecular Dynamics Study of Impact Fracture of Glassy Polymers: Molecular Mechanism of Brittleness and Ductility

Zhiye TANG, Kazushi FUJIMOTO, Wataru SHINODA, Susumu OKAZAKI
Nagoya University

C4-13-P23

Molecular Study of Impact Fracture of Amorphous Polymer I: Brittle and Ductile

Kazushi FUJIMOTO
Nagoya University

Cluster D

Advanced Electronic Materials

Symposium

D-1 2D Layered Materials

D-2 Novel Concepts of Electronic Materials Inspired from Complementary and Competing Fields

D-3 Science and Technology of Superconductivity

D-4 5th E&J BLS Wide-bandgap and 2-dimensional Materials

December 11–13, 2019

Symposium D-1

2D Layered Materials

[Organizers]

Susumu SAITO (Tokyo Institute of Technology)
Yoshihiro IWASA (University of Tokyo)
Yuanbo ZHANG (Fudan University)

[Sponsor]

ATI 公益財団法人新世代研究所 FOUNDATION ADVANCED TECHNOLOGY INSTITUTE

Nanocarbon research committee,
Foundation Advanced Technology Institute

December 11, 2019

Oral Session 1

Time 9:00–11:30 Room Work-4

Chairperson Susumu SAITO

[Opening 9:00–9:30]

D1-11-K01 ▸Keynote 9:30–10:15

Exploring 2D Materials: From Nanopores to Ordered Alloys to e-Beam Induced Circuitry

Alex ZETTL
University of California at Berkeley

D1-11-I02 ▸Invited 10:15–10:45

Optical and vibrational EELS from low-dimensional materials

Kazutomo SUENAGA
AIST

D1-11-O03 10:45–11:00

Change in the photo response by Adsorption of Phthalocyanine Complex Molecules on MoS_2-FET

Hiroki WAIZUMI[1], Tsuyoshi TAKAOKA[2], Kazuki WASHIDA[1], Md Iftekharul ALAM[1], Muhammed Shamim Al MAMUN[1], Tat Trung NGUYEN[1], Tadahiro KOMEDA[2]
[1]Faculty of Science, Tohoku University, [2]IMRAM, Tohoku University

D1-11-O04 11:00–11:15

Molecular adsorption and electronic properties of doped graphene for sensing applications

Yoshitaka FUJIMOTO[1], Susumu SAITO[1,2,3]
[1]Department of Physics, Tokyo Institute of Technology, [2]Advanced Research Center for Quantum Physics and Nanoscience, Tokyo Institute of Technology, [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology

D1-11-O05 11:15–11:30

Effect of The Adsorption of TCNQ And F4-TCNQ On MoS_2–based FET

Tsuyoshi TAKAOKA, Tat Trung NGUYEN, Md Iftekharul ALAM, Kazuki WASHIDA, Hiroki WAIZUMI, Muhammed Shamim ALMAMUN, Tadahiro KOMEDA
Tohoku Univrersity

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Work-4

Chairperson Yoshihiro IWASA

D1-11-K06 ▸Keynote 14:00–14:45

Quantum transport and robotic fabrication of van der Waals junctions of graphene and 2D materials

Tomoki MACHIDA
Institute of Industrial Science, University of Tokyo

D1-11-I07 ▸Invited 14:45–15:15

Charge transfer dynamics at two-dimensional material/liquid electrolyte interfaces

Chun-Wei CHEN
National Taiwan University

D1-11-O08 15:15–15:30

Honeycomb lattice based electrides: Electronic structures and catalytic applications towards selective hydrogenation

Yangfan LU[1], TIAN NAN YE[1], Jian LI[1], Takuya NAKAO[2], Yoshitake TODA[1], Shigenori UDEA[3], Tomofumi TADA[1], Koji HORIBA[4], Hiroshi KUMIGASHIRA[4], Masaaki KITANO[1], Hideo HOSONO[1]
[1]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [2]Laboratory for Materials and Structures, Tokyo Institute of Technology, [3]Synchrotron X-ray Station at SPring-8, National Institute for Material Science (NIMS), [4]Photon Factory and Condensed Matter Research Center, Institute of Materials Structure Science, High Energy Accelerator Research Organization (KEK)

D1-11-O09 15:30–15:45

Concerted Nanoporosity of H_2O-adsorbed GOs, Evidenced by in-situ X-ray Diffractions

Ryusuke FUTAMURA[1], Taku IIYAMA[1,2], Takahiro UEDA[3,4], Katsumi KANEKO[2]
[1]Department of Chemistry, Shinshu University, [2]Research Initiative for Supra-Materials, Shinshu University, [3]The Museum of Osaka University, [4]Department of Chemistry, Graduate School of Science, Osaka University

D1-11-O10 15:45–16:00

Novel friction induced crystal growth of 2D layered MoS_2 on semiconductor surfaces

Tadao TANABE, Takafumi ITO, Junya OSAKI, Chao TANG, Yohei SATO, Yutaka OYAMA
Tohoku University

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Work-4

Chairperson Hiroki AGO

D1-11-I11 ▸Invited 16:30–17:00

Nanophotonics with Hexagonal Boron Nitride

Igor AHARONOVICH
UTS

D1-11-I12 ▸Invited 17:00–17:30

Optical Physics in Two-dimensional Layered Materials and its Hetero-structures

Kazunari MATSUDA
Kyoto University

D1-11-O13 17:30–17:45

Large Photoluminescence Enhancement of Monolayer MoS_2 by a Molecular Treatment with the Aid of UV Irradiation

Yuki YAMADA[1], Yuki AOKI[1], Akito HUKUI[1], Yuji MATSUSHITA[1], Takeshi YOSHIMURA[1], Atsushi ASHIDA[1], Norifumi FUJIMURA[1], Keisuke SHINOKITA[3], Kazunari MATSUDA[3], Daisuke KIRIYA[1,2]
[1]Osaka Prefecture University, [2]JST PRESTO, [3]Institute of Advanced Energy, Kyoto University

D1-11-O14 17:45–18:00

Photodetectors based on bilayer graphene heterostructure FETs

Teerayut UWANNO[1,2], Takashi TANIGUCHI[3], Kenji WATANABE[3], Kosuke NAGASHIO[1]
[1]University of Tokyo, [2]King Mongkut's institute of technology Ladkrabang, [3]National institute of materials science

D1-11-O15 18:00–18:15

Anomalous Hall effect in atomically-thin chromium telluride thin film grown by molecular-beam epitaxy

Yue WANG[1], Masaki NAKANO[1,2], Satoshi YOSHIDA[1], Hideki MATSUOKA[1], Kyoko ISHIZAKA[1,2], Yoshihiro IWASA[1,2]
[1]Dept. of Appl. phys, Univ. of Tokyo, [2]RIKEN CEMS

Post-deadline Invited presentation by Kaya Kobayashi
18:15–18:30

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Mont-3

Chairperson Mikito KOSHINO

Symposium breakfast meeting 1
9:00–9:30

D1-12-K01 ▸Keynote 9:30–10:15

Roles of Interlayer Interactions in Stacked 2D Crystals

Young-Woo SON
Korea Institute for Advanced Study

D1-12-I02 ▸Invited 10:15–10:45

Continue the transistor scaling with 2D materials: Challenges and Perspectives

Lain-Jong LI
TSMC

D1-12-O03 10:45–11:00

Topological Edge States of Monolayer Black Phosphorene

Masaru HITOMI, Mikito KOSHINO
Osaka University

D1-12-O04 11:00–11:15

Room-Temperature Valley-Polarized Light-Emitting Devices *via* Strained Monolayer Semiconductors

Jiang PU[1], Hirofumi MATSUOKA[1], Yu KOBAYASHI[2], Yasumitsu MIYATA[2], Taishi TAKENOBU[1]
[1]Nagoya University, [2]Tokyo Metropolitan University

D1-12-O05 11:15–11:30

Geometries and Electronic Properties of Transition Metal Dichalcogenide Nanotubes

Shuntaro OSHIMA[1], Masayuki TOYODA[1], Susumu SAITO[1,2,3]
[1]Department of Physics, Tokyo Institute of Technology, Meguro, Tokyo, 152-8551, Japan, [2]Advanced Research Center for Quantum Physics and Nanoscience, Tokyo Institute of Technology, Meguro, Tokyo 152-8551, Japan, [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology, Yokohama, Kanagawa 226-8503, Japan

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Mont-3

Chairperson Kosuke NAGASHIO

D1-12-I06 ▸Invited 16:30–17:00

Silicene and Beyond: Experimental Realization of Group IV 2D Materials

Yukiko YAMADA-TAKAMURA
Japan Advanced Institute of Science and Technology

D1-12-I07 ▸Invited 17:00–17:30

Geometric and Electronic Structures of Hybridstructure of 2D Materials

Susumu OKADA
University of Tsukuba

D1-12-O08 17:30–17:45

Crossover between Orbital limit and Pauli-paramagnetic limit in ultra-thin $NbSe_2$

Hideki MATSUOKA[1], Masaki NAKANO[1,2], Yoshimitsu KOHAMA[3], Yue WANG[1], Yuta KASHIWABARA[1], Satoshi YOSHIDA[1], Kazuki MATSUI[3], Takashi SHITAOKOSHI[1], Takumi OUCHI[4], Kyoko ISHIZAKA[1,2], Tsutomu NOJIMA[4], Masashi KAWASAKI[1,2], Yoshihiro IWASA[1,2]
[1]The University of Tokyo, [2]RIKEN Center for Emergent Matter Science (CEMS), [3]Institute for Solid State Physics, University of Tokyo, [4]Institute for Materials Research, Tohoku University

D1-12-O09 17:45–18:00

Ambipolar transistor action of germanane electric double layer transistor

Yumiko KATAYAMA, Ryoto YAMAUCHI, Yuhsuke YASUTAKE, Susumu FUKATSU, Kazunori UENO
The University of Tokyo

D1-12-O10 18:00–18:15

Transparency and Two-dimensional Hole Superconductivity in $Li_{1-x}NbO_2$

Takuto SOMA[1], Kohei YOSHIMATSU[1], Akira OHTOMO[1,2]
[1]Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy (MCES)

D1-12-O11 18:15–18:30

Thickness-dependent Optical Bandgap and Electrical Transport Properties in Layered InSe Thin Films Grown by Pulsed-laser Deposition

Dingheng ZHENG, Junichi SHIOGAI, Kohei FUJIWARA, Atsushi TSUKAZAKI
Institute for Materials Research, Tohoku University, Sendai, 980-8577, Japan

December 13, 2019

Oral Session 7

Time 9:00–11:30 Room Mont-3

Chairperson Tomoki MACHIDA

Symposium breakfast meeting 2
9:00–9:30

D1-13-K01 ▸Keynote 9:30–10:15

Ruoff Group Carbon Research

Rodney RUOFF
UNIST

D1-13-I02 ▸Invited 10:15–10:45

Moiré phonons in the twisted bilayer graphene

Mikito KOSHINO[1], Young Woo SON[2]
[1]Osaka University, [2]Korea Institute for Advanced Study

D1-13-O03 10:45–11:00

Nonreciprocal transport and anomalous photovoltaic effect in van der Waals nanomaterials

Toshiya IDEUE[1], Yoshihiro IWASA[1,2]
[1]The University of Tokyo, [2]RIKEN CEMS

D1-13-O04 11:00–11:15

General theory on the electronic states in layered materials with commensurate interlayer shift

Ryosuke AKASHI
The University of Tokyo

D1-13-O05 11:15–11:30

Quantum and classical ratchet motions of vortices in a 2D trigonal superconductor MoS_2

Yuki ITAHASHI[1], Yu SAITO[1], Toshiya IDEUE[1], Tsutomu NOJIMA[2], Yoshihiro IWASA[1,3]
[1]Department of applied physics, The University of Tokyo, [2]Institute for Materials Research, Tohoku University, [3]RIKEN Center for Emergent Matter Science (CEMS)

December 13, 2019

Oral Session 8

Time 14:00–16:00 Room Mont-3

Chairperson Susumu OKADA

D1-13-I06 ▸Invited 14:00–14:30

High-throughput synthesis of graphene by plasma CVD

Masataka HASEGAWA, Ryuichi KATO, Wararu MIZUTANI, Masatou ISHIHARA, Takatoshi YAMADA, Yuki OKIGAWA
AIST

D1-13-I07 ▸Invited 14:30–15:00

Controlled CVD Growth of High-Quality 2D Layered Materials for Electronic and Photonic Applications

Hiroki AGO
Kyushu University

D1-13-O08 15:00–15:15

Electronic properties of graphene/C-doped h-BN heterostructures

Taishi HAGA[1], Yoshitaka FUJIMOTO[1], Susumu SAITO[1,2,3]
[1]Department of Physics, Tokyo Institute of Technology, [2]Advanced Research Center for Quantum Physics and Nanoscience, Tokyo Institute of Technology, [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology

D1-13-O09 15:15–15:30

Direct observation of electron capture & emission processes by the time domain charge pumping measurement of MoS_2 FET

Kosuke NAGASHIO, Koki TANIGUCHI, Nan FANG
The University of Tokyo

D1-13-O10

Withdrawal

D1-13-O11 15:30–15:45

THz optical and electrical properties, and the interlayer mechanical properties of InSe crystals grown from the liquid phase

Chao TANG, Yohei SATO, Katsuya WATANABE, Junya OSAKI, Tadao TANABE, Yutaka OYAMA
Tohoku University

Closing
15:45–16:00

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

D1-11-P01

Trion-based High-speed Carbon Nanotube Films Electroluminescence Emitters

Hidenori TAKAHASHI[1], Yuji SUZUKI[1], Norito YOSHIDA[1], Kenta NAKAGAWA[2], Hideyuki MAKI[1]
[1]Keio University, [2]KISTEC

D1-11-P02

Electronic Correlation in the Two-Dimensional Electride Y_2C

Masatoshi HIRAISHI[1], Kenji KOJIMA[1,2], Ichihiro YAMAUCHI[1], Hirotaka OKABE[1], Soshi TAKESHITA[1], Akihiro KODA[1,2], Ryosuke KADONO[1,2], Xiao ZHANG[3], Satoru MATSUISHI[4], Hideo HOSONO[3,4], Kazuto HIRATA[5], Shigeki OTANI[5], Naoki OHASHI[5]
[1]KEK IMSS, [2]SOKENDAI, [3]MSL, [4]MCES, [5]NIMS

D1-11-P03

Polymorphs of Transition Metal Dichalcogenide and the superconductivity modulated by the structures

Sana SASAKURA[1], Jun AKIMITSU[2], Kaya KOBAYASHI[1,2]
[1]Graduate school of Natural Science and Technology, Okayama University, [2]RIIS, Okayama University

D1-11-P04

Electronic Structure of Periodically Modified Graphene

Tomoya ITO[1], Susumu SAITO[1,2,3]
[1]Department of Physics, Tokyo Institute of Technology, [2]Advanced Research Center for Quantum Physics and Nanoscience, Tokyo Institute of Technology, [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology

D1-11-P05

Growth and transport properties of monolayer $MoSe_2$/WSe_2 in-plane heterostructures

Hiroshi SHIMIZU
Tokyo Metropolitan University

D1-11-P06

Optical Absorption of The Circularly-Polarized Light Irradiation in Triptycene Molecular Membrane

Masashi AKITA
Department of Nanotechnology for Sustainable Energy, School of Science and Technology Kwansei Gakuin University

D1-11-P07

Co-Intercalation of Metal Chlorides in Large-Area Bilayer Graphene

Amane MOTOYAMA[1], Kenji KAWAHARA[2], Rika MATSUMOTO[3], Hiroki AGO[1,2]
[1]Kyushu University, [2]Global Innovation Center, [3]Tokyo Polytechnic University

D1-11-P08

Influence of Pore Density of Porous Epitaxial Graphene on Aniline Polymerization

Ryuichi HIRAI, Akihiro HASHIMOTO
University of Fukui

D1-11-P09

Topological Pump Induced by Dynamics of Moiré Pattern

Manato FUJIMOTO, Mikito KOSHINO
Osaka University

D1-11-P10

Doping Magnetic Impurity Into Valley Materials by Molecular Beam Epitaxy

Yuki MAJIMA[1], Yuta KASHIWABARA[1], Hideki MATSUOKA[1], Masaki NAKANO[1,2], Yoshihiro IWASA[1,2]
[1]University of Tokyo, [2]RIKEN Center for Emergent Matter Science (CEMS)

D1-11-P11

Low Temperature Liquid Phase Growth of 2D Layered Semiconductor GaSe by Flux Method and Evaluation of Nonlinear Optical Characteristics

Katsuya WATANABE, Yohei SATO, Chao TANG, Junya OSAKI, Tadao TANABE, Chen MINGXI, Yutaka OYAMA
University of Tohoku

D1-11-P12

Electric Double Layer Transistors of CVD-grown monolayers InSe and InS

Jiang PU[1], Han-Ching CHANG[2], Chien-Liang TU[2], Kuang-I LIN[3], Chien-Nan HSIAO[4], Chang-Hsiao CHEN[2,5], Taishi TAKENOBU[1]
[1]Nagoya University, [2]Feng Chia University, [3]National Cheng Kung University, [4]National Applied Research Laboratory, [5]National Sun Yat-sen University

D1-11-P13

Electronic properties in hBN-graphene-hBN trilayer systems

Hiroki OKA
Department of Physics, Osaka University

D1-11-P14

Development of an Electron Doping Method Using Specific Interaction between Amide Molecule and MoS_2

Akito FUKUI[1], Yuh HIJIKATA[2], Jenny PIRILLO[2], Takeshi YOSHIMURA[1], Atsushi ASHIDA[1], Norifumi FUJIMURA[1], Daisuke KIRIYA[1,3]
[1]Osaka Prefecture University, [2]Hokkaido University, [3]JST PRESTO

D1-11-P15

Misfit chalcogenide superconductors: $(BiSe)_{1+\delta}(NbSe_2)_m$

Masaharu SHIRATA[1], Jun AKIMITSU[2], Kaya KOBAYASHI[1,2]
[1]Department of Physics, Okayama University, [2]RiiS, OKayama University

December 11–12, 2019

Symposium D-2

Novel Concepts of Electronic Materials Inspired from Complementary and Competing Fields

[Organizer]

Toshio KAMIYA (Tokyo Institute of Technology)

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Work-7

Chairperson Toshio KAMIYA

break 9:00–9:30

D2-12-I01 ▸Invited 9:30–10:00

Materials Design of Functional Semiconductors with Light Emission and Carrier Dopabilities: Ternary Perovskite Sulfides $AEHfS_3$ (*AE*=Sr & Ba)

Kota HANZAWA[1], Soshi IIMURA[2], Hidenori HIRAMATSU[1,2], Hideo HOSONO[2]

[1]Laboratory for Materials and Structures, Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology

D2-12-O02 10:00–10:15

Light emitting diodes on glass using amorphous oxide semiconductor thin-film phosphors, rare-earth doped *a*-Ga-O

Naoto WATANABE[1], Keisuke IDE[1,2], Takayoshi KATASE[1,3], Junghwan KIM[2], Shigenori UEDA[4,5], Koji HORIBA[6], Hiroshi KUMIGASHIRA[6], Hidenori HIRAMATSU[1,2], Hideo HOSONO[1,2], Toshio KAMIYA[1,2]

[1]Laboratory for Materials and Structures, Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [3]PRESTO, Japan Science and Technology Agency, [4]National Institute for Materials Science, [5]Synchrotron X-ray Station at SPring-8, [6]High Energy Accelerator Research Organization

D2-12-O03 10:15–10:30

Fabrication of electrochromic transistor on flexible substrate

Takaki ONOZATO[1], Hai Jun CHO[1,2], Hiromichi OHTA[1,2]

[1]Graduate School of Information Science and Technology, Hokkaido University, [2]Research Institute for Electronic Science, Hokkaido University

D2-12-O04 10:30–10:45

Enhanced thermoelectric power-factors by strain control in stongly correlated lanthunum titanate

Takayoshi KATASE, Keisuke IDE, Hidenori HIRAMATSU, Hideo HOSONO, Toshio KAMIYA

Tokyo Institute of Technology

D2-12-O05 10:45–11:00

Density Functional Study on Defects and Doping for Layered Ternary Nitride, $SrTiN_2$

XINYI HE[1], Zewen XIAO[2,3], Takayoshi KATASE[1,4], Keisuke IDE[1], Hideo HOSONO[1,2], Toshio KAMIYA[1,2]

[1]MSL, Tokyo Tech, Yokohama, Japan, [2]MCES, Tokyo Tech, Yokohama, Japan, [3]Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, China, [4]PRESTO, JST, Tokyo, Japan

D2-12-O06 11:00–11:15

Anisotropic Expenential Optical Absorption Edge in PbS Quantum Dots on the (001), (110), and (111) Surfaces of Single Crystal Rutile-TiO_2: Comparative Study on Photoacoustic and Absorbance Spectra

Taro TOYODA[1], Qing SHEN[1], Keita KAMIYAMA[2], Shuzi HAYASE[3]

[1]The University of Electro-Communications, [2]bunkoukeiki Co., Ltd., [3]Kyushu Institute of Technology

D2-12-O07 11:15–11:30

Room-Temperature Control of Non-reciprocal Microwave Response in Multiferroic Y-type Hexaferrite

Sakyo HIROSE[1], Yoichi NII[2], Tsuyoshi KIMURA[3], Yoshinori ONOSE[2]

[1]Murata Manufacturing Co., Ltd., [2]Institute for Materials Research, Tohoku University, [3]Department of Advanced Materials Science, University of Tokyo

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Work-7

Chairperson Toshio KAMIYA

D2-12-I08 ▸Invited 16:30–17:00

Shift current: a new perspective on ferroelectric photovoltaics

Masao NAKAMURA[1]

[1]RIKEN Center for Emergent Matter Science (CEMS), [2]PRESTO Japan Science and Technology Agency (JST)

D2-12-I09 ▸Invited 17:00–17:30

Novel Applications of ferroelectric and semiconducting perovskite oxide films

Norifumi FUJIMURA

Osaka Prefecture Univ.

D2-12-I10 ▸Invited 17:30–18:00

Phase stability and property control of ferroelectric HfO_2 films

Hiroshi FUNAKUBO, Takanori MIMURA, Takao SHIMIZU

Tokyo Institute of Technology

D2-12-011 18:00–18:15

Dielectric properties of ReO_3-type oxyfluorides prepared by hydrothermal synthesis

Masanori KODERA[1], Ayako TAGUCHI[2], Takao SHIMIZU[3], Hiroki MORIWAKE[2], Hiroshi FUNAKUBO[1,3]
[1]Material Research Center for Element Strategy, Tokyo Institute of Technoloby, [2]Japan Fine Ceramics Center, [3]School of Materials and Chemical Technology, Tokyo Institute of Technology

D2-12-012 18:15–18:30

Single Crystal Growth and Intrinsic Electron Mobility of Cubic $SrGeO_3$

Christian A. NIEDERMEIER[1], Yu KUMAGAI[2], Keisuke IDE[1,2], Takayoshi KATASE[1,2], Fumiyasu OBA[1,2,3], Hideo HOSONO[1,2], Toshio KAMIYA[1,2]
[1]Laboratory for Materials and Structures, Tokyo Institute of Technology, Yokohama, 226-8503, Japan, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, Yokohama, 226-8503, Japan, [3]Center for Materials Research by Information Integration, National Institute for Materials Science, Tsukuba, Ibaraki 305-0047, Japan

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

D2-11-P01

Structural phase transition and opto-electronic properties of oxide semiconductor solid solution, $(Ba,Sr)(Sn,Ti)O_3$

Yutaro KOBAYASHI[1], Keisuke IDE[1], Takayoshi KATASE[1,2], Hidenori HIRAMATSU[1,3], Hideo HOSONO[1,3], Toshio KAMIYA[1,3]
[1]Laboratory for Materials and Structures, Tokyo Institute of Technology, [2]PRESTO, Japan Science and Technology Agency, [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology

D2-11-P02

Investigation of Anionic Electron-Induced Magnetism in a Two Dimensional Electride Y_2C by Inelastic Neutron Scattering

Hiromu TAMATSUKURI[1], Youichi MURAKAMI[1], Hajime SAGAYAMA[1], Satoru MATSUISHI[2], Yasuhito WASHIO[2], Masato MATSUURA[3], Yukinobu KAWAKITA[4], Hideo HOSONO[2]
[1]Institute of Materials Structure Science, High Energy Accelerator Organization (KEK), [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [3]Comprehensive Research Organization for Science and Society, [4]J-PARC Center, Japan Atomic Energy Agency

D2-11-P03

Nonlinear Current-Voltage Characteristics and High Permittivity in $(In^{3+}+Ta^{5+})$ Co-Doped TiO_2 Ceramics

Prasit THONGBAI[1], Wattana TUICHAI[1], Supamas DANWITTAYAKUL[2], Narong CHANLEK[3]
[1]Khon Kaen University, [2]National Metal and Materials Technology Center, [3]Synchrotron Light Research Institute (Public Organization)

December 11–14, 2019

Symposium D-3

Science and Technology of Superconductivity

[Organizers]

Yoshihiko TAKANO (National Institute for Materials Science)
Yoshikazu MIZUGUCHI (Tokyo Metropolitan university)
Naurang SAINI (Sapienza University of Rome)
Hai-Hu WEN (Nanjing University)

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December 11, 2019

Oral Session 1

Time 9:00–11:40 Room Trade-1

Chairpersons K. SHIMIZU, K. MATSUMOTO

Opening
9:00–9:10

D3-11-I01 ▸Invited 9:10–9:40

Development of MgB_2 and $(Ba,K)Fe_2As_2$ Wires in NIMS

Hiroaki KUMAKURA[1], Zhaoshun GAO[2], Akiyoshi MATSUMOTO[1], Kazumasa TOGANO[1]

[1]National Institute for Materials Science, [2]Institute of Electrical Engineering

D3-11-I02 ▸Invited 9:40–10:00

Recent progress of high performance iron-based superconducting wires

Yanwei MA

Institute of Electrical Engineering, Chinese Academy of Sciences

D3-11-I03 ▸Invited 10:00–10:20

Heteroepitaxial thin-film growth of iron-based superconductors

Hidenori HIRAMATSU, Hideo HOSONO

Tokyo Institute of Technology

Coffee break
10:20–10:40

D3-11-I04 ▸Invited 10:40–11:00

Electrical Transport Properties Of NdFeAs(O,F) Thin Films On Vicinal Substrates

Kazumasa IIDA

Nagoya University

D3-11-I05 ▸Invited 11:00–11:20

In-field and low temperature J_c properties of BHO introduced Eu123 tapes

Satoshi AWAJI[1], Tatsunori OKADA[1], Shinji FUJITA[2], Shogo MUTO[2], Wataru HIRATA[2], Yasuhiro IIJIMA[2], Masanori DAIBO[2]

[1]IMR, Tohoku University, [2]Fujikura co ltd.

D3-11-I06 ▸Invited 11:20–11:40

Development of Processing Technology of Coated Conductors to Contribute to Applications

Takato MACHI

AIST

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Trade-1

Chairperson S. AWAJI

D3-11-I07 ▸Invited 14:00–14:20

High-Pressure Onset of High-Temperature Superconductivity

Katsuya SHIMIZU[1], Mari EINAGA[1], Harushige NAKAO[1], Masafumi SAKATA[1], Yuki NAKAMOTO[1], Akitaka NAKANISHI[1], Takahiro ISHIKAWA[1,2], Saori KAWAGUCHI[3], Naohisa HIRAO[3], Yasuo HIRAO[3]

[1]Osaka University, [2]National Institute for Materials Science, [3]JASRI

D3-11-I08 ▸Invited 14:20–14:40

Ab initio study on the high temperature superconductivity in compressed sulfur hydrides

Ryosuke AKASHI

The University of Tokyo

D3-11-I09 ▸Invited 14:40–15:00

Search for Superconductivity of Hydrides synthesized under High Pressure and High Temperature

Mari EINAGA[1], Daichi TAKEDA[1], Masaomi KITAGAKI[1], Harushige NAKAO[1], Masafumi SAKATA[1], Katsuya SHIMIZU[1], Saori KAWAGUCHI[2], Naohisa HIRAO[2], Yasuo OHISHI[2]

[1]KYOKUGEN, Osaka University, [2]JASRI

D3-11-I10 ▸Invited 15:00–15:20

Data-driven Exploration for Pressure-induced Superconductors Using Novel Diamond Anvil Cell with Boron-doped Diamond Electrodes

Ryo MATSUMOTO[1,2], Hou ZHUFENG[3], Sayaka YAMAMOTO[1,2], Shintaro ADACHI[1], Masanori NAGAO[4], Peng SONG[1,2], Yoshito SAITO[1,2], Takafumi D. YAMAMOTO[1], Kensei TERASHIMA[1], Hiromi TANAKA[5], Tetsuo IRIFUNE[6], Hiroyuki TAKEYA[1], Kiyoyuki TERAKURA[1,7], Yoshihiko TAKANO[1,2]

[1]National Institute for Materials Science, [2]University of Tsukuba, [3]Chinese Academy of Sciences, [4]University of Yamanashi, [5]National Institute of Technology, Yonago College, [6]Ehime University, [7]National Institute of Advanced Industrial Science and Technology

D3-11-I11 ▸Invited 15:20–15:40

Search for Superconductivity in Compressed Hydrides by First-Principles Calculations and Evolutionary Algorithms

Takahiro ISHIKAWA[1,2], Akitaka NAKANISHI[2], Katsuya SHIMIZU[2], Takashi MIYAKE[3]

[1]ESICMM, National Institute for Materials Science, [2]Center for Science and Technology under Extreme Conditions, Graduate School of Engineering Science, Osaka University, [3]CD-FMat, National Institute of Advanced Industrial Science and Technology

D3-11-I12 ▸Invited 15:40–16:00

Acceleration Search method of Higher T_c Superconductors by Machine Learning Algorithm

Kaname MATSUMOTO, Tomoya HORIDE
Kyushu Institute of Technology

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Trade-1

Chairperson K. IIDA

D3-11-I13 ▸Invited 16:30–16:50

Pressure-induced superconductivity in iron-based spin-ladder material $BaFe_2S_3$ and related materials

Hiroki TAKAHASHI
Nihon University

D3-11-I14 ▸Invited 16:50–17:10

Phenomena and physics related to superconductivity revealed by our recent high pressure studies

Liling SUN[1], Jing GUO[1], Yazhou ZHOU[1], Qi WU[1], Tao XIANG[1], Robert CAVA[2], Guangming ZHANG[3], Ni NI[4]

[1]Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, [2]Department of Chemistry, Princeton University, Princeton, New Jersey 08544, USA, [3]State Key Laboratory for Low dimensional Quantum Physics and Department of Physics, Tsinghua University, Beijing 100084, China, [4]Department of Physics and Astronomy, UCLA, Los Angeles, CA90095, USA

D3-11-I15 ▸Invited 17:10–17:30

High-temperature superconductivity in ultrathin iron-chalcogenide films studied by angle-resolved photoemission spectroscopy

Kosuke NAKAYAMA
Tohoku University

D3-11-I16 ▸Invited 17:30–17:50

$EuFeAs_2$ a 112-type Iron-pnictide: Novel Family of Magnetic Superconductors

Michal BABIJ, Lan Maria TRAN, Zbigniew BUKOWSKI
Institute of Low Temperature and Structure Research Polish Academy of Sciences

D3-11-I17 ▸Invited 17:50–18:10

A Review on a Functional Mixed Anion Layered Compound, $Sr_2TMFeAsO_{3-d}$ (*TM*: Transition Metals)

Yoichi KAMIHARA
Keio University

D3-11-I18 ▸Invited 18:10–18:30

Superconductivity in a New Iron Arsenide $LaFe_2As_2$

Akira IYO[1], Shigeyuki ISHIDA[1], Hiroshi FUJIHISA[1], Yoshito GOTOH[1], Izumi HASE[1], Yoshiyuki YOSHIDA[1], Hiroshi EISAKI[1], Kenji KAWASHIMA[1,2]

[1]National Institute of Advanced Industrial Science and Technology (AIST), [2]IMRA Material R&D Co., Ltd.

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

D3-11-P01

Superconductivity in Bi-based layered superconductors

Yoshikazu MIZUGUCHI
Tokyo Metropolitan University

D3-11-P02

Two-Fold-Symmetric Magnetization in Single Crystals of Tetragonal $BiCh_2$-based Superconductor $LaO_{0.5}F_{0.5}BiSSe$

Kazuhisa HOSHI[1], Motoi KIMATA[2], Tatsuma D MATSUDA[1], Yosuke GOTO[1], Toshikazu MIZUGUCHI[1]

[1]Tokyo Metropolitan University, [2]Institute for Materials Research, Tohoku University

D3-11-P03

Crystal Size Improvement of $Bi_2Sr_2CaCu_2O_{8+x}$ Superconducting Whiskers Using Stress-controlled Precursors

Sayaka YAMAMOTO[1,2,3], Ryo MATSUMOTO[1,2], Shintaro ADACHI[2], Yoshihiko TAKANO[1,2], Hiromi TANAKA[3]

[1]University of Tsukuba, [2]National Institute for Materials Science, [3]National Institute of Technology, Yonago College

D3-11-P04

Chemical substitution effect in a possible topological superconductor

Takeshi TAKAHASHI[1], Harald O. JESCHKE[2], Jun AKIMITSU[2], Kaya KOBAYASI[1,2]
[1]Department of Physics, Okayama University, [2]RIIS, Okayama University

D3-11-P05

Intra- and inter-granular superconducting properties and microstructure of $BaFe_2As_2$ polycrystalline bulks prepared by high energy milling

Shinnosuke TOKUTA[1], Akiyasu YAMAMOTO[1], Yusuke SHIMADA[2], Satoshi HATA[3]
[1]Tokyo University of Agriculture and Technology, [2]Tohoku University, [3]Kyushu University

D3-11-P06

Theoretical study of the uniaxial compression and tension effects on the superconductivity in two-leg ladder-type cuprates

Hikaru SAKAMOTO, Kazuhiko KUROKI
University of Osaka

D3-11-P07

Vortex matter and dynamics in YBCO thin films with complex artificial pinning studied by DC magnetization, magnetic relaxation and AC susceptibility measurements

Adrian CRISAN, Ion IVAN, Lucica MIU
National Institute for Materials Physics

D3-11-P08

Superconducting Thin Films of $Bi_2Sr_2CaCu_2O_{8+\delta}$ for Future THz Planar Devices

Kazuhiro ENDO[1], Shunichi ARISAWA[2], Petre BADICA[3]
[1]Kanazawa Institute of Technology, [2]National Institute for Materials Science, [3]National Institute of Materials Physics

D3-11-P09

Unconventional Superconductivity Properties of Re Doped Weyl Semimetal $MoTe_2$

Ravi Prakash SINGH, Manasi MANDAL, Saurav MARIK
Indian Institute of Science Education and Research Bhopal, Bhopal, 462066, India

D3-11-P10

Epitaxial Stabilization and Electrochemical Doping Make Metastable Titanates New Superconducting Materials

Akira OHTOMO[1,2], Kohei YOSHIMATSU[1]
[1]Department of Chemical Science and Engineering, Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology

D3-11-P11

The First Discovery of superconductivity in Yb-based compounds $YbTr_2Al_{20}$ (*Tr* = Mo, Ta)

Naoki NAKAMURA[1], Ryuji HIGASHINAKA[1], Yuji AOKI[1], Hideyuki SATO[1], Dai AOKI[2], Tatsuma D. MATSUDA[1]
[1]Tokyo Metropolitan University, [2]Tohoku University

D3-11-P12

Growth and superconducting transition temperature of $(La,Ce)OBiS_2$ single crystals

Yuji HANADA[1], Masanori NAGAO[1], Akira MIURA[2], Yuki MARUYAMA[1], Satoshi WATAUCHI[1], Yoshihiko TAKANO[3], Isao TANAKA[1]
[1]University of Yamanashi, [2]Hokkaido University, [3]National Institute for Materials Science

D3-11-P13

Superconducting properties of RE123 superconductor with high-entropy-alloy-type RE site

Yuta SHUKUNAMI
Tokyo Metropolitan University

D3-11-P14

New Types Of Iron-Oxypnictide Heterostructures And Their Interfaces

Silvia HAINDL[1], Masato SASASE[2], Hidenori HIRAMATSU[2], Hideo HOSONO[2,3], Erik KAMPERT[4], Ian MACLAREN[5]
[1]World Research Hub Initiative, Institute of Innovative Research, Tokyo Institute of Technology, [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [3]Laboratory for Materials and Structures, Institute of Innovative Research, Tokyo Institute of Technology, [4]Dresden High Magnetic Field Laboratory (HLD-EMFL), Helmholtz-Zentrum Dresden-Rossendorf, [5]School of Physics and Astronomy, University of Glasgow

D3-11-P15

Hydrogen annealing effect of superconducting properties in $FeSe_{1-x}Te_x$

Daiki YAMANE[1], Kazumasa HORIGANE[2], Jun AKIMITSU[2]
[1]Graduate School of natural science and technology, Okayama University, [2]Research Institute for Interdisciplinary Science, Okayama University

D3-11-P16

Superconducting Critical Current Density Enhanced to 285 A cm^{-2} for $Sr_2VFeAsO_{3-\delta}$ Tape Fabricated via ex-situ Powder-in-tube Process

Suguru IWASAKI[1], Ryo MATSUMOTO[2], Shintaro ADACHI[2], Yoshihiko TAKANO[2], Yoichi KAMIHARA[1]
[1]Keio, [2]NIMS

D3-11-P17

Broken time-reversal symmetry probed by muon spin relaxation in the caged type superconductors $R_5Rh_6Sn_{18}$ (R = Lu, Sc, Y)

Devashibhai Thakarshibhai ADROJA
Rutherford Appleton Laboratory

D3-11-P18

Synthesis of the Mother Phase of the Iron-Based Superconductor SmFeAsO at Low Temperatures

Ryosuke SAKAGAMI[1], Simon R. HALL[2], Jason POTTICARY[2], Masanori MATOBA[1], Yoichi KAMIHARA[1]
[1]Keio University, [2]University of Bristol

D3-11-P19

Crystal structure and superconducting properties of $Sr_{1-x}RE_xFBiS_2$ (*RE*: La,Ce,Pr,Nd,Sm) BiS_2-based layered superconductors

Aichi YAMASHITA, Yoshikazu MIZUGUCHI
Tokyo Metropolitan University

D3-11-P20

Superconductivity at 4 K for Eu doped $La_{2-x}Eu_xO_2Bi_3Ag_{0.6}Sn_{0.4}S_6$

RAJVEER JHA
Tokyo Metropolitan University

D3-11-P21

Control of the physical property by the field effect diamond anvil cell

Yoshihiko TAKANO[1,2], Shintaro ADACHI[1]
[1]National Institute for Materials Science (NIMS), [2]Tsukuba Univ.

D3-11-P22

Superconducting Joints between Bi2223 and NbTi Wires using Bi-Pb-Sn Solder

Yoshihiko TAKANO[1,2], Kazuo INOUE[1]
[1]National Institute for Materials Science (NIMS), [2]Tsukuba Univ.

December 12, 2019

Oral Session 4

Time 9:00–12:10 Room Work-1

Chairpersons K. TANIGAKI, T. YOKOYA

D3-12-I01 ▸Invited 9:00–9:30

Neutron Irradiation: from Single Displaced Atoms to Nanometer Sized Defects and their Influence on Superconductivity in Various Materials

Michael EISTERER[1], David X. FISCHER[1], Daniel KAGERBAUER[1], Raphael UNTERRAINER[1], Thomas BAUMGARTNER[1], Stephan PFEIFFER[2], Johannes BERNARDI[2]
[1]TU Wien, Atominstitut, [2]TU Wien, USTEM

D3-12-I02 ▸Invited 9:30–9:50

Vortex dynamics of REBCO films irradiated with low-energy ion irradiations

Toshinori OZAKI
Kwansei Gakuin University

D3-12-I03 ▸Invited 9:50–10:10

Effect of ion irradiation on cuprate and iron-based superconductors

Qiang LI
Brookhaven National Laboratory

D3-12-I04 ▸Invited 10:10–10:30

Extraordinary pinning efficiency of one-dimensional artificial pinning centers with coherent interfaces in $YBa_2Cu_3O_{7-x}$ nanocomposite films

Judy WU
University of Kansas

Coffee break
10:30–10:50

D3-12-I05 ▸Invited 10:50–11:10

Designed nano-structures in high performance oxide superconducting films controlled by novel PLD growthtechniques

Yutaka YOSHIDA[1], Yusuke ICHINO[1], Yuji TSUCHIYA[1], Tomohiro ITO[1], Kaname MATSUMOTO[2], Ataru ICHINOSE[3], Satoshi AWAJI[4]
[1]Nagoya University, [2]Kyushu Inst. Tech., [3]Central Research Institute of Electric Power Industry, [4]Tohoku University

D3-12-I06 ▸Invited 11:10–11:30

Possibility of Unconventional High-T_c Superconductivity Originating from Coexisting Wide and Narrow Bands

Kazuhiko KUROKI
Osaka University

D3-12-I07 ▸Invited 11:30–11:50

Electronic compressibility and high-Tc superconductivity: new links

Luca DE MEDICI
ESPCI

D3-12-I08 ▸Invited 11:50–12:10

High-T_c cuprates – story of two electronic subsystems

Neven BARISIC[1,2]
[1]TU Wien, [2]PMF Zagreb

December 12, 2019

Cluster Session D

Time 14:00–16:00 Room Ken-1

Chairpersons Yoshihiro Iwasa, Kenji Shiojima, Susumu Saito

DX-12-CLK01 14:00–14:40

Atomic-level control of high temperature superconductor materials for unveiling their pairing mechanism

Qi-kun XUE
Tsinghua University, China

DX-12-CLK02 14:40–15:20

Development of Corundum-Structured Gallium Oxide Power Devices by MIST EPITAXY®

Takashi SHINOHE
FLOSFIA INC., Japan.

DX-12-CLK03 15:20–16:00

Emergent electromagnetism in quantum materials

Naoto NAGAOSA
RIKEN and U. Tokyo, Japan

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Work-1

Chairperson K. KUROKI

Symposium special talk

What value can ebook bring in?
~Case in materials science~

Akiyuki Tokuno
Editor, Books, Science, Springer

16:30–16:50

D3-12-I09 ▸Invited 16:50–17:10

High-resolution photoelectron holography of heavily boron-doped diamond

Takayoshi YOKOYA[1], Wataru HOSODA[1], Takumi TANIGUCHI[1], Kensei TERASHIMA[1], Hirokazu FUJIWARA[1], Yuko YANO[1], Tomohiro MATSUSHITA[2], Takayuki MURO[2], Toyohiko KINOSHITA[2], Yoshihiko TAKANO[3], Taisuke KAGEURA[4], Hiroshi KAWARADA[4], Tamio OGUCHI[5], Yuji MURAOKA[1]
[1]Okayama University, [2]Japan Synchrotron Radiation Research Institute, [3]National Institute for Materials Science, [4]Waseda University, [5]Osaka University

D3-12-I10 ▸Invited 17:10–17:30

Fundamental Properties and Device Applications of Superconducting Single-crystalline Boron-doped Diamond

Taisuke KAGEURA[1,2], Yoshihiko TAKANO[2], Hiroshi KAWARADA[2,3]
[1]National Institute for Materials Science, [2]Waseda University, [3]The Kagami Memorial Laboratory for Materials Science and Technology Waseda University

D3-12-I11 ▸Invited 17:30–17:50

High Pressure Polymerization of Metal Doped C_{60} ~In an Attempt to Prepare Carbon Clathrate High T_c Superconductor~

Masashi TANAKA
Kyushu Institute of Technology

D3-12-I12 ▸Invited 17:50–18:10

Electron-Phonon and Electron-Electron Interactions in Electron Doped Aromatic Carbon Materials viewed from Electrical Transport

Katsumi TANIGAKI, Yuki MATSUDA
Tohoku University

D3-12-I13 ▸Invited 18:10–18:30

Enhanced Superconductivity in Polar IV – VI Semiconductors

Markus KRIENER[1], M. KAMITANI[1], T. KORETSUNE[1,2], S. M. BAHRAMY[1,3], M. SAKANO[3], R. YUKAWA[4], K. HORIBA[4], H. KUMIGASHIRA[4], K. ISHIZAKA[1,3], R. ARITA[1,3], Y. TOKURA[1,3], Y. TAGUCHI[1]
[1]RIKEN Center for Emergent Matter Science (CEMS), Wako 351-0198, Japan, [2]Department of Applied Physics and Quantum-Phase Electronics Center (QPEC), University of Tokyo, Tokyo 113-8656, Japan, [3]Photon Factory, Institute of Materials Structure Science, High Energy Accelerator Research Organization (KEK), Tsukuba, Ibaraki 305-0801, Japan

December 13, 2019

Oral Session 7 (1)

Time 9:00–12:10 Room Work-1

Chairpersons H. KUMAKURA, M. EISTERER

D3-13(1)-I01 ▸Invited 9:00–9:30

Emerging materials for high field applications: activities at CNR-SPIN.

Carlo FERDEGHINI[1], Emilio BELLINGERI[1], Cristina BERNINI[1], Valeria BRACCINI[1], Alessandro LEVERATTO[1], Andrea MALAGOLI[1], Pietro MANFRINETTI[1,2], Ilaria PALLECCHI[1], Alessia PROVINO[1], Marina PUTTI[1,2], Aisha SABA[1,2], Giulia SYLVA[1,2], Andrea TRAVERSO[1,2]
[1]CNR-SPIN, Genova, Italy, [2]University of Genova, Italy

D3-13(1)-I02 ▸Invited 9:30–9:50

Magnetic Properties in Superconducting Metals and Alloys Processed by High-Pressure Torsion

Terukazu NISHIZAKI[1], Kaveh EDALATI[2,3], Seungwon LEE[4], Zenji HORITA[2,3], Tadahiro AKUNE[1], Tsutomu NOJIMA[5], Satoshi IGUCHI[5], Takahiko SASAKI[5]
[1]Department of Electrical Engineering, Kyushu Sangyo University, [2]WPI, International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, [3]Department of Materials Science and Engineering, Kyushu University, [4]Department of Materials Design and Engineering, University of Toyama, [5]Institute for Materials Research, Tohoku University

D3-13(1)-I03 ▸Invited 9:50–10:10

Recent Progress in Nb_3Sn High Field Performance

Chiara TARANTINI, Shreyas BALACHANDRAN, Peter L. LEE, Fumitake KAMETANI, Yi-Feng SU, Benjamin WALKER, William L. STARCH, David C. LARBALESTIER
Applied Superconductivity Center, National High Magnetic Field Laboratory, Florida State University

D3-13(1)-I04 ▸Invited 10:10–10:30

Development of MgB_2-based Materials Towards Different Superconducting Applications

Petre BADICA
National Institute of Materials Physics

Coffee break
10:30–10:50

D3-13(1)-I05 ▸Invited 10:50–11:10

Monolithic terahertz emitter of high-temperature superconductors

Itsuhiro KAKEYA[1], Asem ELARABI[1], Keiichiro MAEDA[1], Shuma FUJITA[1], Manabu TSUJIMOTO[2]
[1]Kyoto University, [2]University of Tsukuba

D3-13(1)-I06 ▸Invited 11:10–11:30

Development of High-T_cSuperconducting THz Emitters

Takanari KASHIWAGI[1,2], Shungo NAKAGAWA[1], Takayuki IMAI[1], Genki KUWANO[1], Youta KANEKO[1], Yukino ONO[1], Shinji KUSUNOSE[1], Takashi YAMAMOTO[3], Hidetoshi MINAMI[1,2], Manabu TSUJIMOTO[1,2], Kazuo KADOWAKI[4]
[1]Graduate School of Pure & Applied Sciences, University of Tsukuba, [2]Division of Materials Science, Faculty of Pure & Applied Sciences, University of Tsukuba, [3]QuTech, Delft University of Technology, [4]Algae Biomass and Energy System R&D Center, University of Tsukuba

D3-13(1)-I07 ▸Invited 11:30–11:50

Elemental Substitution in the *RE*-123 and Bi-2212 Cuprate Superconductors for the Enhancement of T_c

Masatsune KATO, Kohei NAKAGAWA, Takayuki KAWAMATA, Takashi NOJI, Yoji KOIKE
Tohoku University

D3-13(1)-I08 ▸Invited 11:50–12:10

Bond vs. Diagonal Nematicity in the Pseudogap Phase of High-Temperature Cuprate Superconductors

Shigeru KASAHARA
Kyoto University

December 13, 2019

Oral Session 7 (2)

Time 9:00–12:10 Room Work-6

Chairpersons R. ARITA

D3-13(2)-I01 ▸Invited 10:50–11:10

Polymorphism and Superconductivity in Platinum Pnictides

Minoru NOHARA
Okayama University

D3-13(2)-I02 ▸Invited 11:10–11:30

Pressure-induced superconductivity in non-symmorphic CrAs

Hisashi KOTEGAWA
Kobe University

D3-13(2)-I03 ▸Invited 11:30–11:50

Unconventional Superconductivity in Noncentrosymmetric Superconductors

Ravi Prakash SINGH
IISER Bhopal

D3-13(2)-I04 ▸Invited 11:50–12:10

Possible valence skipping superconductivity in doped Dirac metal

Kaya KOBAYASHI[1,2], T. UENO[1], T. WAKITA[2], T. FURUKAWA[3], T. ITOU[3], T. YOKOYA[1,2], J. AKIMITSU[2]
[1]Department of Physics, Okayama University, [2]RIIS, Okayama University, [3]Department of Applied Physics, Tokyo University of Science

December 13, 2019

Oral Session 8 (1)

Time 14:00–16:00 Room Work-1

Chairperson C. FERDEGHINI

D3-13(1)-I09 ▸Invited 14:00–14:20

Novel Electronic Nematicity in Heavily Hole-Doped Iron-Pnictide Superconducotrs

Takasada SHIBAUCHI
University of Tokyo

D3-13(1)-I10 ▸Invited 14:20–14:40

The Interplay of Superconductivity and Magnetism in Iron Based Superconductors: Study of $EuFe_2As_2$-based Magnetic-Superconductors

Lan Maria TRAN, Michał BABIJ, Zbigniew BUKOWSKI, Andrzej J. ZALESKI
Institute of Low Temperature and Structure Research Polish Academy of Sciences in Wrocław

D3-13(1)-I11 ▸Invited 14:40–15:00

Superconducting properties of 1144-type iron pnictide superconductors

Hiraku OGINO[1], Shigeyuki ISHIDA[1], Akira IYO[1], Hiroshi EISAKI[1], Kenji KAWASHIMA[1,2]
[1]National Institute of Advanced Industrial Science and Technology (AIST), [2]IMRA Material R&D Co., Ltd.

D3-13(1)-I12 ▸Invited 15:00–15:20

Quasi-particle self-consistent GW calculations and superconductivity in iron-based Superconductors

Katsuhiro SUZUKI[1], Taishi OGURA[2], Hirofumi SAKAKIBARA[3,4], Takao KOTANI[3], Hiroaki IKEDA[2]
[1]Research Organization of Science and Technology, Ritsumeikan University, [2]Department of Physics, Ritsumeikan University, [3]Department of Applied Mathematics and Physics, Tottori University, [4]Computational Condensed Matter Physics Laboratory

D3-13(1)-I13 ▸Invited 15:20–15:40

Magnetism in Fe pnictides and chalcogenides

Rudi HACKL
Walther Meissner Institut, Bayerische Akademie der Wissenschaften

D3-13(1)-I14 ▸Invited 15:40–16:00

μSR Study of Multigap Superconductivity in $ACa_2Fe_4As_4F_2$ (A = K, Rb and Cs)

Devashibhai Thakarshibhai ADROJA
Rutherford Appleton Laboratory

December 13, 2019

Oral Session 8 (2)

Time 14:00–16:00 Room Work-6

Chairperson K. KOBAYASHI

D3-13(2)-I05 ▸Invited 14:00–14:20

Chiral Majorana Mode in Topological Superconducting Element hcp Thallium

Ryotaro ARITA[1,2]
[1]University of Tokyo, [2]RIKEN Center for Emergent Matter Science

D3-13(2)-I06 ▸Invited 14:20–14:40

Zero-energy modes in topological materials: experimental observations and proposed models

Tomasz DIETL
International Research Centre MagTop, Institute of Physics, Polish Academy of Sciences

D3-13(2)-I07 ▸Invited 14:40–15:00

Observation and control of nematic topological superconductivity in doped Bi_2Se_3 superconductors

Shingo YONEZAWA
Kyoto University

D3-13(2)-I08 ▸Invited 15:00–15:20

NMR studies of Topological Superconductors

Kazuaki MATANO
Okayama University

D3-13(2)-I09 ▸Invited 15:20–15:40

Nature of zero-energy vortex bound state in superconducting topological surface state of Fe(Se,Te)

Tadashi MACHIDA
RIKEN

D3-13(2)-I10 ▸Invited 15:40–16:00

Superconductivity and Possible Electronic Nematic Phases in Titanium Pnictide Oxides

Takeshi YAJIMA[1], Wataru ISHII[1], Shunsaku KITAGAWA[2], Kenji ISHIDA[2], Kota KATAOKA[1], Kanako TAKAHASHI[1], Zenji HIROI[1]
[1]University of Tokyo, [2]Kyoto University

December 13, 2019

Oral Session 9 (1)

Time 16:30–18:30 Room Work-1

Chairperson I. KAKEYA

D3-13(1)-I15 ▸Invited 16:30–16:50

Growth and evaluation of multi rare earth elements substituted *R*OBiS$_2$ (*R*: rare earth elements) superconducting single crystals

Masanori NAGAO[1], Yuji HANADA[1], Akira MIURA[2], Yuki MARUYAMA[1], Satoshi WATAUCHI[1], Yoshihiko TAKANO[3], Isao TANAKA[1]
[1]University of Yamanashi, [2]Hokkaido University, [3]National Institute for Materials Science

D3-13(1)-I16 ▸Invited 16:50–17:10

Bulk superconductivity induced via two-site substitution in $La_2O_2M_4S_6$-type layered oxychalcogenide $La_2O_2Bi_3Ag_{0.6}Sn_{0.4}S_{5.7}Se_{0.3}$

RAJVEER JHA, Yosuke GOTO, Yoshikazu MIZUGUCHI
Tokyo Metropolitan University

D3-13(1)-I17 ▸Invited 17:10–17:30

The change of electronic structure by Bi dimer disconnection in the bismuth chalcogenide superconductor $CsBi_{4-x}Pb_xTe_6$

Hiroyuki OKAZAKI[1,2,3], Kensei TERASHIMA[3], David BILLINGTON[4], Takanori WAKITA[2], Yoshihiko TAKANO[3], Yuji MURAOKA[2], Takayoshi YOKOYA[2]
[1]Takasaki Advanced Radiation Research Institute, National Institutes for Quantum and Radiological Science and Technology, [2]Research Institute for Interdisciplinary Science (RIIS), Okayama University, [3]National Institute for Materials Science, [4]School of Physics and Astronomy, Cardiff University

D3-13(1)-I18 ▸Invited 17:30–17:50

Scanning Tunneling Microscopy/Spectroscopy Study in Bi*Ch*$_2$ superconductors

Satoshi DEMURA[1], Shotaro SHOBU[2], Kazuki MIYATA[2], Shin-ichi KANEKO[3], Satoshi OKUMA[3]
[1]Nihon University, [2]Tokyo University of Science, [3]Tokyo Institute of Technology

D3-13(1)-I19 ▸Invited 17:50–18:10

Study of chemical pressure effect on electronic- and local crystal-structure in $LaOBiCh_2$ system

Kensei TERASHIMA[1], Yuko YANO[2], Eugenio PARIS[3], Yosuke GOTO[4], Yoshikazu MIZUGUCHI[4], Yoichi KAMIHARA[5], Takanori WAKITA[6], Yuji MURAOKA[6], Naurang L. SAINI[3], Takayoshi YOKOYA[6]
[1]National Institute for Materials Science, [2]Graduate School of Natural Sciences, Okayama University, [3]Department of Physics, University of Rome "La Sapienza", [4]Department of Physics, Tokyo Metropolitan University, [5]Department of Applied Physics and Physico-Informatics, Keio University, [6]Research Institute for Interdisciplinary Science, Okayama University

Symposium special talk
18:10–18:30

December 13, 2019

Oral Session 9 (2)

Time 16:30–18:30 Room Work-6

Chairperson H. KOTEGAWA

D3-13(2)-I11 ▸Invited 16:30–16:50

Spin-Triplet Superconductivity and Field-Induced Phenomena in Uranium Compounds

Dai AOKI
IMR, Tohoku University

D3-13(2)-I12 ▸Invited 16:50–17:10

NMR Studies on U-based Ferromagnetic Superconductors

Kenji ISHIDA
Kyoto University

D3-13(2)-I13 ▸Invited 17:10–17:30

NMR studies of Spin-Triplet Superconductors UPt_3 and UBe_{13} : An Aspect of Spin-Orbit Interaction Experienced by the Cooper

Hideki TOU
Department of Physics, Kobe University

D3-13(2)-I14 ▸Invited 17:30–17:50

The First Discovery of Superconducting State and Fermi Surface Properties in Yb-based Skutterudite and 1-2-20 Systems

Tatsuma D. MATSUDA
Tokyo Metropolitan University

D3-13(2)-I15 ▸Invited 17:50–18:10

Material Design of Light Rare-Earth Dodecaborides by High Pressure Synthesis and Novel Feature of Kondo Insulator YbB_{12}

Fumitoshi IGA[1], Wataru MATSUHRA[1], Hiroyuki NAKAYAMA[1], Takahiro YAMADA[1], Hyohma TAKEMORI[1], Akira MATSUO[2], Yasuhiro H. MATSUDA[2], Yoshimitsu KOHAMA[2], Koichi KINDO[2], Toru SHIMMEI[3], Takehiro KUNIMOTO[3], Tetsuo IRIFUNE[3], Norimasa NISHIYAMA[4], Hitoshi SATO[5], Tomoko KAGAYAMA[6], Katsuya SHIMIZU[6]
[1]Institute of Quantum Beam Science, Ibaraki University, [2]Institute of Solid State Physics, University of Tokyo, [3]Geodynamics Research Center, Ehime University, [4]Laboratory for Materials and Structures, Tokyo Institute of Technology, [5]Hiroshima Synchrotron Radiation Center, Hiroshima University, [6]Center for Science and Technology under Extreme Conditions, Osaka University

D3-13(2)-I16 ▸Invited 18:10–18:30

Multipole ordering in a Pr-based quaternary compound $PrRu_2Sn_2Zn_{18}$

Kazuhei WAKIYA[1], Takahiro KOMAGATA[1], Yuki SUGIYAMA[1], Masatomo UEHARA[1], Jun GOUCHI[2], Kazuyuki MATSUBAYASHI[3], Yoshiya UWATOKO[2], Izuru UMEHARA[1]
[1]Yokohama National University, [2]The University of Tokyo, [3]The University of Electro-Communications

December 14, 2019

Oral Session 10

Time 9:00–12:20 Room Work-1

Chairpersons Y. TAKANO, Y. MIZUGUCHI

D3-14-I01 ▸Invited 9:00–9:30

Science and Technology on Recent Bi2223 Joints Connecting DI-BSCCO

Jun-ichi SHIMOYAMA[1], Yasuaki TAKEDA[2], Takanori MOTOKI[1], Takayoshi NAKASHIMA[3], Shin-ichi KOBAYASHI[3], Takeshi KATO[3]
[1]Aoyama Gakuin University, [2]The University of Tokyo, [3]Sumitomo Electric Industries

D3-14-I02 ▸Invited 9:30–9:50

Overview of the performance test of 1km-long high-Tc superconducting DC cable system in Ishikari and future prospects

Noriko CHIKUMOTO, Hirofumi WATANABE, Yury IVANOV, Satarou YAMAGUCHI
Center of Applied Superconductivity and Sustainable Energy Research, Chubu University

D3-14-I03 ▸Invited 9:50–10:10

Grain Boundary structures and Intergrain Connectivity in Bi-2212 and Ba-122 High Temperature Superconductors

Fumitake KAMETANI, Yavuz OZ, Abiola OLOYE, Chongin PAK, Shah LIMON, Yi-Feng SU, Jianyi JIANG, Ulf TROCIEWITZ, Chiara TARANTINI, Eric HELLSTROM, David LARBALESTIER
Florida State University

D3-14-I04 ▸Invited 10:10–10:30

Exploring Ternary Molybdenum Superconducting Nitrides by Self-Combustion Synthesis

Akira MIURA[1], Jin ODAHARA[1], Nataly Carolina ROSERO-NAVARRO[1], Masanori NAGAO[2], Isao TANAKA[2], Kiyoharu TADANAGA[1]
[1]Hokkaido University, [2]University of Yamanashi

Coffee break
10:30–10:50

D3-14-I05 ▸Invited 10:50–11:10

Solid state electrochemistry for intercalation by using proton-driven ion introduction

Masaya FUJIOKA[1], Kento SATO[1], Masanori NAGAO[2], Satoshi DEMURA[3], Hideaki SAKATA[4], Shintaro ADACHI[5], Yoshihiko TAKANO[5], Hideo KAIJU[6], Melbert JEEM[1], Junji NISHII[1]
[1]Hokkaido University, [2]University of Yamanashi, [3]Nihon University, [4]Tokyo University of Science, [5]National Institute for Materials Science, [6]Keio University

D3-14-I06 ▸Invited 11:10–11:30

Layered Tin Pnictides as a New Class of van der Waals-type Superconductors

Yosuke GOTO
Tokyo Metropolitan University

D3-14-I07 ▸Invited 11:30–11:50

Exploring novel superconductors in low-dimensional materials

Zhi An REN
Institute of Physics, Chinese Academy of Sciences

D3-14-I08 ▸Invited 11:50–12:10

Carrier-doping to Iridate Sr_2IrO_4

Jun AKIMITSU
Okayama University

Closing
12:10–12:20

December 11–12, 2019

Symposium D-4

5th E&J BLS

Wide-bandgap and 2-dimensional Materials

[Organizers]

Kenji SHIOJIMA (University of Fukui)
Fumimasa HORIKIRI (SCIOCS Co. Ltd.)
Hiroshi KAWARADA (Waseda University)
Akihiro HASHIMOTO (University of Fukui)
Patrick CHIN (Intelligent Epitaxy Technology Inc.)
Matteo MENEGHINI (Padova Univ.)

December 11, 2019

Oral Session 1

Time 9:00–11:30 Room Trade-3

Chairperson Kenji SHIOJIMA

[Blank 9:00–9:30]

D4-11-I01 ▸Invited 9:30–10:00

Reliability and Dynamic Performance of Gallium Nitride-based Devices for Power Applications

Carlo DE SANTI, Matteo MENEGHINI, Alessandro BARBATO, Matteo BORGA, Eleonora CANATO, Francesca CHIOCCHETTA, Elena FABRIS, Zhan GAO, Fabrizio MASIN, Kalparupa MUKHERJEE, Arianna NARDO, Maria RUZZARIN, Mehdi RZIN, Alaleh TAJALLI, Gaudenzio MENEGHESSO, Enrico ZANONI

University of Padova

D4-11-I02 ▸Invited 10:00–10:30

Ultra-wide Bandgap Al-rich AlGaN Alloys for Power Diodes and Transistors

Andrew ALLERMAN, Mary H. CRAWFORD, Andrew M. ARMSTRONG, Greg W. PICKRELL, Jeramy R. DICKERSON, Robert J. KAPLAR, Andrew T. BINDER, Michael L. SMITH, Vincent M. ABATE

Sandia National Laboratories

D4-11-I03 ▸Invited 10:30–11:00

Effects of device structures and epi propertieson high efficiency AlGaN/GaN HEMTs

Kazutaka TAKAGI, Kenichi SUGITA, Kunio TSUDA, Hideki KIMURA

Toshiba Infrastructure Systems & Solutions Corporation

D4-11-I04 ▸Invited 11:00–11:30

Compositional metrology of Atom Probe Tomography applied to III-N optoelectronic devices

Lorenzo RIGUTTI

University of Rouen Normandie, Groupe de Physique des Matériaux

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Trade-3

Chairpersons Patrick CHIN, Kenji SHIOJIMA

D4-11-I05 ▸Invited 14:00–14:30

The Hunt for Mobile Holes Induced by Polarization in GaN

Huili Grace XING

Cornell University

D4-11-I06 ▸Invited 14:30–15:00

Challenge and Opportunity for Mass Production of UVC LED by MOVPE on High Temperature Annealed AlN Template

Koh MATSUMOTO[1], Yuji TOMITA[1], Akira MISHIMA[1], Yuya YAMAOKA[1], Shuuichi KOSEKI[1], Yoshiki YANO[1], Hideto MIYAKE[2], Hideki HIRAYAMA[3]

[1]TAIYO NIPPON SANSO, [2]Mie University, [3]RIKEN

D4-11-I07 ▸Invited 15:00–15:30

Breakdown Phenomena in High- and Low-Voltage SiC Devices

Tsunenobu KIMOTO

Kyoto University

D4-11-I08 ▸Invited 15:30–16:00

Carrier Recombination Velocity in 4H-SiC: at Surfaces and Defects

Masashi KATO

Nagoya Institute of Technology

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Trade-3

Chairperson Matteo MENEGHINI

D4-11-I09 ▸Invited 16:30–17:00

Vertical GaN p-n Junction Diodes Fabricated on Free-standing GaN Substrates

Tomoyoshi MISHIMA

Hosei University

D4-11-I10 ▸Invited 17:00–17:30

GaN-based normally-off HEMTs for switching and logic applications

Jan KUZMIK

Institute of Electrical Eng., Slovak Academy of Sci.

D4-11-I11 ▸Invited 17:30–18:00

Ab-initio based description and design of nitride surfaces: The role of surface rehybridization on alloy composition and ordering.

Liverios LYMPERAKIS, Christoph FREYSOLDT, Jörg NEUGEBAUER
Computational Materials Design departement, Max-Planck-Insitut für Eisenforschung

D4-11-I12 ▸Invited 18:00–18:30

Epitaxial Growth of N-Polar Nitride Semiconductor and its Device Application

Takashi MATSUOKA
New Industry Creation Hatchery Center, Tohoku University

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Miel-5

Chairperson Fumimasa HORIKIRI

Blank
9:00–10:00

D4-12-I01 ▸Invited 10:00–10:30

Electrochemical application on boron-doped diamond electrodes

Yasuaki EINAGA
Keio University

D4-12-I02 ▸Invited 10:30–11:00

Electrical properties of GaN MOS capacitors with ALD-High-k gate insulators

Toshihide NABATAME[1], Yoshihiro IROKAWA[1], Koji SHIOZAKI[2], Yasuo KOIDE[1]
[1]National Institute for Materials Science, [2]Institute of Materials and Systems for Sustainability, Nagoya University

D4-12-O03 11:00–11:15

Difference in carrier lifetimes for SiC measured by microwave photoconductivity decay and time-resolved photoluminescence methods

Masashi KATO
Nagoya Institute of Technology

D4-12-O04 11:15–11:30

Simple Photoelectrochemical Etching of GaN for RF Application

Fumimasa HORIKIRI[1], Noboru FUKUHARA[1], Yoshinobu NARITA[1], Takehiro YOSHIDA[1], Masachika TOGUCHI[2], Kazuki MIWA[2], Taketomo SATO[2]
[1]SCIOCS Company Limited, [2]Hokkaido University

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Work-6

Chairperson Akihiro HASHIMOTO

D4-12-I05 ▸Invited 16:30–17:00

Structural evaluation of β-Ga2O3 crystals by TEM and related techniques

Osamu UEDA[1], Akito KURAMATA[2], Hirotaka YAMAGUCHI[3], Makoto KASU[4]
[1]Meiji University, [2]Novel Crystal Technology Inc., [3]National Institute of Advanced Industrial Science and Technology, [4]Saga University

D4-12-I06 ▸Invited 17:00–17:30

Photoemission Study of Chemically-Cleaned GaN Surfaces and GaN-SiO_2 Interfaces Formed by Remote Plasma CVD

Seiichi MIYAZAKI, Akio OHTA
Nagoya University

D4-12-I07 ▸Invited 17:30–18:00

Fabrication and characterization of twisted bilayer graphene

Satoru TANAKA[1], Hitoshi IMAMURA[1], Ryo-suke UOTANI[1], Takashi KAJIWARA[1], Anton VISIKOVSKIY[1], Takushi IIMORI[2], Toshio MIYAMACHI[2], Kan NAKATSUJI[3], Kazuhiko MASE[4], Fumio KOMORI[2]
[1]Kyushu Univ., [2]Univ. Tokyo, [3]Tokyo Inst. Tech., [4]KEK

D4-12-O08 18:00–18:15

New Method for First-principles Electronic-structure Study of Impurity Induced States and its Application to Diamond and Cubic BN

Hiroki YAMASHITA[1], Taishi HAGA[1], Yoshitaka FUJIMOTO[1], Susumu SAITO[1,2,3]
[1]Department of Physics, Tokyo Institute of Technology, [2]Advanced Research Center for Quantum Physics and Nanoscience, Tokyo Institute of Technology, [3]Materials Research Center for Element Strategy, Tokyo Institute of Technology

D4-12-O09 18:15–18:30

High electrical conductivity exceeding ~3000 S cm^{-1} of a transparent oxide semiconductor, La-doped $SrSnO_3$

Mian WEI[1], Anup V. SANCHELA[2], Hai Jun CHO[1,2], Hiromichi OHTA[1,2]
[1]Graduate School of Information Science and Technology, Hokkaido University, [2]Research Institute for Electronic Science, Hokkaido University

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

D4-11-P01

Repair of Multifunctional Two Dimension Structure by Additional Growth of AlN Atomic Layer in MEE Mode

Yuta KAMADA, Tomoya TAKEUCHI, Riku SHAMOTO, Akihiro HASHIMOTO
University of Fukui

D4-11-P02

Orientation Control of a-axis in InN Growth by AlN/ Epitaxial Graphene/4H-SiC(0001)

Riku SHAMOTO, Yuta KAMADA, Akihiro HASHIMOTO
University of Fukui

D4-11-P03

Mapping of Photo-Electrochemical Etched Ni/ n-GaN Schottkey Contacts Using Scanning Internal Photoemission Microscopy

Ryo MATSUDA[1], Fumimasa HORIKIRI[2], Yoshinobu NARITA[2], Takehiro YOSHIDA[2], Tomoyoshi MISHIMA[3], Kenji SHIOJIMA[1]
[1]University of Fukui, [2]SCIOCS, [3]Hosei University

D4-11-P04

High Breakdown-Capability Vertical GaN p-n Junction Diodes

Hiroshi OHTA[1], Naomi ASAI[1], Fumimasa HORIKIRI[2], Yoshinobu NARITA[2], Takehiro YOSHIDA[2], Tomoyoshi MISHIMA[1]
[1]HOSEI University, [2]SCIOCS Co. Ltd

D4-11-P05

Contactless Photoelectrochemical Etching of n-GaN in $K_2S_2O_8$ solution

Masachika TOGUCHI[1], Kazuki MIWA[1], Fumimasa HORIKIRI[2], Noboru FUKUHARA[2], Yoshinobu NARITA[2], Takehiro YOSHIDA[2], Taketomo SATO[1]
[1]Hokkaido University, [2]SCIOCS CO., Ltd.

D4-11-P06

Precise Control in Threshold Voltage of AlGaN/GaN HEMTs by Photoelectrochemical Etching

Yuto KOMATSU, Masachika TOGUCHI, Taketomo SATO
Hokkaido University

D4-11-P07

Effect of Optical and Acoustic Phonons on Optical Properties of Yb_2O_3 and Lu_2O_3 Thin Films

Takaho ASAI[1], Takayuki MAKINO[1], K KAMINAGA[2], Daichi OKA[3], Tomoteru FUKUMURA[2,3]
[1]University of Fukui, [2]Tohoku University

Cluster E

Magnet and Spintronics

Symposium

E-1 New Aspects of Understanding Magnetic Materials

E-2 Spin Conversion Phenomena in Spin Orbit Materials

E-3 Quantum State in Low Symmetry Environment Probed by Advanced Spin Polarized Quantum Beam

December 12–13, 2019

Symposium E-1

New Aspects of Understanding Magnetic Materials

[Organizers]

Takashi MIYAKE (National Institute of Advanced Industrial Science and Technology)
Chiharu MITSUMATA (National Institute for Materials Science)
Leonid POUROVSKII (Ecole Polytechnique)

December 12, 2019

Oral Session 5

Time 14:00–16:00 Room Mont-3

Chairperson Christian ELSÄSSER

E1-12-I01 ▸Invited 14:00–14:30

Magnetic Anisotropy in $L1_0$-FeNi Magnet: Experiment and Theory

Masaki MIZUGUCHI, Koki TAKANASHI
Tohoku University

E1-12-O02 14:30–14:45

A Brief Review of MnBi-Based Hard Magnetic Materials

Jun CUI[1]
[1]Critical Materials Institute, Ames Laboratory, [2]Materials Science & Engineering, Iowa State University

E1-12-I03 ▸Invited 14:45–15:15

Crystal field, Kondo effect and magnetic anisotropy in perspective rare-earth based hard magnets

Leonid POUROVSKII[1,2]
[1]CPHT, CNRS, Ecole Polytechnique, IP Paris, F-91128 Palaiseau, France, [2]Collège de France, 11 place Marcelin Berthelot, 75005 Paris, France

E1-12-O04 15:15–15:30

Optimal *4f-3d* Exchange Couplings in Rare-Earth Permanent Magnets

Munehisa MATSUMOTO[1], Takafumi HAWAI[1,2], Kanta ONO[1,2,3]
[1]Institute of Materials Structure Science, High Energy Accelerator Research Organization (KEK), [2]Elements Strategy Initiative Center for Magnetic Materials, National Institute for Materials Science, [3]Materials Research by Information Integration Initiative, National Institute for Materials Science

E1-12-O05 15:30–15:45

First-principles study of interface magnetism in materials structures of Nd-Fe-B sintered magnets

Asako TERASAWA, Yoshihiro GOHDA
Tokyo Institute of Technology

E1-12-O06 15:45–16:00

Heterogeneous Sm-Co Sintered Magnets With Improved Flexural Strength

BAOZHI CUI
Ames Laboratory, US Department of Energy

December 13, 2019

Oral Session 7

Time 9:00–11:30 Room Mont-4

Chairperson Leonid POUROVSKII

E1-13-I01 ▸Invited 9:00–9:30

Functional magnetic materials from data-mining and self-organized maps

Olle ERIKSSON[1,2]
[1]Uppsala University, [2]Örebro University

E1-13-I02 ▸Invited 9:30–10:00

Screening of rare-earth-lean intermetallic 1-11-X, 1-12-X, and 1-13-X compounds for hard-magnetic applications

Christian ELSAESSER
Fraunhofer IWM

E1-13-O03 10:00–10:15

Thermodynamic Stability Study of Substitutional Elements in $(R,M)(Fe,X)_{12}$ Structure using Special Quasirandom Structures

Arkapol SAENGDEEJING, Ying CHEN
Tohoku University

Short Break
10:15–10:30

E1-13-I04 ▸Invited 10:30–11:00

Ensemble Learning Reveals Similarity Between Rare-earth Transition Metal Binary Alloys

Hieu Chi DAM[1,2], Nguyen Duong NGUYEN[1], Viet Cuong NGUYEN[3], Hiori KINO[2], Takashi MIYAKE[2,4]
[1]Japan Advanced Institute of Science and Technology, 1-1 Asahidai, Nomi, Ishikawa 923-1292, Japan, [2]National Institute for Materials Science, 1-2-1 Sengen, Tsukuba, Ibaraki 305-0047, Japan, [3]HPC Systems Inc., Minato, Tokyo 108-0022, Japan, [4]CD-FMat, Advanced Institute of Science and Technology, 1-1-1 Umezono, Tsukuba 305-8568, Japan

E1-13-O05 11:00–11:15

Can Non-Critical Rare Earths Be Used For Permanent Magnets?

David PARKER
Oak Ridge National Laboratory

E1-13-O06 11:15–11:30

Cerium-Based Gap Magnets. Recent Advances In Understanding And Optimization.

Andriy PALASYUK[1], Savannah DOWNING[2], Olena PALASYUK[1,3], Tae-Hoon KIM[1], Matthew LYNN[1], Lin ZHOU[1], Matthew KRAMER[1,3], Sergey BUD'KO[1,2], Paul CANFIELD[1,2]
[1]Ames Laboratory, [2]Department of Physics and Astronomy, Iowa State University, [3]Department of Material Science and Engineering, Iowa State University

December 13, 2019

Oral Session 8

Time 14:00–16:00 Room Mont-4

Chairperson Olle ERIKSSON

E1-13-I07 ▸Invited 14:00–14:30

Chiral Magnetic Skyrmions For Information Technology

Stefan BLÜGEL[1], Markus HOFFMANN[1,2], Bernd ZIMMERMANN[1,2], Gideon MÜLLER[1,2], Hongying JIA[1,2]
[1]Forschungszentrum Jülich, [2]JARA

E1-13-I08 ▸Invited 14:30–15:00

Atomistic Approach to the $Nd_2Fe_{14}B$ magnet

Seiji MIYASHITA[1,3,6], Yuta TOGA[6], Masamichi NISHINO[2,6], Taichi HINOKIHARA[3,6], Ismail UYSAL[2,6], Akimasa SAKUMA[4], Takashi MIYAKE[5], Hisazumi AKAI[3,6], Satoshi HIROSAWA[6]
[1]The Physical Society of Japan, [2]National Institute for Materials Science(NIMS), [3]Institute for Solid State Physics, The University of Tokyo, [4]Department of Applied Physics, Tohoku University, [5]CD-FMat, National Institute of Advanced Industrial Science and Technology (AIST), [6]ESICMM(The Elements Strategy Initiative Center for Magnetic Materials), NIMS

E1-13-O09 15:00–15:15

Temperature dependence of coercivity in $Nd_2Fe_{14}B$ atomistic spin model

Yuta TOGA[1,6], Seiji MIYASHITA[2,3,6], Akimasa SAKUMA[4], Takashi MIYAKE[5,6]
[1]National Institute for Materials Science (NIMS), [2]The Physical Society of Japan, [3]Institute for Solid State Physics, The University of Tokyo, [4]Department of Applied Physics, Tohoku University, [5]National Institute of Advanced Industrial Science and Technology (AIST), [6]Elements Strategy Initiative Center for Magnetic Materials (ESICMM)

E1-13-O10 15:15–15:30

Micromagnetic simulation of magnetization reversals and domain wall motions inside permanent magnet

Hiroshi TSUKAHARA[1], Kaoru IWANO[1], Tadashi ISHIKAWA[1], Chiharu MITSUMATA[2], Kanta ONO[1]
[1]High Energy Accelerator Research Organization, [2]National Institute for Materials Science

E1-13-I11 ▸Invited 15:30–16:00

Ginzburg-Landau Type Analysis of Permanent Magnets with Perpendicular Anisotropy

Kaoru IWANO[1], Chiharu MITSUMATA[2], Hiroshi TSUKAHARA[1], Kanta ONO[1]
[1]High Energy Research Organization, [2]National Institute of Materials Scinece

December 13, 2019

Oral Session 9

Time 16:30–17:30 Room Mont-4

Chairperson Stefan BLÜGEL

E1-13-O12 16:30–16:45

A first-principles study on magnetic damping at Fe/MgO(001)

Yoshio MIURA
National Institute for Materials Science

E1-13-O13 16:45–17:00

Theoretical Study for Interfacial Magnetic Anisotropy in Magnetic Tunnel Junctions

Keisuke MASUDA, Yoshio MIURA
National Institute for Materials Science (NIMS)

E1-13-O14 17:00–17:15

Withdrawal

E1-13-O15 17:15–17:30

Study on magnetization dynamics in magnetic wires on $LiNbO_3$

Shunya SAEGUSA
University of Hyogo

December 12, 2019

Poster Session

Time 16:30–18:00 Room Trade-0

E1-12-P01

First-principles Study on Electric Structure and Magnetic Properties of Ytttrium Iron Garnet from Constrained DFT Approach

Hiroki NAKASHIMA, Abdul-Muizz PRADIPTO, Toru AKIYAMA, Tomonori ITO, Kohji NAKAMURA
Mie University

E1-12-P02

Electric Field Effect on Magnetocrystalline Anisotropy in 3d Transition-metal Thin Films

Thi Phuong Thao NGUYEN
Osaka University

E1-12-P03

Computational materials design of spin-gapless quaternary Heusler alloys

Fumiaki KURODA[1], Tetsuya FUKUSHIMA[1,2,3], Tamio OGUCHI[1,2]
[1]The Institute of Scientific and Industrial Research, Osaka Univ., [2]Center for Spintronics Research Network, Osaka Univ., [3]Institute for NanoScience Design, Osaka Univ.

E1-12-P04

Theoretical Sm-Fe-Cu ternary phase diagram for subphase-exploration of $SmFe_{12}$ permanent magnets

Sonju KOU[1], Taichi ABE[2], Yoshihiro GOHDA[1]
[1]Tokyo Institute of Technology, [2]National Institute for Materials Science

E1-12-P05

First-principles based calculation of magnetic properties at finite temperature

Shotaro DOI
National Institute of Advanced Industrial Science and Technology

E1-12-P06

Magnetic properties of Fe-doped $CuCrO_2$ Electrospun nanofibers

Rattakarn YENSANO
Department of Physics, Faculty of Science, Khon Kaen University

E1-12-P07

Theoretical Prediction of Maximum Curie temperatures of Fe-based Dilute Magnetic Semiconductors by First-principles Calculations

Tetsuya FUKUSHIMA[1,2,3], Hikari SHINYA[3,4], Akira MASAGO[3], Kazunori SATO[3,5], Hiroshi KATAYAMA-YOSHIDA[6]
[1]Institute for NanoScience Design, Osaka University, [2]Center for Spintronics Research Network, Osaka University, [3]Research Institute of Electrical Communication, Tohoku University, [4]Graduate School of Engineering, Osaka University, [5]Center for Spintronics Research Network, The University of Tokyo

E1-12-P08

Search for Stable Compounds in Y-Fe Binary System: Application of Evolutionary Construction Technique of Formation Energy Convex Hull

Takahiro ISHIKAWA[1], Takashi MIYAKE[2,1]
[1]ESICMM, National Institute for Materials Science, [2]CD-FMat, National Institute of Advanced Industrial Science and Technology

E1-12-P09

Linearly Independent Descriptor Generation Method for Interpretable Modeling

Hitoshi FUJII[1,2], Tetsuya FUKUSHIMA[3,4], Tamio OGUCHI[1,2]
[1]National Institute for Materials Science, [2]Institute of Scientific and Industrial Research, [3]Institute for NanoScience Design, [4]Institute for Datability Science

E1-12-P10

Effects of Electron-phonon Scattering on Temperature Dependence of Half-metallicity of Co_2MnSi

Naomi HIRAYAMA, Hisazumi AKAI
The Institute for Solid State Physics, The University of Tokyo

E1-12-P11

Fabrication of $L1_0$-type FeCo ordered structure using a periodic Ni buffer layer

Hisaaki ITO[1], Masahiro SAITO[1], Toshio MIYAMACHI[2], Fumio KOMORI[2], Tomoyuki KOGANEZAWA[3], Masaki MIZUGUCHI[4,5], Masato KOTSUGI[1]
[1]Tokyo University of Science, [2]The Institute for Solid State Physics, The University of Tokyo, [3]Japan Synchrotron Radiation Research Institute (JASRI/SPring-8), [4]Institute for Materials Research, Tohoku University, [5]Center for Spintronics Research Network, Tohoku University

E1-12-P12

Evidence of Non-Joulian Magnetostriction for Fe-Ga and Fe-Al Single Crystal Alloys.

Masaki FUJITA
Tokyo City University

E1-12-P13

First-principles electronic structure calculations of rare-earth nitrides by using quasi-particle self-consistent *GW* method

Kazunori SATO[1,2], Takao KOTANI[3]
[1]Division of Materials and Manufacturing Science, Graduate School of Engineering, Osaka University, [2]Center for Spintronics Research Network (CSRN), Osaka University, [3]Department of Applied Mathematics and Physics, Tottori University

E1-12-P14

Magnetic Bulk Rashba Effect in Ferroelectric Materials: A First-Principles Study

Kunihiko YAMAUCHI[1], Paolo BARONE[2], Silvia PICOZZI[2]
[1]ISIR-SANKEN, Osaka University, [2]Consiglio Nazionale delle Ricerche (CNR-SPIN)

E1-12-P15

First-principles calculation of (R, Zr)(Fe, Co, Ti)$_{12}$ (R = Y, Nd, Sm)

Taro FUKAZAWA[1,2], Yosuke HARASHIMA[1,2,3], Takashi MIYAKE[1,2]
[1]CD-FMat, National Institute of Advanced Industrial Science and Technology, [2]ESICMM, National Institute for Materials Science, [3]IMaSS, Nagoya University

E1-12-P16

First-principles study of magnetic properties of Nd-Fe alloys in Nd-Fe-B magnets

Yuta AINAI
Tokyo Tech

E1-12-P17

First-Principles Study on Piezoelectricity and Magnetic Stability in $Bi(Fe,Co)O_3$

Hiroshi KATSUMOTO, Kunihiko YAMAUCHI, Tamio OGUCHI
Institution of Scientific and Industrial Research, Osaka University

E1-12-P18

Spin wave dispersion of 3*d* ferromagnets based on QSGW calculations

Haruki OKUMURA[1], Kazunori SATO[1], Takao KOTANI[2]
[1]Division of Materials and Manufacturing Science, Graduate School of Engineering, Osaka University, [2]Department of Applied Mathematics and Physics, Tottori University

E1-12-P19

Magnetic polaron and unconventional magneto-transport properties in single crystalline $EuBiTe_3$ compound

Won Hyuk SHON[1], Jong-Soo RHYEE[1], Yingshi JIN[2], Sung-Jin KIM[2]
[1]Kyung Hee University, [2]Ewha Womans University

December 11, 2019

Symposium E-2

Spin Conversion Phenomena in Spin Orbit Materials

[Organizers]

YoshiChika OTANI (ISSP University of Tokyo)
Akira OIWA (ISIR Osaka University)

December 11, 2019

Oral Session 2

Time 14:00–16:20 Room Miel-5

Chairpersons A. OIWA, T. HIGO

E2-11-I01 ▸Invited 14:00–14:25

Large time-reversal-odd responses in the topological antiferromagnet Mn_3Sn

Tomoya HIGO[1,2], Huiyuan MAN[1,3], Muhammad IKHLAS[1], Danru QU[1,4], Yoshichika OTANI[1,2,5], Satoru NAKATSUJI[1,2,3,6]

[1]ISSP, University of Tokyo, [2]JST-CREST, [3]Johns Hopkins University, [4]Institute of Physics, Academia Sinica, [5]RIKEN-CEMS, [6]Dept. of Physics, University of Tokyo

E2-11-O02 14:25–14:40

Magneto-transport properties in the chiral antiferromagnet Mn_3Sn thin film

Ayuko KOBAYASHI[1], Danru QU[1,2], Tomoya HIGO[1,3], Satoru NAKATSUJI[1,3,4,5], Yoshichika OTANI[1,3,6]

[1]ISSP, University of Tokyo, [2]Institute of Physics, Academia Sinica, [3]JST-CREST, [4]Johns Hopkins University, [5]Dept. of Physics, University of Tokyo, [6]RIKEN-CEMS

E2-11-O03 14:40–14:55

Large Spin Anomalous Hall Effect in $L1_0$-FePt

Takeshi SEKI[1,2], Satoshi IIHAMA[3], Tomohiro TANIGUCHI[4], Koki TAKANASHI[1,2]

[1]Institute for Materials Research, Tohoku University, Japan, [2]Center for Spintronics Research Network, Tohoku University, Japan, [3]WPI Advanced Institute for Materials Research, Tohoku University, Japan, [4]AIST, Japan

E2-11-O04 14:55–15:10

Observation of Inverse Spin Hall Effect at First-order Magnetic Phase Transition Temperature

Kenta MATSUMOTO[1], Kouta KONDOU[1,2], Tomoya HIGO[1], Jamie R. MASSEY[3], Rowan C. TEMPLE[3], Christopher H. MARROWS[3], YoshiChika OTANI[1,2]

[1]ISSP, the University of Tokyo, [2]RIKEN-CEMS, [3]School of Physics and Astronomy, University of Leeds

E2-11-I05 ▸Invited 15:10–15:35

Magnetic spin Hall effect in chiral antiferromagnet Mn_3Sn

Kouta KONDOU[1,2,3], Motoi KIMATA[3], Hua CHEN[4,5], Satoshi SUGIMOTO[3], Prasanta Kumar MUDULI[3], Ikhlas MUHAMMAD[3], Takahiro TOMITA[2,3], Allan Hugh MACDONALD[4], Satoru NAKATSUJI[2,3], Yoshichika OTANI[1,2,3]

[1]RIKEN, [2]CREST, Japan Science and Technology Agency (JST), [3]Institute for Solid State Physics, University of Tokyo, [4]Department of Physics, University of Texas at Austin, [5]Department of Physics, Colorado State University

E2-11-O06 15:35–15:50

Semi-metallic bulk generated spin-orbit torque in disordered topological insulator

Tenghua GAO, Kazuya ANDO
Keio University

E2-11-O07 15:50–16:05

Comparison of Spin Hall Angles for Epitaxial and Polycrystalline Platinum Thin Films

Zheng ZHU[1], Tomoya HIGO[1,2], Junyeon KIM[3], Kenta MATSUMOTO[1], Hironari ISSHIKI[1], Danru QU[4], Kouta KONDOU[3], Satoru NAKATSUJI[1,2], Yoshichika OTANI[1,2,3]

[1]Institute for Solid State Physics, The University of Tokyo, [2]JST CREST, [3]RIKEN-CEMS, [4]Institute of Physics, Academia Sinica

E2-11-O08 16:05–16:20

Spin Hall effect in highly oriented bismuth by using spin-torque ferromagnetic resonance

Masayuki MATSUSHIMA[1], Yuichiro ANDO[1], Ryo OHSHIMA[1], Sergey DUSHENKO[1], Ei SHIGEMATSU[1], Takeshi KAWABE[2], Teruya SHINJO[1], Shinji MIWA[2], Masashi SHIRAISHI[1]

[1]Kyoto University, [2]The University of Tokyo

December 11, 2019

Oral Session 3

Time 16:30–18:35 Room Miel-5

Chairpersons K. KONDOU, A. OIWA

E2-11-I09 ▸Invited 16:30–16:55

Spintronic operations with antiferromagnets

Takahiro MORIYAMA
Kyoto University

E2-11-O10 16:55–17:10

Spin currents in nearly-compensated ferrimagnetic insulators

Rafael RAMOS
Advanced Institute for Materials Research, Tohoku University

E2-11-O11 17:10–17:25

Conversion between electron spin and phonon angular momentum

Masato HAMADA, Shuichi MURAKAMI
Tokyo Institute of Technology

E2-11-O12 17:25–17:40

An effective way to control the orbital magnetic moment

Shengqun SU
IMCE, Kyushu University

E2-11-I13 ▸Invited 17:40–18:05

Optical excitation and detection of ultrafast antiferromagnetic state

Takuya SATOH
Tokyo Institute of Technology

E2-11-O14 18:05–18:20

Excitation and propagation dynamics of spin waves observed by phase-resolved spin-wave tomography

Yusuke HASHIMOTO
Tohoku University

E2-11-O15 18:20–18:35

Ultrafast spin dependent phenomena and opt-magnetic control in ferrimagnetic rear-earth transition metal alloy

Arata TSUKAMOTO
Nihon University

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

E2-11-P01

Electrical detection of all-optical magnetization switching in ferrimagnetic GdFeCo alloy by anomalous Hall effect

Yuichi KASATANI[1,2], Hiroki YOSHIKAWA[1], Arata TSUKAMOTO[1]
[1]Nihon University, [2]JSPS Research Fellow

E2-11-P02

CoIrMnAl: A potential candidate for spintronics application

Tufan ROY[1], Masahito TSUJIKAWA[1,2], Takuro KANEMURA[1], Masafumi SHIRAI[1,2,3]
[1]Research Institute of Electrical Communication, Tohoku University, [2]Center for Spintronics Research Network, Tohoku University, [3]Center for Science and Innovation in Spintronics (CSIS), Core Research Cluster (CRC), Tohoku University

E2-11-P03

Nonreciprocal spin current conversion from non-uniform charge-current flow

Genki OKANO[1], Mamoru MATSUO[2,3], Yuichi OHNUMA[2,3], Sadamichi MAEKAWA[3,2], Yukio NOZAKI[1,4]
[1]Department of Physics, Keio University, [2]Kavli Institute for Theoretical Sciences, University of Chinese Academy of Sciences, [3]RIKEN CEMS, [4]Center for Spintronics Research Network, Keio University

E2-11-P04

Magnetic properties of a $Co_2FeSi/BaTiO_3$ interfacial multiferroic system

Shinya YAMADA[1,2], Yuki TERAMOTO[2], Taichi MURATA[2], Daishi MATSUMI[2], Kohei KUDO[2], Tomoyasu TANIYAMA[3], Kohei HAMAYA[1,2]
[1]Center for Spintronics Research Network, Graduate School of Engineering Science, Osaka University, [2]Department of Systems Innovation, Graduate School of Engineering Science, Osaka University, [3]Department of Physics, Nagoya University

E2-11-P05

First-principles Calculation of Spin Properties in Two-dimensional Systems Under In-plane Electric Fields

Naoya YAMAGUCHI[1], Fumiyuki ISHII[2]
[1]Graduate School of Natural Science and Technology, Kanazawa University, [2]Nanomaterials Research Institute, Kanazawa University

E2-11-P06

Optical detection of magnetization dynamics and damping for synthetic antiferromagnet

Akira KAMIMAKI[1,2], Satoshi IIHAMA[2,3], Tomohiro TANIGUCHI[4], Shigemi MIZUKAMI[2,3,5]
[1]Department of Applied Physics, Graduate School of Engineering, Tohoku University, Japan, [2]WPI Advanced Institute for Materials Research (AIMR), Tohoku University, Japan, [3]Center for Spintronics Research Network (CSRN), Tohoku University, Japan, [4]National Institute of Advanced Industrial Science and Technology (AIST), Spintronics Research Center, Japan, [5]Center for Science and Innovation in Spintronics (CSIS), Core Research Cluster (CRC), Tohoku University, Japan

E2-11-P07

Spin dependent transport properties in the magnetic tunnel junctions with a Cr_2O_3 barrier layer

Tomohiro ICHINOSE[1], Kelvin ELPHICK[2], Atsufumi HIROHATA[2], Shigemi MIZUKAMI[1,3,4]
[1]WPI-AIMR, Tohoku University, [2]Department of Electronic Engineering, University of York, [3]CSIS, Tohoku University, [4]CSRN, Tohoku University

E2-11-P08

Inverse Edelstein effect Induced by magnon-phonon Coupling

Mingran XU[1], Jorge PUEBLA[2], Florent AUVRAY[1], Bivas RANA[2], Kouta KONDOU[2], Yoshichika OTANI[1,2]
[1]Institute for Solid State Physics, University of Tokyo, [2]CEMS, RIKEN

E2-11-P09

Electric field control of damping constant

Bivas RANA[1], Collins Ashu AKOSA[1], Gen TATARA[1], YoshiChika OTANI[1,2]
[1]CEMS, RIKEN, [2]Institute for Solid State Physics, University of Tokyo

E2-11-P10

Gate control of intra-Landau level transition and observation of spin precession at quantum Hall state

Takase SHIMIZU, Yoshiaki HASHIMOTO, Taketomo NAKAMURA, Akira ENDO, Shingo KATSUMOTO
The institute for solid state physics, the University of Tokyo

E2-11-P11

Spin transport properties in antiferromagnetic $L1_2$-ordered Mn_3Ir thin films

Hiroyuki IWAKI, Takahiro MORIYAMA, Tetsuya IKEBUCHI, Kento ODA, Yoichi SHIOTA, Teruo ONO
Institute for Chemical Research, Kyoto University

E2-11-P12

Magnon-phonon interaction induced thermal Hall effect in the triangular antiferromagnet

Takuma SAITO
Department of Applied Physics, The University of Tokyo

E2-11-P13

Crystal orientation dependence of the spin current transmission in single crystalline NiO thin films

Tetsuya IKEBUCHI, Takahiro MORIYAMA, Kent ODA, Hiroyuki IWAKI, Teruo ONO
Kyoto University

E2-11-P14

Fabrication and rectifying properties of epitaxial magnetic tunnel junctions with metastable rock-salt ZnO tunnel barrier

Hidekazu SAITO[1], Shintaro KON[1,2], Yukiko YASUKAWA[2], Hiroshi IMAMURA[1], Shinji YUASA[1]
[1]National Institute of Advanced Industrial Science and Technology, Spintronics Research Center, [2]Chiba Institute of Technology

E2-11-P15

Photoinduced Rashba spin-to-charge conversion via an interfacial unoccupied state

Jorge PUEBLA
Center of Emergent Matter Science RIKEN

E2-11-P16

Spin-blockade and Rashba-resonance in a double quantum well diode

Taketomo NAKAMURA, Yoshiaki HASHIMOTO, Shingo KATSUMOTO
The University of Tokyo

E2-11-P17

Spin dynamics in nanostructures probed by quantum dot sensors

Tomohiro OTSUKA[1], Takashi NAKAJIMA[2], Matthieu R. DELBECQ[2], Peter STANO[2], Shinichi AMAHA[2], Jun YONEDA[2], Kenta TAKEDA[2], Gilles ALLISON[2], Sen LI[2], Akito NOIRI[2], Takumi ITO[2], Daniel LOSS[2], Arne LUDWIG[3], Andreas D. WIECK[3], Seigo TARUCHA[2]
[1]Tohoku University, [2]RIKEN, [3]Ruhr-Universität Bochum

E2-11-P18

Quantum spin transport to self-assembled InGaAs quantum dots through AlGaAs/GaAs superlattice

Satoshi HIURA[1], Junichi TAKAYAMA[1], Takayuki KIBA[2], Akihiro MURAYAMA[1]
[1]Hokkaido University, [2]Kitami Institute of Technology

E2-11-P19

Detection of optical spin orientation by inverse spin Hall effect in (110)-AlGaAs/GaAs quantum well

Yuji SAKAI[1], Tomohiro NAKAGAWA[1], Julian RITZMANN[2], Andreas WIECK[2], Arne LUDWIG[2], Akira OIWA[1]
[1]ISIR, Osaka University, [2]Ruhr-Universität

December 11–13, 2019

Symposium E-3

Quantum State in Low Symmetry Environment Probed by Advanced Spin Polarized Quantum Beam

[Organizers]

Koichiro SHIMOMURA (High Energy Accelerator Research Organization)
Wataru HIGEMOTO (Japan Atomic Energy Agency)

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Trade-2

Chairperson E. TORIAI

E3-11-O01 14:00–14:25

Coexistence of Dynamical and Static Component of Molecular Dynamics in Polybutadiene Probed by Muon Spin Relaxation

Soshi TAKESHITA[1], Hirotaka OKABE[1], Akihiro KODA[1], Masatoshi HIRAISHI[1], Kenji KOJIMA[1,2], Ryosuke KADONO[1], Hideki SETO[1], Tomomi MASUI[3], Noboru WAKABAYASHI[3]
[1]High Energy Accelerator Research Organization (KEK), [2]TRIUMF, [3]Sumitomo Rubber Industries, Ltd

E3-11-O02 14:25–14:50

μSR Study of Glycine, Oligoglycine and N-methylacetamide

Yoko SUGAWARA[1,2], Amba D. PANT[3], Takahisa FUJITA[2], Shigefumi YAMAMURA[2], Akihiro KODA[4], Wataru HIGEMOTO[5], Koichiro SHIMOMURA[4], Katsuhiko ISHIDA[6], Eiko TORIKAI[7], Kanetada NAGAMINE[4]
[1]Toyota Physical & Chemical Research Institute, [2]Kitasato University, [3]Ibaraki University, [4]IMSS, KEK, [5]Atomic Energy Agency, [6]RIKEN, [7]University of Yamanashi

E3-11-O03 14:50–15:15

Direct Observation of Electron and Proton Transfers in Enzymatic Reactions by μSR

Tamiko KIYOTAN[1], Ichiro TANAKA[2], Nobuo NIIMURA[2]
[1]Showa Pharmaceutical University, [2]Ibaraki University

E3-11-O04 15:15–15:40

An Application of μSR in Biology, The Electron Transfer in DNA

Isao WATANABE[1], Harison ROZAK[1,2,3], Wan Nurfadhilah ZAHARIM[2,3], Issei MIYAZAKI[4], Nur Eliana ISMAIL[2], Siti Nuramira ABU BAKAR[2], Daruliza KERNAIN[2], Razip SAMIAN[2], Koichi ICHIMURA[4], Mohamed Ismail MOHAMED-IBRAHIM[2,3], Shukri SULAIMAN[2,3]
[1]RIKEN, [2]Universiti Sains Malaysia, [3]USM-RIKEN International Center for Ageing Science, [4]Hokkaido University

E3-11-O05 15:40–16:00

First Principles Theory of Hyperfine Interactions in Guanine Nucleobase

Isao WATANABE[1], Wan Nurfadhilah ZAHARIM[2,3], Shukri SULAIMAN[2,3], Siti Nuramira ABU BAKAR[2,3], Nur Eliana ISMAIL[2,3], Harison ROZAK[1,2,3]
[1]RIKEN, [2]Universiti Sains Malaysia, [3]USM-RIKEN International Center for Ageing Science, [4]Hokkaido University

December 11, 2019

Oral Session 3

Time 16:30–18:35 Room Trade-2

Chairperson K. SHIMOMURA

E3-11-I06 ▸Invited 16:30–16:55

Photoexcited μSR Experiments at the ISIS Pulsed Neutron and Muon Source

Koji YOKOYAMA, James S. LORD
ISIS, STFC Rutherford Appleton Laboratory, Didcot, OX11 0QX, United Kingdom

E3-11-O07 16:55–17:20

Progress and prospects of new DC muon source and muon analysis at MuSIC-RCNP, Osaka University

Dai TOMONO
Osaka University

E3-11-O08 17:20–17:45

Generation of Ultra Cold Muonium from Silicon into Vacuum

Amba Datt PANT[1,2], Hiromi IINUMA[1], Katsuhiko ISHIDA[3], Chiori OGHANE[1], Moe SUGITA[1], Koichiro SHIMOMURA[2]
[1]Institute of Quantum Beam Science, Ibaraki University, Mito, 310-8512, Japan, [2]Institute of Materials Structure Science, KEK, Tsukuba, 305-0801, Japan, [3]Advanced Meson Science Laboratory, RIKEN, Wako, 351-0198, Japan

E3-11-O09 17:45–18:10

Muon Spin Resonance Experiment in the High Magnetic Field at J-PARC

Shoichiro NISHIMURA
High Energy Accelerator Research Organization

E3-11-O10 18:10–18:35

Negative-Muon Decelerator for Material Science

Chihiro OHMORI
KEK

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Trade-3

Chairperson T. ADACHI

E3-12-O01 9:00–9:25

Transformation of interstitial proton into substitutional hydride in reduced $SrTiO_3$ simulated with positively charged muons

Takashi U. ITO[1,2], Wataru HIGEMOTO[1,2,3], Akihiro KODA[2,4], Koichiro SHIMOMURA[2,4]
[1]Advanced Science Research Center, Japan Atomic Energy Agency, [2]Muon Science Section, MLF Division, J-PARC Center, [3]Department of Physics, Tokyo Institute of Technology, [4]Institute of Materials Structure Science, High Energy Accelerator Research Organization

E3-12-O02 9:25–9:50

Local Electronic Structure of Interstitial Hydrogen in Iron Disulfide

Ryosuke KADONO
Institute of Materials Structure Science, KEK

E3-12-O03 9:50–10:15

Electronic Structure of Interstitial Hydrogen in Electride LaScSi Probed by Muon Spin Rotation Technique

Masatoshi HIRAISHI[1], Kenji KOJIMA[1,2], Hirotaka OKABE[1], Soshi TAKESHITA[1], Akihiro KODA[1,2], Ryosuke KADONO[1,2], Jiazhen WU[3], Hideo HOSONO[3,4]
[1]KEK IMSS, [2]SOKENDAI, [3]MSL, Tokyo Tech., [4]MCES, Tokyo Tech.

E3-12-I04 ▸Invited 10:15–10:40

μSR Approach To The Understanding Of Hydrogen Embrittlement In Steels

Nobuhiko NISHIDA
JAEA

E3-12-O05 10:40–11:05

Muon Spin Relaxation in a Hydrogen Charged Al-0.2%Cu Alloy

Katsuhiko NISHIMURA[1], Kenji MATSUDA[1], Takahiro NAMIKI[1], Seungwon LEE[1], Wataru HIGEMOTO[2], Yasuhiro MIYAKA[3], Hiroyuki TODA[4], Kazuyuki SHIMIZU[4]
[1]University of Toyama, [2]Japan Atomic Energy Agency, [3]High Energy Accelerator Research Organization, [4]Kyushu University

E3-12-O06 11:05–11:30

Hydrogen Absorption-Desorption Process in Palladium Studied by Muon Spectroscopy

Mototsugu MIHARA[1], Hideki ARAKI[2], Koichiro SHIMOMURA[3], Wataru HIGEMOTO[4], Masataka MIZUNO[2], Kazuki SUGITA[2], Yuki TANAKA[2], Yuta KITAYAMA[2], Dai TOMONO[5], Eiko TORIKAI[6], Wataru SATO[7], Kanji OHKUBO[2], Ryoma MURAKAMI[2], Naoki MATSUOKA[2], Isao WATANABE[8], Teiichiro MATSUZAKI[8], Ryosuke KADONO[3]
[1]Department of Physics, Osaka University, [2]Division of Materials and Manufacturing Science, Osaka University, [3]Institute of Materials Structure Science, High Energy Accelerator Research Organization (KEK), [4]Advanced Science Research Center, Japan Atomic Energy Agency (JAEA), [5]Research Center for Nuclear Physics (RCNP), Osaka University, [6]University of Yamanashi, [7]Institute of Science and Engineering, Kanazawa University, [8]RIKEN Nishina Center for Accelerator-Based Science

December 12, 2019

Oral Session 5

Time 14:00–16:05 Room Trade-3

Chairperson W. HIGEMOTO

E3-12-O07 14:00–14:25

Development of Ultra slow muon microscope to probe near surface and buried interface in materials and life science

Eiko TORIKAI[1,2], Yasuhiro MIYAKE[2,3], Ryosuke KADONO[2,3], Masahiko IWASAKI[4]
[1]University of Yamanashi, [2]High Energy Accelerator Research Organization, [3]J-PARC Center, [4]RIKEN

E3-12-O08 14:25–14:50

Advanced Muon Spin Spectroscopy for Sustainable Society

Jun SUGIYAMA[1,2,3], Wataru HIGEMOTO[2], Koichiro SHIMOMURA[3]
[1]CROSS-Tokai Neutron Science and Technology Center, [2]Advanced Science Research Center, Japan Atomic Energy Agency, [3]High Energy Accelerator Research Organization (KEK)

E3-12-O09 14:50–15:15

Negative muon spin rotation with low-density gas target under transverse magnetic field

Sohtaro KANDA, Katsuhiko ISHIDA
RIKEN

E3-12-O10 15:15–15:40

Polarized neutron inelastic scattering technique ~powerful probe for solid state physics~

Takatsugu MASUDA
University of Tokyo

E3-12-011 15:40–16:05

Spin-Polarized ^{3}He Gas for Polarized Neutron Scattering Measurements

Takashi INO
KEK

December 12, 2019

Oral Session 6

Time 16:30–18:55 Room Trade-3

Chairperson R. KADONO

E3-12-012 16:30–16:55

Anisotropy of spontaneous magnetic field in chiral superconductor

Wataru HIGEMOTO[1], Takeshi OKAZAWA[1,2], Yuto ODA[1,2], Itsuku MIYAZAKI[2], Takashi U ITO[1], Yoshiyuki YOSHIDA[3]
[1]Advanced Science Research Center, Japan Atomic Energy Agency, [2]Department of Physics, Tokyo Institute of Technology, [3]National Institute of Advanced Industrial Science and Technology

E3-12-I13 ▸Invited 16:55–17:20

Spin Fluctuations in High-Temperature Superconductors Probed by Muon

Tadashi ADACHI
Sophia University

E3-12-014 17:20–17:45

Magnetotransport and Superconductivity in Spin Momentum–Locked Surface State of Ion-Gated $SrTiO_3$

Tsutomu NOJIMA[1], Takumi OUCHI[1], Sunao SHIMIZU[2,3], Yoshihiro IWASA[3,4]
[1]Institute for Materials Research, Tohoku University, [2]Central Research Institute of Electric Power Industry, [3]RIKEN Center for Emergent Matter Science, [4]Quantum Phase Electronics Center and Department of Applied Physics, University of Tokyo

E3-12-015 17:45–18:10

Magnetism in T*-Type $La_{1-x/2}Eu_{1-x/2}Sr_xCuO_4$ Studied by μSR Measurement

Masaki FUJITA[1], Shun ASANO[2], Kota KUDO[2], Motofumi TAKAHAMA[2], Isao WATANABE[3], Akihiro KODA[4], Ryosuke KADONO[4]
[1]Institute for Materials Research, Tohoku University, [2]Department of Physics, Tohoku University, [3]Advanced Meson Science Laboratory, The Institute of Physical and Chemical Research, [4]Institute of Materials Structure Science, High Energy Accelerator Research Organization

E3-12-016 18:10–18:35

Superconducting Characteristics of MgO/MgB_2 Nanocomposites with a Self-Similar Fractal-Like Structure

Takashi UCHINO[1], Yusuke SETO[1], Takahiro SAKURAI[1], Hitoshi OHTA[1], Yoshifumi SAKAGUCHI[2], Kazuki OHISHI[2], Akihiro KODA[3]
[1]Kobe University, [2]CROSS, [3]KEK

E3-12-017 18:35–18:55

A Possible Weak Magnetism in Overdoped $La_{2-x}Sr_xCuO_4$ Nanoparticles

Suci WINARSIH[1,2,3], Faisal BUDIMAN[4,5], Hirofumi TANAKA[4], Tadashi ADACHI[6], Takayuki GOTO[6], Akihiro KODA[7], Bambang SOEGIJONO[2], Budhy KURNIAWAN[2], Isao WATANABE[1,2,3]
[1]RIKEN, [2]Universitas Indonesia, [3]Hokkaido University, [4]Kyushu Institute of Technology, [5]Telkom University, [6]Sophia University, [7]High Energy Accelerator Research Organization (KEK)

December 13, 2019

Oral Session 7

Time 9:00–11:45 Room Trade-1

Chairperson I. WATANABE

E3-13-001 9:00–9:25

Interplay of Magnetic, Electronic and Elastic Degrees of Freedom in Chiral Materials

Junichiro KISHINE
The Open University of Japan

E3-13-002 9:25–9:50

Search for Odd-Parity Augmented Multipoles and Cross-Correlation Phenomena in Antiferromagnetic Metals

Hiroshi AMITSUKA
Hokkaido University

E3-13-003 9:50–10:15

Strong Enhancement of Spin-orbit Interaction in Alkali Metal Nanoclusters Incorporated into Zeolite A

Takehito NAKANO
Ibaraki University

E3-13-004 10:15–10:40

Successive Change of the Motion in Na-loaded Low Silica-X Zeolite According to Loading Density of External Na Atom - An NMR Study -

Mutsuo IGARASHI[1], Peter JEGLIC[2], Takehito NAKANO[3], Denis ARCON[2,4]
[1]National Institute of Technology, Gunma College, Japan, [2]Jozef Stefan Institute, Slovenia, [3]Institute of Quantum Beam Science, Graduate School of Science and Engineering, Ibaraki University, Japan, [4]Faculty of Mathematics and Physics, University of Ljubljana, Slovenia

E3-13-005 10:40–11:05

Magnetic state of β-MnO_2 probed by muon spin spectroscopy

Hirotaka OKABE[1], R. Kadono[1], M. Hiraishi[1], A. Koda[1], S. Takeshita[1], K. M. Kojima[2], I. Yamauchi[3], H. Sato[4]
[1]High Energy Accelerator Research Organization (KEK), [2]TRIMF, [3]Saga University, [4]Chuo University

E3-13-O06 11:05–11:25

Hole Doping Effect on Magnetic Ordering and Spin Dynamic of $(Eu_{1-x}Ca_x)_2Ir_2O_7$ Studied by μSR

Utami WIDYAISWARI[1,2,3], Julia ANGEL[1,3], Hironori NOMURA[4], Tomoya TANIGUCHI[4], Kazuyuki MATSUHIRA[4], Akihiro KODA[5], Budhy KURNIAWAN[2], Isao WATANABE[1,2,3]

[1]Meson Science Laboratory, RIKEN Nishina Center, Wako, Saitama, 351-0198, Japan, [2]Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Indonesia, Depok, 16424, Indonesia, [3]Department of Condensed Matter Physics, Hokkaido University, Sapporo, 060-0808, Japan, [4]Faculty of Engineering, Kyushu Institute of Technology, Kitakyushu, 804-8550, Japan, [5]Muon Science Laboratory, Institute of Materials and Structural Science, High Energy Accelerator Research Organization (KEK), Tokai, Ibaraki, 319-1106, Japan

E3-13-O07 11:25–11:45

The admixture of an *s*-wave component into *d*-wave superconducting gap symmetry in organic superconductor λ-$(BETS)_2GaCl_4$ studied by μSR

DITA PUSPITA SARI[1], Retno ASIH[2,3], Koichi HIRAKI[4], Takehito NAKANO[3], Yasuo NOZUE[3], Adrian HILLIER[5], Yasuyuki ISHII[1], Isao WATANABE[2,3]

[1]Shibaura Institute of Technology, [2]Meson Science Laboratory RIKEN, [3]Osaka University, [4]Fukushima Medical University, [5]ISIS STFC Rutherford Appleton Laboratory

December 13, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

E3-13-P01

Neutron Spin Prism Method with High Energy Neutrons at J-PARC

Masaki FUJITA

Institute for Materials Research, Tohoku University

E3-13-P02

Investigation of hydrogen states in semiconducting $BaSi_2$ by muon spin rotation

Takashi SUEMASU[1], Zhihao XU[1], Takuma SATO[1,2], Jumpei NAKAMURA[3], Akiho KODA[3,4], Koichiro SHIMOMURA[3,4]

[1]University of Tsukuba, [2]University Grenoble Aples, [3]KEK, [4]The Graduate University for Advanced Studies

E3-13-P03

μSR study of the Long-range Ordered State in Organic Antiferromagnet λ-$(BEDT\text{-}STF)_2FeCl_4$

DITA PUSPITA SARI[1], Takaaki MINAMIDATE[3], Noriaki MATSUNAGA[4], Atsushi KAWAMOTO[4], Isao WATANABE[2], Yasuyuki ISHII[1]

[1]Shibaura Institute of Technology, [2]Meson Science Laboratory RIKEN, [3]Condensed Molecular Material Laboratory RIKEN, [4]Hokkaido University

E3-13-P04

Observation of Hole Localization on Apical Oxygen in Sr_2IrO_4 via Oxygen Spin Measured by μSR

Masanori MIYAZAKI[1], Mizuki ISHIHARA[1], Takumi KINOSHITA[1], Yuya NISHIYAMA[1], Hiroshi ISODA[1], Masatoshi HIRAISHI[2], Hirotaka OKABE[2], Kenji M. KOJIMA[3], Akihiro KODA[2], Ryosuke KADONO[2], Shuji EBISU[1]

[1]Muroran Institute of Technology, [2]High Energy Accelerator Research organization, [3]TRIUMF

E3-13-P05

The Effects of Split Valence Basis Sets on Muon Hyperfine Interaction in Guanine Nucleobase and Guanine Nucleotide Structures

WAN NURFADHILAH ZAHARIM[1,2], SHUKRI SULAIMAN[1], SITI NUR AFIFI AHMAD[1], SITI NURAMIRA ABU BAKAR[1], NUR ELIANA ISMAIL[1], HARISON ROZAK[1,2], ISAO WATANABE[1,2,3]

[1]UNIVERSITI SAINS MALAYSIA, [2]RIKEN NISHINA CENTER, [3]HOKKAIDO UNIVERSITY

E3-13-P06

Density Functional Theory Investigation of Muon Hyperfine Interactions in $Au_{25}SR_{18}$ Nanocluster

WAN NURFADHILAH ZAHARIM[1,2], SITI NUR AFIFI AHMAD[1], SHUKRI SULAIMAN[1], DANG FATIHAH HASAN BASERI[1], NOR ZAKIAH YAHAYA[1], HASNI ARSAD[1], LEE SIN ANG[3], ISAO WATANABE[2,4]

[1]UNIVERSITI SAINS MALAYSIA, [2]RIKEN NISHINA CENTER, [3]UNIVERSITI TEKNOLOGI MARA, [4]HOKKAIDO UNIVERSITY

E3-13-P07

Magnetic Phase Diagram of $(Y_{0.95-x}Cu_{0.05}Ca_x)_2Ir_2O_7$ Revealed by μSR

Julia ANGEL[1,2], Utami WIDYAISWARI[1,2,3], Hironori NOMURA[4], Tomoya TANIGUCHI[4], Kazuyuki MATSUHIRA[4], Isao WATANABE[1,2,3]

[1]Meson Science Laboratory, RIKEN Nishina Center, [2]Department of Condensed Matter Physics, Hokkaido University, [3]Department of Physics, Faculty of Mathematics and Natural Sciences, Universitas Indonesia, [4]Faculty of Engineering, Kyushu Institute of Technology

E3-13-P08

DFT and μSR Studies on $YBa_2Cu_3O_6$ and La_2CuO_4

Irwan RAMLI[1,2], Muhammad Redo RAMADHAN[1,2,3], Suci WINARSIH[1,2,3], Mohamed Ismail MOHAMED IBRAHIM[4,5], Shukri SULAIMAN[4,5], Isao WATANABE[1,2,3,4,5]

[1]Meson Science Laboratory, RIKEN Nishina Center, [2]Department of Condensed Matter Physics, Graduate School of Science, Hokkaido University, [3]Department of Physics, Faculty of Mathematics and Natural Sciences (FMIPA), Universitas Indonesia, [4]Computational Chemistry and Physics Laboratory, School of Distance Education, Universiti Sains Malaysia, [5]USM-RIKEN International Center for Ageing Science, School of Distance Education, Universiti Sains Malaysia

E3-13-P09

Shallow donor Hydrogen in TiO_2 studied by muSR

Koichiro SHIMOMURA, Ryosuke KADONO, Hua LI

KEK IMSS

Cluster F

Energy

Symposium

F-1 Battery Materials for Sustainability

F-2 Catalysis and Catalyst Materials for Energy and Environment

F-3 Advancements in Thermoelectric Materials and Applications

F-4 Synchrotron X-ray Probes for Mesoscale Materials Science

December 12–13, 2019

Symposium F-1

Battery Materials for Sustainability

[Organizers]

Atsuo YAMADA (The University of Tokyo)
Shinichi KOMABA (Tokyo University of Science)
Naoaki YABUUCHI (Yokohama National University)
Yong-Sheng HU (Chinese Academy of Science)
Shirley MENG (University of California, San Diego)
Rosa PALACIN (ICMAB-CSIC)
Koji OHTA (Kyoto University)

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Work-5

Chairpersons Atsuo YAMADA, Alexis GRIMAUD, Shirley MENG, Patrik JOHANSSON

Opening Talk
Atsuo Yamada
9:00–9:10

F1-12-I01 ▸Invited 9:10–9:35

How the water solvation structure affects its reduction for the development of aqueous electrolytes for Li-ion batteries

Alexis GRIMAUD
Collège de France, CNRS

F1-12-I02 ▸Invited 9:35–10:00

Understanding Interfacial Electrochemistry on Highly Oriented Pyrolytic Graphite (HOPG) with Water-In-Salt Electrolyte

Hye Ryung BYON
Korea Advanced Institute of Science and Technology

F1-12-I03 ▸Invited 10:00–10:25

Robust Prussian Blue Cathodes for Potassium Aqueous Battery with Ultralong Cycle Life and High Power Capability

Yaxiang LU
Institute of Physics, Chinese Academy of Sciences

Break
10:25–10:40

F1-12-I04 ▸Invited 10:40–11:05

Complex Ionic Liquids & Liquid Ionic Complexes

Patrik JOHANSSON[1,2], Piotr JANKOWSKI[1,2,3], Gustav ÅVALL[1]
[1]Chalmers University of Technology, [2]Alistore-European Research Institute, [3]Warsaw University of Technology

F1-12-I05 ▸Invited 11:05–11:30

Rational Design of BIAN Based Binder/Additive for Li Ion Secondary Batteries

Noriyoshi MATSUMI, Sai Gourang PATNAIK, Raman VEDARAJAN
Japan Advanced Institute of Science and Technology

December 12, 2019

Oral Session 5

Time 14:00–16:05 Room Work-5

Chairpersons Shinichi KOMABA, Seung-Taek MYUNG

F1-12-I06 ▸Invited 14:00–14:25

Phase and Structural Evolution of Layered Positive Electrodes

Neeraj SHARMA
UNSW

F1-12-I07 ▸Invited 14:25–14:50

Stable Cycling Performance of Manganese-based Cathode Materials for Rechargeable Sodium Batteries

Seung-Taek MYUNG
Sejong University

F1-12-I08 ▸Invited 14:50–15:15

Novel Phosphates and Fluoride-Phosphates Cathode Materials for Me-ion Batteries

Evgeny ANTIPOV[1,2]
[1]Lomonosov Moscow State University, [2]Skolkovo Institute of Science and Technology

F1-12-I09 ▸Invited 15:15–15:40

Organic Electrodes-based Rechargeable Batteries

Yonggang WANG
Fudan University

F1-12-I10 ▸Invited 15:40–16:05

Operando X-ray Characterization of Multi-Scale Kinetic Limitations in Battery Electrodes

Karena CHAPMAN
Stony Brook University

December 13, 2019

Oral Session 7

Time 9:00–11:20 Room Work-5

Chairpersons Naoaki YABUUCHI, Monste CASAS-CABANAS, Yong-Sheng HU, Zheng CHEN

F1-13-I01 ▸Invited 9:00–9:25

Design of Li and Na fast ion conductors using high-throughput bond-valence calculations

Montse CASAS-CABANAS
CIC energiGUNE

F1-13-I02 ▸Invited 9:25–9:50

Lithium Metal and the Solid Electrolyte Interphase; past, present and future

Adam BEST

CSIRO Manufacturing

F1-13-I03 ▸Invited 9:50–10:15

Withdrawal

Break

10:15–10:30

F1-13-I04 ▸Invited 10:30–10:55

Fundamental Processes and Design Strategies for Alkali Metal–Oxygen Batteries

Yi-Chun LU, Yu WANG

The Chinese University of Hong Kong

F1-13-I05 ▸Invited 10:55–11:20

Leveraging Reversible Chemistry for Materials Sustainability in Energy Storage

Zheng CHEN

University of California San Diego

December 13, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

F1-13-P01

Cation-disordered rocksalt oxides/oxyfluorides for high-energy rechargeable Li/Na batteries

Naoaki YABUUCHI

Yokohama National University

F1-13-P02

Appearance, manipulation, and visualization of lithium-ion conduction in a La–Li–Co–O band insulator

Tsuyoshi TAKAMI[1], Yoshiyuki MORITA[1], Masao YONEMURA[2], Yoshihisa ISHIKAWA[2], Shingo TANAKA[3], Masahiro MORI[3], Toshiharu FUKUNAGA[1], Eiichiro MATSUBARA[1]

[1]Kyoto University, [2]High Energy Accelerator Research Organization, [3]National Institute of Advanced Industrial Science and Technology

F1-13-P03

Assessing electrolyte-improved FeF_3 batteries: A universal description characterized by Fe nanoparticles

Tsuyoshi TAKAMI[1], Keitaro MATSUI[2], Hiroshi SENOH[2], Noboru TAGUCHI[2], Masahiro SHIKANO[2], Hikari SAKAEBE[2], Toshiharu FUKUNAGA[1]

[1]Kyoto University, [2]National Institute of Advanced Industrial Science and Technology

F1-13-P04

Fabrication of Self-standing Three-Dimensional Porous TiO_2-Si Nano-scaffolds for High Volumetric Capacity Lithium Ion Microbatteries

Wen-Yin KO

National Chung-Hsing University

F1-13-P05

Sensitized "Thermal" Cell

Sachiko MATSUSHITA

Tokyo Institute of Technology

F1-13-P06

A Novel Cathode Material $Na_2V_3O_7$ for Sodium-Ion Batteries by High-throughput Search

Masanobu NAKAYAMA[1,2,3], Naoto TANIBATA[1,2], Hayami TAKEDA[1,2]

[1]Nagoya Institute of Technology, [2]ESICB, Kyoto University, [3]Mi2i, National Institute for Materials Science

F1-13-P07

Computational study of redox process and formation of defects in $NaMnO_2$ cathode material of Na-ion battery

Maxim SHISHKIN, Hirofumi SATO

ESICB, Kyoto University

F1-13-P08

Ion Conduction Mechanism in Highly Concentrated Sulfolane-Based Electrolytes for Sodium-Ion Batteries

Kaoru DOKKO[1,2], Yukihiro OKAMOTO[1], Kazuhide UENO[1], Masayoshi WATANABE[1]

[1]Yokohama National University, [2]Kyoto University

F1-13-P09

Cathode properties of amorphous xNaF-$FeSO_4$ Systems ($1 \le x \le 2$) for sodium ion batteries

Ayuko KITAJOU[1,4], Hiroyoshi MOMIDA[2,4], Takahiro YAMASHITA[3], Tamimo OGUCHI[2,4], Shigeto OKADA[3,4]

[1]Yamaguchi University, [2]Osaka University, [3]Kyushu University, [4]ESICB, Kyoto University

F1-13-P10

Preparation And Characterization Of a Lithium Ion Conductor Cubic-Li_2FeCl_4

Masashi KATO[1], Koki NAKANO[1], Hayami TAKEDA[1,2], Naoto TANIBATA[1,2], Masanobu NAKAYAMA[1,2,3]

[1]Nagoya Institute of Technology, [2]Kyoto University ESICB, [3]National Institute for Materials Science Mi2i & GREEN

F1-13-P11

First-Principles Calculations of X-Ray Absorption Spectra in $NaFeSO_4F$ Cathode for Exploring Na-Ion Battery Reactions

Hiroyoshi MOMIDA[1,2], Ayuko KITAJOU[3,2], Shigeto OKADA[4,2], Tamio OGUCHI[1,2]

[1]Osaka University, [2]Kyoto University, [3]Yamaguchi University, [4]Kyushu University

F1-13-P12

A Computational Study on Diffusion of Divalent Ions in Spinel-type Cathodes Materials for Mg Ion Batteries

Taruto ATSUMI[1], Kohei SHIMOKAWA[4], Maho HARADA[1], Masanobu NAKAYAMA[1,2,3], Tetsu ICHITSUBO[4]
[1]Nagoya Institute of Technology, [2]Kyoto University ESICB, [3]MaDiS/CMi2, NIMS, [4]Tohoku University

F1-13-P13

Electrochemical Properties and Local Structure of $NaClO_4$ Aqueous Electrolyte for Na-ion Batteries

Maho YAMASHITA[1], Ryo SAKAMOTO[2], Nobuko YOSHIMOTO[1], Kenta FUJII[1], Ayuko KITAJOU[1,3]
[1]Yamaguchi University, [2]Kyushu University, [3]ESICB, Kyoto University

F1-13-P14

One-Dimensional Nanoparticles as Anode Materials for LIBs

Mai Thanh NGUYEN[1], Tetsu YONEZAWA[1], Lyn Marie De JUAN-CORPUZ[2]
[1]Hokkaido University, [2]Chulalongkorn University

F1-13-P15

Predicting Transport Properties of Ionic Liquids by Using Molecular Dynamics Simulation with DFT-based Force Field

Yoshiki ISHII[1], Nobuyuki MATUBAYASI[1,2]
[1]Osaka University, [2]Kyoto University

F1-13-P16

Effect of Thermal Annealing on Chemical Composition and Phase Transition of $LiCoO_2$ Powders

Awadol KHEJONRAK, Saroj RUJIRAWAT
Suranaree University of Technology

F1-13-P17

Microscopic mechanism of diffusion processes in dilute electrolyte solutions for sodium-ion batteries

Junichi ONO[1], Chien-Pin CHOU[1], Hiromi NAKAI[1,2,3]
[1]Waseda Research Institute for Science and Engineering (WISE), Waseda University, [2]Department of Chemistry and Biochemistry, School of Advanced Science and Engineering, Waseda University, [3]Elements Strategy Initiative for Catalysts & Batteries (ESICB), Kyoto University

F1-13-P18

Microscopic Mechanism of SEI Layer Formation in Highly Concentrated Electrolytes Based on the Nonflammable Trimethyl Phosphate Solvent

Amine BOUIBES[1], Norio TAKENAKA[1,2], Soumen SAHA[1,2], Masataka NAGAOKA[1,2]
[1]Nagoya University, [2]ESICB, Kyoto University

F1-13-P19

Reversible Sodium Metal Electrodes: Is Fluorine an Essential Interphasial Component?

Kyosuke DOI[1], Yuki YAMADA[1,2], Masaki OKOSHI[2,3], Junichi ONO[4], Chien-Pin CHOU[4], Hiromi NAKAI[2,3,4], Atsuo YAMADA[1,2]
[1]Department of Chemical System Engineering, The University of Tokyo, [2]Elements Strategy Initiative for Catalysts & Batteries (ESICB), Kyoto University, [3]Department of Chemistry and Biochemistry, Waseda University, [4]Waseda Research Institute for Science and Engineering (WISE), Waseda University

F1-13-P20

N-Ethyl-*N*-propylpyrrolidinium Bis(fluorosulfonyl)amide Ionic Liquid Electrolytes with High Na Molar Fraction for Sodium Secondary Batteries

Huan YANG, Jingkwang HWANG, Kazuhiko MATSUMOTO, Rika HAGIWARA, Yushen WANG
Kyoto University

F1-13-P21

A Sulfur-doped Black Phosphorus-TiO_2 Composite as High-Performance Anode Material for Sodium-Ion Storage

Haimei LIU
Shanghai University of Electric Power

F1-13-P22

Battery Performance and Reaction Mechanism in Tin-compounds as Negative Electrode: First-Principles Calculations

Hiroki KOTAKA[1], Hiroyoshi MOMIDA[1,2], Tamio OGUCHI[1,2]
[1]Elements Strategy Initiative for Catalysts and Batteries, Kyoto University, [2]Scientific and Industrial Research, Osaka University

F1-13-P23

HPO_3^{2-} as Building Unit for Sodium-Ion Battery Cathodes: $Na_2Fe(HPO_3)_2$

Zihan MA[1], Laura LANDER[1], Masashi OKUBO[1,2], Atsuo YAMADA[1,2]
[1]The University of Tokyo, [2]Kyoto University, ESICB

F1-13-P24

Microscopic Structure of Electrode/electrolyte Interface Probed by Molecular Simulation and Sum Frequency Generation Spectroscopy

Lin WANG[1,2], Satoshi NIHONYANAGI[3,4], Ken-ichi INOUE[1], Kei NISHIKAWA[5], Akihiro MORITA[1,2], Shen YE[1,2], Tahei TAHARA[3,4]
[1]Department of Chemistry, Graduate School of Science, Tohoku University, [2]Elements Strategy Initiative for Catalysts and Batteries (ESICB), Kyoto University, [3]Molecular Spectroscopy Laboratory, RIKEN, [4]Ultrafast Spectroscopy Research Team, RIKEN Center for Advanced Photonics (RAP), RIKEN, [5]Rechargeable Battery Materials Group, Center for Green Research on Energy and Environmental Materials, National Institute for Material Sciences

F1-13-P25

Aqueous Alkali Metal-Ion Battery with Naphthalene Tetracarboxylic Diimide-Based Metal-Organic Framework

Kosuke NAKAMOTO[1], Junwen BAI[2], Liwei ZHAO[1], Ryo SAKAMOTO[2], Masato ITO[1], Shigeto OKADA[1], Eiji YAMAMOTO[3], Haruno MURAYAMA[3], Makoto TOKUNAGA[3]
[1]Institute for Materials Chemistry and Engineering, Kyushu University, [2]Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, [3]Department of Chemistry, Kyushu University

F1-13-P26

Molecular simulations for polymer binder of sodium ion batteries

Hitoshi WASHIZU[1,2]
[1]University of Hyogo, [2]Kyoto University

F1-13-P27

Post Lithium-Ion Batteries; Theoretical Characterization of Phosphorous and Tin for Potassium-ion Anodes

Koichi YAMASHITA
Kyoto University

F1-13-P28

Soft X-ray Li-K and Si-$Li_{2,3}$ Emission from Lithium Silicides in Lithium-Ion Batteries Anode

Andrey LYALIN[1,2], Vladimir KUZNETSOV[3], Akira NAKAYAMA[4], Igor ABARENKOV[3], Ilya TUPITSIN[3], Igor GABIS[3], Kohei UOSAKI[2], Tetsuya TAKETSUGU[5]
[1]Institute for Chemical Reaction Design and Discovery (ICReDD), Hokkaido University, [2]National Institute for Materials Science (NIMS), [3]Faculty of Physics, St. Petersburg State University, [4]Department of Chemical System Engineering, University of Tokyo, [5]Department of Chemistry, Hokkaido University

F1-13-P29

A Promising Layer Cathode Material for Sodium Ion Batteries: A First Principles Investigation

Huu Duc LUONG
Osaka University

F1-13-P30

Structural and Electrochemical Properties of Nonflammable Solvent-Based Concentrated Electrolytes for Lithium-Ion Batteries

Saki SAWAYAMA, Hideyuki MIMURA, Masayuki MORITA, Kenta FUJII
Yamaguchi University

F1-13-P31

Electrochemical simulation based on the ESM-RISM formalism: a theory and its applications

Yasunobu ANDO[1,2], Minoru OTANI[1,2]
[1]CD-FMat, AIST, [2]ESICB, Kyoto University

F1-13-P32

Microscope Mechanism of Li-ion Transport at Interfaces between $LiCoO_2$ Cathode and Sulfide Electrolyte in All-Solid-State Battery via DFT-CALYPSO Method

Bo GAO[1], Randy JALEM[1], Yanming MA[2], Yoshitaka TATEYAMA[1]
[1]National Institute for Materials Science, [2]Jilin University

F1-13-P33

Electrochemical Sodium-ion Intercalation Behavior into Graphite-Based Electrode

Yasuyuki KONDO[1], Yuto MIYAHARA[2], Kohei MIYAZAKI[1,2,3], Takeshi ABE[1,2,3]
[1]Graduate school of Global Environmental Studies, Kyoto University, [2]Graduate school of Engineering, Kyoto University, [3]Element Strategy Initiative for Catalysts & Batteries, Kyoto University

F1-13-P34

Conversion-Type Reaction Mechanism of MF_3 (M = Fe, Ti) Cathode for Li-Ion Battery: First-Principles Calculations

Tatsuya TAKAHASHI[1], Hiroyoshi MOMIDA[1,2], Tamio OGUCHI[1,2]
[1]The Institute of Scientific and Industrial Research, Osaka University, [2]Elements Strategy Initiative for Catalysts and Batteries, Kyoto University

F1-13-P35

Comparative study of electrochemical behavior of micro-Sn and nano-Sn negative electrodes for Na-ion batteries

Mika FUKUNISHI[1,2], Tatsuo HORIBA[1,2], Kei KUBOTA[1,2], Shinichi KOMABA[1,2]
[1]Tokyo University of Science, [2]ESICB, Kyoto University

F1-13-P36

Polyanionic Compounds as Positive Electrode Materials for K-Ion Batteries

Tomooki HOSAKA[1], Tomoaki SHIMAMURA[1], Kei KUBOTA[1,2], Shinichi KOMABA[1,2]
[1]Tokyo University of Science, [2]ESICB, Kyoto University

F1-13-P37

Impact of metal-substitution in O3-type $NaNi_{1/2}Mn_{1/2}O_2$ for Na-Ion Battery

Naoya FUJITANI[1], Yusuke YODA[1], Kazutoshi KUROKI[1], Kei KUBOTA[1,2], Shinichi KOMABA[1,2]
[1]Tokyo University of Science, [2]ESICB, Kyoto University

F1-13-P38

Ca substitution effect on layered P3 and P2-type Na_xCoO_2

Yuji ISHADO[1], Hirona HASEGAWA[2], Shigeto OKADA[3,4], Minoru MIZUHATA[2], Hideshi MAKI[2], Masaki MATSUI[2,4]
[1]Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, [2]Department of Chemical Science and Engineering, Kobe University, [3]Institute for Materials Chemistry and Engineering, Kyushu University, [4]Elements Strategy Initiative for Catalyst and Batteries (ESICB), Kyoto University

F1-13-P39

First-Principles Study on Cation-Disordered Rock-Salt Type Cathode $Li_{2.4}M1_{0.8}M2_{0.8}O_4$ (M1, M2 = Ti, Cr, and Mn) for Li-Ion Batteries

Motoyuki HAMAGUCHI[1], Hiroyoshi MOMIDA[1,2], Tamio OGUCHI[1,2]
[1]Institute of Scientific and Industrial Research, Osaka University, [2]Elements Strategy Initiative for Catalysts and Batteries (ESICB), Kyoto University

F1-13-P40

Effects of Magnesium-Organo-Haloaluminate Complex in Magnesium Ion Battery Electrolytes: A Car-Parrinello Molecular Dynamics Study

Ashu CHOUDHARY, Keitaro SODEYAMA, Yoshitaka TATEYAMA
NIMS

F1-13-P41

Lithium Diffusion Mechanism in Highly Concentrated Electrolytes via First-Principles Molecular Dynamics Sampling

Yang SUN[1], Keitaro SODEYAMA[2,3], Yuki YAMADA[3,4], Atsuo YAMADA[3,4], Yoshitaka TATEYAMA[1,2]
[1]Center for Green Research on Energy and Environmental Materials (GREEN) & International Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science (NIMS), [2]Center for Materials Research Information Integration (cMI2), Research and Services Division of Materials Data and Integrated System (MaDIS), NIMS, [3]Elements Strategy Initiative for Catalysts & Batteries (ESICB), Kyoto University, [4]Department of Chemical System Engineering, The University of Tokyo

F1-13-P42

Na^+ Conducting Na_3SbS_4-Based Solid Electrolytes

Akitoshi HAYASHI, Fumika TSUJI, Naoki MASUZAWA, So YUBUCHI, Chie HOTEHAMA, Atsushi SAKUDA, Masahiro TATSUMISAGO
Osaka Prefecture University

F1-13-P43

Improving intrinsic and surface of traditional graphene oxide as active material for supercapacitors electrodes

Sarawudh NATHABUMROONG[1], Saroj RUJIRAWAT[1], Rattikorn YIMNIRUN[3], Adisorn TUANTRANONT[2]
[1]Suranaree University of Technology, [2]National Electronics and Computer Technology Center, [3]Vidyasirimedhi Institute of Science and Technology

F1-13-P44

Phenolic Resin Derived Hard Carbon as Negative Electrode for High-Energy Sodium- and Potassium-Ion Batteries

Azusa KAMIYAMA[1], Kei KUBOTA[1], Shun FUJIMURA[1], Soshi SHIRAISHI[2], Hidehiko TSUKADA[3], Shinishi KOMABA[1]
[1]Tokyo University of Science, [2]Gunma University, [3]AION Co., Ltd.

F1-13-P45

Synthesis of molybdenum disulfide/ nitrogen-doped reduced graphene oxide nanocomposite for high performance supercapacitors

Wipakorn RITTISUT
Suranaree University of Technology

F1-13-P46

$K_2[(VO)_2(HPO_4)_2(C_2O_4)]$ as 4 V Electrode Material for K-Ion Batteries

Shahul Hameed ABDULRAHMAN[1], Akihiro KATOGI[1], Kei KUBOTA[1,2], Shinichi KOMABA[1,2]
[1]Tokyo University of Science, [2]ESICB, Kyoto University

F1-13-P47

Multiple Adsorption Modes and Decomposition Pathways of Carbonate Electrolyte Molecules at $LiNi_{0.5}Mn_{1.5}O_4$ Cathode Interfaces: Ab Initio Study

Yoshitaka TATEYAMA[1], Keisuke USHIROGATA[3], Ganes SHUKRI[1,2], Yukihiro OKUNO[3]
[1]National Institute for Materials Science, [2]Kyoto University, [3]FUJIFILM Corporation

December 11, 2019

Symposium F-2

Catalysis and Catalyst Materials for Energy and Environment

[Organizers]

Tetsuya SHISHIDO (Tokyo Metropolitan University)
Wen-Yueh YU (National Taiwan University)
Kevin C.-W. WU (National Taiwan University)
Ning YAN (National University of Singapore)
Katsutoshi NAGAOKA (Nagoya University)
Yutaka AMAO (Osaka City University)
Koji OHTA (Kyoto University)

December 11, 2019

Oral Session 1

Time 9:00–12:15 Room Work-5

Chairperson Tetsuya SHISHIDO

Opening Talk
Tetsuya Shishido
9:00–9:05

F2-11-K01 ▸Keynote 9:05–9:45

Single-atom catalysts for energy and environmental applications

Ning YAN
National University of Singapore

F2-11-O02 9:45–10:00

Charge transfer process of WO_x-modified Ti-HAp under UV illumination

Kana ISHISONE[1], Toshihiro ISOBE[1], Sachiko MATSUSHITA[1], Masato WAKAMURA[2], Mitsutake OSHIKIRI[3], Akira NAKAJIMA[1]
[1]Tokyo Institute of Technology, [2]Fujitsu Laboratories Ltd., [3]National Institute of Materials Science

F2-11-O03 10:00–10:15

Vibration-driven reaction of CO_2 on Cu surfaces

Takumi IMABAYASHI[1], Jiamei QUAN[2], Taijun KOZARASHI[1], Tomoyasu MOGI[1], Takahiro KONDO[2,3], Junji NAKAMURA[2,3]
[1]Graduate School of Pure and Applied Sciences, University of Tsukuba, [2]Faculty of Pure and Applied Sciences, University of Tsukuba, [3]Tsukuba Research Center for Energy Materials Science (TREMS), University of Tsukuba

F2-11-O04 10:15–10:30

Electronic Factors Affecting Surface Oxygen Vacancy Formation Energies on Metal Oxides

Kenichi SHIMIZU[1,2], Takashi TOYAO[1,2], Takashi KAMACHI[2,3], Yoyo HINUMA[4]
[1]Institute for Catalysis, Hokkaido University, [2]ESICB, Kyoto University, [3]Department of Life, Environment and Materials Science, Fukuoka Institute of Technology, [4]Center for Frontier Science, Chiba University

Break
10:30–10:45

F2-11-I05 ▸Invited 10:45–11:15

Metal-Organic Frameworks (MOFs)-Derived Nanomaterials for Catalytic Conversion of Lignocellulosic Biomass

Kevin C.-W. WU
National Taiwan University

F2-11-O06 11:15–11:30

Purification of automotive exhaust gas over Pd catalyst supported on $Ca_2AlMnO_{5+\delta}$

Saburo HOSOKAWA[1,2], Yudai OSHINO[2], Hiroyuki ASAKURA[1,2], Kentaro TERAMURA[1,2], Tsunehiro TANAKA[1,2]
[1]Element Strategy Initiative for Catalysts & Batteries (ESICB), Kyoto University, [2]Department of Molecular Engineering, Graduate School of Engineering, Kyoto University

F2-11-O07 11:30–11:45

Synergistic Effect between Isolated Electron-Rich Pt and Co for Automotive Exhaust Purification

Katsutoshi SATO[1,3], Ayano ITO[2], Hiroyuki TOMONAGA[2], Homare KANEMATSU[2], Yuichiro WADA[2], Hiroyuki ASAKURA[1], Saburo HOSOKAWA[1], Tsunehiro TANAKA[1], Katsutoshi NAGAOKA[1,3]
[1]Kyoto University, [2]Oita University, [3]Nagoya University

F2-11-O08 11:45–12:00

Effect of Zeolite Topology on Cu Species in Cu-Zeolite Catalysts for NO Direct Decomposition

Yusuke OHATA[1], Takahiko MOTEKI[1,2], Masaru OGURA[1,2]
[1]Institute of Industrial Science, the University of Tokyo, [2]Unit of Elements Strategy Initiative for Catalysts & Batteries, Kyoto University

F2-11-O09 12:00–12:15

A possible mechanism for high turnover frequency CO–NO reactions over nanometric Rh overlayer catalysts

Hiroshi YOSHIDA[1,2], Yusuke KUZUHARA[1], Kenichi KOIZUMI[2,3], Masahiro EHARA[2,4], Mauro BOERO[5], Akinori MATSUMOTO[1], Satoshi MISUMI[1], Junya OHYAMA[1,2], Masato MACHIDA[1,2]
[1]Kumamoto University, [2]Kyoto University, [3]Riken, [4]Institute for Molecular Science, [5]University of Strasbourg

December 11, 2019

Oral Session 2

Time 14:00–16:10 Room Work-5

Chairperson Kevin C.-W. WU

F2-11-K10 ▸Keynote 14:00–14:40

Ammonia synthesis under Mild Conditions

Ping CHEN
Dalian Institute of Chemical Physics

F2-11-I11 ▸Invited 14:40–15:10

Heterogeneous Catalysis of Porous Ionic Crystals Based on Polyoxometalates

Sayaka UCHIDA
The University of Tokyo

F2-11-O12 15:10–15:25

Acid-durable Electride with Layered Ruthenium for Ammonia Synthesis: Boosting the Activity via Selective Etching

Jiang LI[1], Jiazhen WU[1], Haiyun WANG[2], Yangfan LU[1], Tiannan YE[1], Masato SASASE[1], Xiaojun WU[2], Masaaki KITANO[1], Takeshi INOSHITA[1], Hideo HOSONO[1]
[1]Research Center for Element Strategy, Tokyo Institute of Technology, [2]Hefei National Laboratory for Physical Sciences at the Microscale, University of Science and Technology of China

F2-11-O13 15:25–15:40

Electride Materials for Advanced Catalytic Application

Tian-Nan YE
Tokyo Institute of Technology

F2-11-O14 15:40–15:55

Carbon Dioxide Hydrogenation to Formic Acid Driven by Nano-structured Metal Catalysts

Kohsuke MORI[1,2,3], Taiki SANO[1], Shinya MASUDA[1], Hiromi YAMASHITA[1,3]
[1]Osaka University, [2]JST-PRESTO, [3]ESICB, Kyoto University

F2-11-O15 15:55–16:10

Pt-Fe surface alloy active for CO room-temperature oxidation

Teng MA[1], Yaqin WANG[1,2]
[1]Shenyang Agricultural University, [2]Shenyang Ligong University

December 11, 2019

Oral Session 3

Time 16:30–18:40 Room Work-5

Chairperson Katsutoshi NAGAOKA

F2-11-K16 ▸Keynote 16:30–17:10

Transition Metal-Catalyzed Reduction of Molecular Dinitrogen into Ammonia under Ambient Conditions

Yoshiaki NISHIBAYASHI
The University of Tokyo

F2-11-I17 ▸Invited 17:10–17:40

Design of Heteropolytungstates for Water Oxidation Catalysis

Masahiro SADAKANE
Hiroshima University

F2-11-O18 17:40–17:55

Improvement of Hydrogen Oxidation Reaction in Alkaline Solutions by Modification of Pt/C Catalyst

Junya OHYAMA[1], Keiichi OKUBO[3], Atsushi SATSUMA[2,3]
[1]Kumamoto University, [2]Kyoto University ESICB, [3]Nagoya University

F2-11-O19 17:55–18:10

The OER/ORR Mechanism Including Redox Cycle of Perovskite Oxides for Secondary Metal-Air Batteries

Oyunbileg GALINDEV[1,2], Tatsuya TAKEGUCHI[1,3], Koichi UI[1], Enkhsaruul BYAMBAJAV[2]
[1]Iwate University, [2]National University of Mongolia, [3]ESICB

F2-11-O20 18:10–18:25

Interaction of O_2, CO_2, and H_2O with Perovskite Surfaces. Insights from the Theory.

Aleksandar STAYKOV[1], Tatsumi ISHIHARA[1], John KILNER[2]
[1]Kyushu University, [2]Imperial College London

F2-11-O21 18:25–18:40

Mechanistic Investigation in Reverse Water-Gas Shift Reaction over Platinum Catalysts Supported on Various Metal Oxides

Akira YAMAMOTO[1], Yuqiang DAI[1], Taiki WATANABE[1], Hisao YOSHIDA[1,2]
[1]Graduate School of Human and Environmental Studies, Kyoto University, [2]Elements Strategy Initiative for Catalysts and Batteries (ESICB), Kyoto University

December 11, 2019

Poster Session

Time 12:15–14:00 Room Trade-0

F2-11-P01

Catalytic Combustion of Diesel Soot over Fe and Ag-doped Manganese Oxide Catalyst

Yasutaka KUWAHARA[1,2], Akihiro FUJIBAYASHI[1], Genki KATO[1], Kohsuke MORI[1,2,3], Hiromi YAMASHITA[1,2]
[1]Osaka University, [2]Unit of Elements Strategy Initiative for Catalysts & Batteries (ESICB), [3]JST, PRESTO

F2-11-P02

Shape Controlled CoO_x/CeO_2 Catalyst in Diesel Soot Combustion

Kohsuke MORI[1], Hirotaka JIDA[1], Yasutaka KUWAHARA[1,2], Hiromi YAMASHITA[1,2]
[1]Osaka University, [2]ESICB Kyoto University, [3]JST-PRESTO

F2-11-P03

Ultrathin Oxide Films as Potential Catalysts for NO-CO Elimination: A DFT Study

Hiroaki KOGA[1], Kohei TADA[2], Akihide HAYASHI[3], Yoshinori ATO[3], Mitsutaka OKUMURA[1,3]
[1]ESICB, Kyoto University, [2]Research Institute of Electrochemical Energy, AIST, [3]Department of Chemistry, Osaka University

F2-11-P04

$Pd/CoAl_2O_4/Al_2O_3$ Prepared by Galvanic Deposition — Promotion of Reduction-Oxidation Steps of Pd Particle during Methane Combustion

Atsushi SATSUMA[1,2], Yuji MAHARA[1], Takumi TOJO[1], Kazumasa MURATA[1], Junya OHYAMA[1,2,3]
[1]Nagoya University, [2]ESICB Kyoto University, [3]Kumamoto University

F2-11-P05

Methanolysis of ammonia borane over supported Pd-Au alloy catalysts

Tetsuya SHISHIDO[1,2,3,4], Mitsuhiro TOMINAGA[1], Hiroshi MIURA[1,2,4]
[1]Department of Applied Chemistry for Environment, Graduate School of Engineering, Tokyo Metropolitan University, [2]Research Center for Hydrogen Energy-based Society, Tokyo Metropolitan University, [3]Research Center for Gold Chemistry, Tokyo Metropolitan University, [4]Elements Strategy Initiative for Catalysts & Batteries, Kyoto University

F2-11-P06

Preparation of ZrO_2/C cathode catalysts as an alternative of Pt/C for polymer electrolyte fuel cells

Jun KUBOTA[1,2], Masako MATSUYAMA[1]
[1]Fukuoka University, [2]ESICB, Kyoto University

F2-11-P07

Automated Structural and Reaction Pathway Searches Toward Theoretical Cluster Catalysis

Takeshi IWASA[1,2,3], Takaaki SATO[4], Makito TAKAGI[4], Min GAO[5], Yusuke KONDO[3], Rina TAKAHARA[4], Hirono MOHRI[4], Andrey LYALIN[2], Masato KOBAYASHI[1,2,3,6], Ken-ichi SHIMIZU[3,5], Satoshi MAEDA[1,2,3], Tetsuya TAKETSUGU[1,2,3,4]
[1]Department of Chemistry, Faculty of Science, Hokkaido University, [2]WPI-ICReDD, Hokkaido University, [3]ESICB, Kyoto University, [4]Graduate School of Chemical Sciences and Engineering, Hokkaido University, [5]Institute for Catalysis, Hokkaido University, [6]JST-PRESTO

F2-11-P08

Adsorption and Activation of Methane on the (110) Surface of IrO_2

Yuta TSUJI, Kazunari YOSHIZAWA
Kyushu University

F2-11-P09

Construction of Surface Model Calculation Database and Its Usage for Catalytic Activity Prediction: A Case Study for Methane Steam Reforming

Masato KOBAYASHI[1,2,3], Haruka ONODA[4], Tetsuya TAKETSUGU[1,2,3]
[1]Faculty of Science, Hokkaido University, [2]WPI-ICReDD, Hokkaido University, [3]ESICB, Kyoto University, [4]Graduate School of Chemical Sciences and Engineering, Hokkaido University

F2-11-P10

Preparation of Ru/Complex-rare-earth Oxide for Efficient Ammonia Synthesis

Yuta OGURA[1], Shin-ichiro MIYAHARA[1], Takahiro ASAI[2], Katsutoshi SATO[3], Katsutoshi NAGAOKA[1]
[1]Nagoya University, [2]Oita University, [3]Kyoto University

F2-11-P11

Effect of Oxygen Non-Stoichiometry of $LaNiO_{3-\delta}$ on Oxygen Reduction and Evolution Reaction Activities

Hiroyuki TANAKA[1], Hiroyuki ASAKURA[1,2], Saburo HOSOKAWA[1,2], Kentaro TERAMURA[1,2], Tsunehiro TANAKA[1,2]
[1]Department of Molecular Engineering, Graduate School of Engineering, Kyoto University, [2]Elements Strategy Initiative for Catalysts & Batteries (ESICB), Kyoto University

F2-11-P12

Three-way catalytic reaction using $FeNbO_4$ as catalyst support

Kenya ONISHI[1], Saburo HOSOKAWA[1,2], Hiroyuki ASAKURA[1,2], Kentaro TERAMURA[1,2], Tsunehiro TANAKA[1,2]
[1]Department of Molecular Engineering, Graduate School of Engineering, Kyoto University, [2]Element Strategy Initiative for Catalysts & Batteries (ESICB), Kyoto University

F2-11-P13

Particle size effect on CO oxidation over Pd/Al_2O_3 with different alumina crystalline phase

Kazumasa MURATA[1], Eleen ELEEDA[1], Junya OHYAMA[2,3], Yuta YAMAMOTO[4], Shigeo ARAI[4], Atsushi SATSUMA[1,3]
[1]Graduate School of Engineering, Nagoya University, [2]Faculty of Advanced Science and Technology, Kumamoto University, [3]Unit of Elements Strategy Initiative for Catalysts & Batteries, Kyoto University, [4]Institute of Materials and Systems for Sustainability, Nagoya University

F2-11-P14

Development of Pd Catalyst Supported on Sr-Ti Mixed Oxide for Purifying Automotive Exhaust Gases

Chikara WATANABE[1], Saburo HOSOKAWA[1,2], Hiroyuki ASAKURA[1,2], Kentaro TERAMURA[1,2], Tsunehiro TANAKA[1,2]
[1]Department of Molecular Engineering, Graduate School of Engineering, Kyoto University, [2]Element Strategy Initiative for Catalysts & Batteries (ESICB), Kyoto University

F2-11-P15

Activity of Silica-Coated Pt Cathode Catalysts with Low Ionomer Loading for PEFCs under Low Humidity Conditions

Masaki GOTO, Sakae TAKENAKA
Doshisha University

F2-11-P16

Improvement of the Durability of Pt Cathode Catalysts for PEFCs using Titanium Oxide Nanosheets

Sakae TAKENAKA[1,2], Tomohiro SUZUKI[1]
[1]Doshisha University, [2]Kyoto University

F2-11-P17

DFT Calculations Analysis of Catalytic Activity Modifications with Electric Field

Katsuhiro WAKAMATSU, Teppei OGURA
Kwansei Gakuin University

F2-11-P18

Origin of $(NO)_3$ Formation on Cu(111) from Density Functional Theory Calculations.

Yoshitada MORIKAWA[1,3], Thanh Ngoc PHAM[1,2], Kouji INAGAKI[1,3], Do Ngoc SON[2], Ikutaro HAMADA[1,3], Yuji HAMAMOTO[1,3]
[1]Osaka University, [2]Ho Chi Minh City University of Technology, VNU-HCM, [3]ESICB, Kyoto University

F2-11-P19

Why Does Not Only the Rh_{13}^+ Cluster Reduce Nitrogen Oxides?

Naoki HARUTA[1,2,3], Sho FUKUSHIMA[1,2], Wataru OTA[1,2], Tohru SATO[1,2,3]
[1]Fukui Institute for Fundamental Chemistry, Kyoto University, Japan, [2]Department of Molecular Engineering, Graduate School of Engineering, Kyoto University, Japan, [3]Unit of Elements Strategy Initiative for Catalysts & Batteries, Kyoto University, Japan

F2-11-P20

Density-Functional Tight-Binding Study on Oxygen Vacancy Diffusion in Ceria Systems

Aditya Wibawa SAKTI[1,2], Chien-Pin CHOU[2], Hiromi NAKAI[1,2,3]
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F2-11-P21

Gold and Gold–Palladium Nanoflower Catalysts with High Catalytic Activity for Alcohol Oxidation

Yoshiro IMURA[1], Ryota AKIYAMA[1], Masami TANAKA[1], Haruna SAITO[1], Clara MORITA-IMURA[2], Takeshi KAWAI[1]
[1]Tokyo University of Science, [2]Ochanomizu University

F2-11-P22

Local structure and three-way catalysis of thermally aged Cu/Al_2O_3

Taiki HIRAKAWA[1], Hiroshi YOSHIDA[2,3], Yushi SHIMOKAWA[1], Wakana TOKUZUMI[1], Junya OHYAMA[2,3], Masato MACHIDA[2,3]
[1]Department of Applied Chemistry and Biochemistry, Graduate School of Science and Technology, Kumamoto University, [2]Division of Materials Science and Chemistry, Faculty of Advanced Science and Technology, Kumamoto University, [3]Unit of Elements Strategy Initiative for Catalysts & Batteries, Kyoto University

F2-11-P23

In situ Reflectance Spectroscopy for the Real-Time Observation of Redox Dynamics of Pd Supported on CeO_2-ZrO_2

Ayumi FUJIWARA[1], Yuki UCHIDA[1], Riichiro KAKEI[1], Hiroshi YOSHIDA[2,3], Junya OHYAMA[2,3], Masato MACHIDA[2,3]
[1]Graduate School of Science and Technology, Kumamoto University, [2]Division of Materials Science and Chemistry, Faculty of Advanced Science and Technology, [3]Unit of Elements Strategy Initiative for Catalysts & Batteries, Kyoto University

F2-11-P24

Enhanced Photocatalytic Activity of Perovskite $NaNbO_3$ by Oxygen Vacancies Engineering

Bian YANG, Jihong BIAN, Lei WANG, Jianwei WANG, Yaping DU, Zhiguang WANG, Chao WU, Yaodong YANG
Xi'an Jiaotong University

F2-11-P25

Redox behavior and three-way catalytic activity of $Rh\text{-}Fe/Al_2O_3$

Kyoko FUJITA[1], Hiroyuki ASAKURA[1,2], Saburo HOSOKAWA[1,2], Kentaro TERAMURA[1,2], Tsunehiro TANAKA[1,2]
[1]Kyoto University, [2]ESICB, Kyoto University

F2-11-P26

Effect of Zn species in Ag-loaded Zn-modified $ZnTa_2O_6$ for Photocatalytic conversion of CO_2 by H_2O

Shuying WANG[1], Kentaro TERAMURA[1,2], Saburo HOSOKAWA[1,2], Hiroyuki ASAKURA[1,2], Tsunehiro TANAKA[1,2]
[1]Kyoto University, [2]Element Strategy Initiative for Catalysts & Batteries (ESICB), Kyoto University

F2-11-P27

Electron-rich Gold Clusters Stabilized by Polyvinylpyridines as Robust and Active Oxidation Catalysts

Atsushi MATSUO[1], Shingo HASEGAWA[1], Shinjiro TAKANO[1], Tatsuya TSUKUDA[1,2]
[1]Department of Chemistry, The University of Tokyo, [2]Elements Strategy Initiative for Catalysis and Batteries (ESICB), Kyoto University

F2-11-P28

Theoretical Study on the Electronic Origin and Reaction Mechanism of Catalytic Nitric Oxide Reduction with Metal Clusters

Ryoichi FUKUDA[1], Kaho NAKATANI[1], Nozomi TAKAGI[1], Masahiro EHARA[2], Shigeyoshi SAKAKI[1]
[1]Kyoto University, [2]Institute for Molecular Science

F2-11-P29

Ammonia Synthesis Mechanism using Ru-loaded Hydride Catalyst from First principles

Takuya NAKAO, Tomofumi TADA, Hideo HOSONO
Materials Research Center for Element Strategy, Tokyo Institute of Technology

F2-11-P30

Improving Catalytic Performance and Stability of Polymer-Stabilized Gold Clusters

Tatsuya TSUKUDA[1,2], Shingo HASEGAWA[1], Atsushi MATSUO[1], Koto HIRANO[1], Shinjiro TAKANO[1]
[1]The University of Tokyo, [2]Kyoto University

F2-11-P31

Synthesis of metal-metal oxide hybrid clusters and their catalytic properties

Jun HIRAYAMA[1,2], Taku KOJIMA[2], Tomoki MATSUYAMA[2], Kanako SHIBATA[2], Mio TSUKADA[2], Hiroki MIURA[1,3], Tetsuya SHISHIDO[1,3], Hikaru TAKAYA[4], Seiji YAMAZOE[1,2,5]
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F2-11-P32

Reaction Behavior of NO Molecule on 4*d* Metal Clusters M_{13} and M_{55} (M = Ru, Rh, Pd, and Ag); Theoretical Study

Nozomi TAKAGI[1], Ryoichi FUKUDA[1], Masahiro EHARA[1,2], Shigeyoshi SAKAKI[1,3]
[1]Elements Strategy Initiative for Catalysts and Batteries, Kyoto University, [2]Institute for Molecular Science, [3]Fukui Institute for Fundamental Chemistry, Kyoto University

F2-11-P33

Design of Intermetallic Electrides for Catalytic Ammonia Synthesis

Jiazhen WU[1], Jiang LI[1], Masaaki KITANO[1], Takeshi INOSHITA[1,2], Hideo HOSONO[1,3]
[1]Materials Research Center for Element Strategy, Tokyo Institute of Technology, [2]National Institute for Materials Science, [3]Laboratory for Materials and Structures, Institute of Innovative Research, Tokyo Institute of Technology

F2-11-P34

Plasmonic Molybdenum Oxide Microspheres for Complete Nitrogen Photofixation

Haoyuan BAI, Jianhua YANG, Jianfang WANG
The Chinese University of Hong Kong

F2-11-P35

Propene Oxidation by M_{55} Cluster (M= Pd or Rh): Theoretical Study of Reaction Mechanism and Difference(s) between Pd and Rh

Bo ZHU, Masahiro EHARA, Shigeyoshi SAKAKI
Kyoto University

F2-11-P36

Effect of size and morphology of Ag nanoparticles modified on $NaTaO_3$ for photoreduction of CO_2 by H_2O

Xu XUANWEN[1], Kentaro TERAMURA[1,2], Hiroyuki ASAKURA[1,2], Saburo HOSOKAWA[1,2], Tsunehiro TANAKA[1,2]
[1]Department of Molecular Engineering, Graduate School of Engineering, Kyoto University, [2]ESICB, Kyoto University

F2-11-P37

CO Oxidation and NO Reduction on Pd-loaded $Sr_3Fe_2O_{7-\delta}$ Catalyst: A Theoretical Approach

Kuduva R. VIGNESH[1,2], Archana VELLOTH[1,2], Ryoichi FUKUDA[2,3], Saburo HOSOKAWA[2,3], Tsunehiro TANAKA[2,3], Masahiro EHARA[1,2]
[1]Institute for Molecular Science, [2]ESICB, Kyoto University, [3]Department of Molecular Engineering, Kyoto University

F2-11-P38

Theoretical Investigation on Structures and Bond Activation on Isolated and Supported Pt-Co Bimetallic Nanoclusters

Masahiro EHARA[1,2], Archana VELLOTH[1,2], Tao YANG[1,2], Ryoichi FUKUDA[2,3]
[1]Institute for Molecular Science, [2]ESICB, Kyoto University, [3]Department of Molecular Engineering, Kyoto University

F2-11-P39

Ammonia decomposition reaction on the Ni supported various metal imides

Kiya OGASAWARA[1], Kazuhisa KISHIDA[1], Masaaki KITANO[1,2], Hideo HOSONO[1]
[1]Materials and Structures Laboratory, Tokyo Institute of Technology, [2]Precursory Research for Embryonic Science and Technology (PRESTO), Japan Science and Technology Agency (JST)

F2-11-P40

Importance of Pd Site in Hydrosilylation of Internal Alkynes by Palladium-Gold Alloy Catalyst

Pei ZHAO[1], Tumpa SADHUKHAN[1,2], Anchalee JUNKAEW[3], Hiroki MIURA[2,4,5], Tetsuya SHISHIDO[2,4,5], Masahiro EHARA[1,2]
[1]Institute for Molecular Science , Research Center for Computational Science, [2]Elements Strategy Initiative for Catalysts and Batteries (ESICB), Kyoto University, [3]National Nanotechnology Center (NANOTEC), Thailand Science Park, [4]Department of Applied Chemistry, Graduate School of Urban Environmental Sciences, Tokyo Metropolitan University, [5]Research Center for Hydrogen Energy-Based Society, Tokyo Metropolitan University

F2-11-P41

Redox behavior of Ni–Cu bimetallic alloy catalysts for automobile exhaust purification

Hiroyuki ASAKURA[1,2], Saburo HOSOKAWA[1,2], Kentaro TERAMURA[1,2], Nozomi TAKAGI[2], Shigeyoshi SAKAKI[2,3], Tsunehiro TANAKA[1,2]
[1]Kyoto University, [2]ESICB, Kyoto University, [3]Fukui Institute for Fundamental Chemistry, Kyoto University

F2-11-P42

The change of electronic structure at the interface between Pt nanoparticles and the carbon support by the ion irradiation

Hiroyuki OKAZAKI[1], Akira IDESAKI[1], Hiroshi KOSHIKAWA[1], Daiju MATSUMURA[2], Syunya YAMAMOTO[1], Yusunari MAEKAWA[1], Tetsuya YAMAKI[1]
[1]National Institutes for Quantum and Radiological Science and Technology, [2]Japan Atomic Energy Agency

F2-11-P43

Mechanistic Analysis of Oxygen Vacancy Formation and Ionic Transport in $Sr_3Fe_2O_{7-\delta}$

Tadashi OTA, Hidetoshi KIZAKI, Yoshitada MORIKAWA
Department of Precision Science and Technology, Graduate School of Engineering, Osaka University

December 11–13, 2019

Symposium F-3

Advancements in Thermoelectric Materials and Applications

[Organizers]

Takao MORI (National Institute for Materials Science)
Michihiro OHTA (National Institute of Advanced Industrial Science and Technology)
Lidong CHEN (Shanghai Institute of Ceramics, Chinese Academy of Sciences)
Franck GASCOIN (CRISMAT)
Yuri GRIN (Max Planck Institute for Chemical Physics of Solids)
Yuzuru MIYAZAKI (Tohoku University)
Michitaka OHTAKI (Kyushu University)
Jong-Soo RHYEE (Kyung Hee University)
Jeff SNYDER (Northwestern University)
Tsunehiro TAKEUCHI (Toyota Technological Institute)
Takahiro YAMAMOTO (Tokyo University of Science)

December 11, 2019

Oral Session 1

Time 9:00–12:05 Room Work-2

Chairpersons Takao MORI, Johannes DE BOOR, Yaniv GELBSTEIN

F3-11-K01 ▸Keynote 9:00–9:25

The Effect of Microstructure in Understanding the Electronic Properties of Complex Materials

G. Jeffrey SNYDER
Northwestern

F3-11-I02 ▸Invited 9:25–9:45

Phonon dispersion and scattering in thermoelectrics

Yanzhong PEI
Tongji University

F3-11-I03 ▸Invited 9:45–10:05

New concept to effectively increase *ZT* and development of high-performance Si- Ge based thermoelectric materials

Tsunehiro TAKEUCHI
Toyota Technological Institute

F3-11-I04 ▸Invited 10:05–10:25

Topological and Anderson transition in thermoelectricity

Jong-Soo RHYEE
Kyung Hee University

F3-11-I05 ▸Invited 10:25–10:45

Effect of Phonon Drag on Seebeck Coefficient Based on Linear Response Theory: Application to $FeSb_2$

Masao OGATA[1], Hiroyasu MATSUURA[1], Hideaki MAEBASHI[1], Hidetoshi FUKUYAMA[2]
[1]Department of Physics, University of Tokyo, [2]Science University of Tokyo

F3-11-I06 ▸Invited 10:45–11:05

Optical Properties of Thermoelectric Materials

Peng JIANG
Dalian Institute of Chemical Physics, Chinese Academy of Sciences

F3-11-O07 11:05–11:20

Enhanced thermoelectric properties of Si-Ge by tuning boron concentration and dispersion of Au nanoparticle in Si-Ge matrix synthesized by high-pressure and low-temperature sintering process

Omprakash MUTHUSAMY
Toyota Technological Institute

F3-11-O08 11:20–11:35

Charge density wave and thermoelectric properties in Te-deficient $InTe_{1-\delta}$ compounds

Song Yi BACK[1], Young-Kwang KIM[2], Hyunyong CHO[1], Jong-Soo RHYEE[1]
[1]Kyung Hee University, [2]Pohang University of Science and Technology (POSTECH)

F3-11-O09 11:35–11:50

Locally Distorted Structures with Multiple Anions Realize Ultralow Lattice Thermal Conductivity

Naoki SATO[1], Norihide KURODA[2], Yukari KATSURA[3], Ikuzo KANAZAWA[2], Kaoru KIMURA[3], Takao MORI[1]
[1]WPI-MANA and CFSN, National Institute for Materials Science, [2]Tokyo Gakugei University, [3]The University of Tokyo

F3-11-O10 11:50–12:05

(Micro)Structure – Thermoelectric Properties Relationships In Mesostructured $MnSi_{1.74}$ and β-$FeSi_2$ Prepared By Magnesioreduction

Sylvain LE TONQUESSE[1], Valérie DEMANGE[1], Carmelo PRESTIPINO[1], Vincent DORCET[1], Loïc JOANNY[1], Quansheng GUO[2], David BERTHEBAUD[2], Takao MORI[3], Mathieu PASTUREL[1]
[1]Univ. Rennes, [2]CNRS - Saint-Gobain - NIMS, LINK, [3]National Institute for Materials Science (NIMS)

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Work-2

Chairpersons G. Jeffrey SNYDER, Tsunehiro TAKEUCHI

F3-11-K11 ▸Keynote 14:00–14:25

Challenges Facing the Thermoelectrics Community

Zhifeng REN
University of Houston

F3-11-I12 ▸Invited 14:25–14:45

Towards Magnesium-Silicide Based Thermoelectric Generators: Material Optimization, Contact Development and Prototypes

Johannes DE BOOR
German Aerospace Center (DLR)

F3-11-013 14:45–15:00

Silicides for industrial heat waste recovery

David BERTHEBAUD[1], Quansheng GUO[1,2], Yuichi MICHIUE[2], Franck GASCOIN[3], Sylvain LE TONQUESSE[4], Mathieu PASTUREL[4], Takao MORI[2]
[1]CNRS-Saint Gobain-NIMS, UMI 3629, Laboratory for Innovative Key Materials and Structures (LINK), National Institute for Materials Science, Tsukuba 305-0044, Japan, [2]WPI-MANA & CFSN, NIMS, 1-1 Namiki, Tsukuba 305-0044, Japan, [3]Laboratoire CRISMAT UMR 6508 CNRS ENSICAEN, France, [4]Univ Rennes, CNRS, ISCR-UMR6226, F-35000, Rennes France

F3-11-014 15:00–15:15

Refinement of the Calculated Power Generation Characteristics of a Unileg-type Mg_2Si Thermoelectric Module Using Thermal-electric Analysis

Yuki SHIOJIMA, Takeaki HARADA, Kenki TANI, Tatsuya YAMASHITA, Daishi SHIOJIRI, Tsutomu IIDA
Tokyo University of Science

F3-11-015 15:15–15:30

Conversion Efficiency Of Colusite ($Cu_{26}Nb_2Ge_6S_{32}$)-Based Thermoelectric Element With Au-Based Diffusion Barrier

Raju CHETTY[1], Yuta KIKUCHI[1], Yohan BOUYRIE[1], Priyanka JOOD[1], Atsushi YAMAMOTO[1], Koichiro SUEKUNI[2], Michihiro OHTA[1]
[1]National Institute of Advanced Industrial Science and Technology, [2]Kyushu University

F3-11-016 15:30–15:45

Measurement of thermophysical property distribution by pulsed light heating thermoreflectance method with high spatial resolution

Tetsuya BABA, Naoki SATO, Takahiro BABA, Takao MORI
National Institute of Materials Science

F3-11-017 15:45–16:00

Perspectives of ultra-high temperature thermoelectric materials and applications

Takao MORI
National Institute for Materials Science (NIMS)

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Work-2

Chairpersons Zhifeng REN, Jong-Soo RHYEE

F3-11-I18 ▸Invited 16:30–16:50

Chalcogenides based thermoelectric materials for power generation

Yaniv GELBSTEIN
Ben-Gurion University

F3-11-I19 ▸Invited 16:50–17:10

Thermoelectric Modules for Near Room-temperature Uses Based on N-type $Mg_3Sb_{1.5}Bi_{0.5}$ Materials and P-type $Bi_{0.48}Sb_{1.52}Te_3$

Huaizhou ZHAO
Institute of Physics, Chinese Academy of Sciences

F3-11-I20 ▸Invited 17:10–17:30

Investigation on the stability of liquid-like thermoelectric materials and modules

Pengfei QIU[1], Xun SHI[1], Lidong CHEN[1], Jeffrey SNYDER[2]
[1]Shanghai Institute of Ceramics, Chinese Academy of Sciences, [2]Department of Materials Science and Engineering, Northwestern University

F3-11-021 17:30–17:45

Development Of High-Efficiency Segmented Thermoelectric Systems For Space Applications

Kathleen LEE[1], Jean-Pierre FLEURIAL[1], Sabah BUX[1], Fivos DRYMIOTIS[1], Kurt STAR[1], Ike CHI[1], Kevin YU[1], Obed VILLALPANDO[1], Billy LI[1], Kevin SMITH[1], Dean CHEIKH[1], David UHL[1], Chen-Kuo HUANG[1], Michell ARANDA[1], David NEFF[1], Sutinee SUJITTOSAKUL[1], Emmanuelle DESPAGNET-AYOUB[1], Jong-Ah PAIK[1], Samad FIRDOSY[1], Knut OXNEVUT[1], Vilupanur RAVI[1,2], Frances HURWITZ[3], Dongming ZHU[3], Haiquan GUO[3], Gustavo COSTA[3], Kang LEE[3], Jessica CASHMAN[3], Zi Kui LIU[4], Jorge PAZ SOLDAN PALMA[4], Yi WANG[4], XiaoYu CHONG[4]
[1]NASA Jet Propulsion Laboratory, [2]California State Polytechnic University Pomona, [3]NASA Glenn Research Center, [4]Pennsylvania State University

F3-11-022 17:45–18:00

Development of Thermal Diodes using Unusual Thermoelectric Properties of Ag_2Ch (*Ch* = S, Se, Te)

Keisuke HIRATA, Takuya MATSUNAGA, Masaharu MATSUNAMI, Tsunehiro TAKEUCHI
Toyota Technological Institute

F3-11-023 18:00–18:15

Examination of Fabrication Condition of Thermoelectric Conversion Devices Using Porous Thermoelectric Materials

Yasutaka HASHIMOTO[1], Makoto SASAKI[1], Yohei HIYAMA[1], Takatoshi NAGANO[2], Teruyuki IKEDA[2]
[1]Graduate School of Science and Engineering, Ibaraki University, [2]Department of Materials Science and Engineering, College of Engineering, Ibaraki University

F3-11-024 18:15–18:30

Development of a New Heat Flow Switching Device

Takuya MATSUNAGA, Keisuke HIRATA, Masaharu MATSUNAMI, Tsunehiro TAKEUCHI
Toyota Technological Institute

December 12, 2019

Oral Session 4

Time 9:00–12:05 Room Trade-1

Chairpersons Franck GASCOIN, Dario NARDUCCI, Prashun GORAI

F3-12-K01 ▸Keynote 9:00–9:25

Chemical bonding and thermoelectrics

Yuri GRIN
Max-Planck-Institut für Chemische Physik fester Stoffe

F3-12-I02 ▸Invited 9:25–9:45

How Far Can Chemists Go Toward High *ZT*

Ling CHEN, Li-Ming WU
Beijing Normal University

F3-12-I03 ▸Invited 9:45–10:05

Combined use of Alloying and Interstitials to Enhance the Performance of TiNiSn-based Half-Heuslers

Jan-Willem BOS[1], Sonia BARCZAK[1], Robert QUINN[1], Srinivas POPURI[1], John HALPIN[2], Donald MACLAREN[2], Kamil DOMOSUD[3], Keith REFSON[3]
[1]Heriot-Watt University, [2]University of Glasgow, [3]Royal Holloway University London

F3-12-I04 ▸Invited 10:05–10:25

From bulk to film: largely enhanced thermoelectric performance in full Heusler systems

Ernst BAUER[1], Bernhard HINTERLEITNER[1], Takao MORI[2], Xingqiu CHEN[3]
[1]TU Wien, [2]Institute for Materials Science, NIMS, [3]Shenyang National Laboratory for Materials Science

F3-12-O05 10:25–10:40

Ru-substitution effects on the crystal and electronic structures, and thermoelectric properties of half-Heusler-type VFeSb compounds

Yi HUANG, Kei HAYASHI, Yuzuru MIYAZAKI
Tohoku University

F3-12-I06 ▸Invited 10:40–11:00

$CoGe_{1.5}Te_{1.5}$ Skutterudites for Thermoelectric Performance

Kuei-Hsien CHEN[1]
[1]Institute of Atomic and Molecular Sciences, Academia Sinica, [2]Center for Condensed Matter Sciences, National Taiwan University, [3]Taiwan International Graduate Program, Academia Sinica

F3-12-O07 11:00–11:15

Power factor and wettability of the filled skutterudite $Sm_y(Fe_xNi_{1-x})_4Sb_{12}$

Giovanna LATRONICO
Shibaura Institute of Technology

F3-12-O08 11:15–11:30

Effect of non-equilibrium processing on the synthesis and thermoelectric properties of skutterudites and half Heusler compounds

Alberto CASTELLERO[1], Francesco AVERSANO[1], Stefano BOLDRINI[2], Alberto FERRARIO[2], Carlo FANCIULLI[3], Marcello BARICCO[1]
[1]University of Turin, [2]CNR – ICMATE, Padova, [3]CNR – ICMATE, Lecco

F3-12-I09 ▸Invited 11:30–11:50

Exceptional Thermoelectric Performance of Polycrystalline SnSe Materials

In CHUNG[1,2]
[1]Seoul National University, [2]Nanoparticle Research Center, Institute for Basic Science

F3-12-O10 11:50–12:05

Study on thermoelectric properties of co-evaporated Sn-Se films with different phase formations

Guojian LI, Baohai JIA, Shiying LIU, Shan LIU, Yaoyao ZHOU, Qiang WANG
Northeastern University

December 12, 2019

Oral Session 5

Time 14:00–16:10 Room Work-2

Chairpersons Yuri GRIN, In CHUNG

F3-12-I11 ▸Invited 14:00–14:20

Ionic Pnictides for High Temperature Applications

Franck GASCOIN
CRISMAT laboratory, CNRS, ENSICAEN

F3-12-I12 ▸Invited 14:20–14:40

Beyond the Known: Computational Discovery of New *n*-type Zintl Thermoelectric Materials

Prashun GORAI
Colorado School of Mines

F3-12-I13 ▸Invited 14:40–15:00

Thermoelectric Properties of Ternary Thallium Tellurides

Holger KLEINKE
University of Waterloo

F3-12-I14 ▸Invited 15:00–15:20

Silicon Reloaded: Novel Perspectives of Si as a Thermoelectric Material

Dario NARDUCCI
University of Milano Bicocca

F3-12-I15 ▸Invited 15:20–15:40

Ag$_2$Se and PbTe thermoelectrics- High performance materials and modules for room temperature to mid-temperature applications.

Priyanka JOOD[1], Atsushi YAMAMOTO[1], G. Jeffrey SNYDER[2], Mercouri G. KANATZIDIS[3,4], Michihiro OHTA[1]
[1]Research Institute for Energy Conservation, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, 305-8568, Japan, [2]Department of Materials Science & Engineering, Northwestern University, Evanston, 60208, USA, [3]Department of Chemistry, Northwestern University, Evanston, 60208, USA, [4]Materials Science Division, Argonne National Laboratory, Argonne, 60439, USA

F3-12-O16 15:40–15:55

Enhancing the transport properties of $Bi_2Te_{3-x}Se_x$ alloys for thermoelectric power generation applications via melt-spinning

Omer MEROZ
Ben Gurion University of the Negev

F3-12-O17 15:55–16:10

Enhanced thermoelectric performance of p-type Bi_2Te_3-based alloys reprocessed from commercial ingot by nano SiC dispersion

Bowen CAI
Tsinghua University

December 13, 2019

Oral Session 7

Time 9:00–12:05 Room Work-2

Chairpersons Koji MIYAZAKI, Kedar HIPPALGAONKAR, Naohito TSUJII

F3-13-K01 ▸Keynote 9:00–9:25

Synergistic control of electrical and thermal transport property in thermoelectric nanocomposites

Jing-Feng LI
Tsinghua University

F3-13-I02 ▸Invited 9:25–9:45

Link the relationship between structure and thermoelectric property through atomic observation

Zhigang CHEN
University of Southern Queensland

F3-13-I03 ▸Invited 9:45–10:05

A high-throughput approach to thermoelectric materials with enhanced properties in complex material systems

Teruyuki IKEDA
Ibaraki University

F3-13-I04 ▸Invited 10:05–10:25

Defects And Their Influence On The Thermoelectric Properties Of Materials: An *Ab Initio* Study

Philippe JUND, Alexandre BERCHE
University of Montpellier

F3-13-I05 ▸Invited 10:25–10:45

First-Principles Thermoelectric Calculations of Magnetic Semiconductors

Hirokazu TAKAKI[1,2], Kazuaki KOBAYASHI[2], Masato SHIMONO[2], Nobuhiko KOBAYASHI[1], Kenji HIROSE[3], Naohito TSUJII[2], Takao MORI[2]
[1]University of Tsukuba, [2]National Institute for Materials Science, [3]NEC corporation

F3-13-I06 ▸Invited 10:45–11:05

First Principles Simulations of Thermoelectric Transport in n-type PbTe

Ivana SAVIC[1], Jiang CAO[1,2], Jose D. QUERALES-FLORES[1], Stephen FAHY[1,3]
[1]Tyndall National Institute, Cork, T12 R5CP, Ireland, [2]Department of Electronic and Optical Engineering, Nanjing University of Science and Technology, Nanjing, 210094, China, [3]Department of Physics, University College Cork, Cork, T12 K8AF, Ireland

F3-13-O07 11:05–11:20

Development of high-performance thermoelectric materials of rock-salt IV-VI compounds guided by large-scale experimental data and first-principle calculation

Takushi KODANI[1]
[1]The University of Tokyo, [2]National Institute for Materials Science (NIMS)

F3-13-O08 11:20–11:35

First-Principles Study of Thermoelectric Properties of Iodide Perovskite

Satoshi IIKUBO, Kumiko YAMAMOTO, Shoya KAWANO, Masayuki MORIMOTO, Koji MIYAZAKI
Kyushu Institute of Technology

F3-13-O09 11:35–11:50

Discovery of Colossal Seebeck Effect in Metallic Cu_2Se

Dogyun BYEON[1], Robert SOBOTA[1], Kevin DELIME-CODRIN[1], Seongho CHOI[1], Keisuke HIRATA[1], Masahiro ADACHI[2], Makoto KIYAMA[2], Takashi MATSUURA[2], Yoshiyuki YAMAMOTO[2], Masaharu MATSUNAMI[1], Tsunehiro TAKEUCHI[1]
[1]Toyota Technological Institute, [2]Sumitomo Electric Industries, Ltd.

F3-13-O10 11:50–12:05

Entropy-Driven Formation of Cubic Structure GeTe

ZIHANG LIU
National Institute for Materials Science

December 13, 2019

Oral Session 8

Time 14:00–16:10 Room Work-2

Chairpersons Zhigang CHEN, Teruyuki IKEDA

F3-13-K11 ▸Keynote 14:00–14:25

Printed Flexible Thermoelectric Device of the Bismuth Telluride based Composite

Koji MIYAZAKI[1], Shirikant SAINI[1], Satoshi IIKUBO[1], Ajay Kumar BARANWAL[2], Shuzi HAYASE[1]

[1]Kyushu Institute of Technology, [2]The University of Electro-Communications

F3-13-I12 ▸Invited 14:25–14:45

Thermoelectric Properties of van der Waals Materials

Taishi TAKENOBU

Nagoya University

F3-13-I13 ▸Invited 14:45–15:05

New horizons in Thermoelectric Materials: inorganic-organic hybrids and machine learning for inorganic crystals

Kedar HIPPALGAONKAR

Institute of Materials Research and Engineering, A*Star

F3-13-I14 ▸Invited 15:05–15:25

Thermoelectric Materials Made from Molecularly-doped Semiconducting Carbon Nanotube Networks

Yoshiyuki NONOGUCHI

Nara Institute of Science and Technology

F3-13-O15 15:25–15:40

Flexible Inorganic Thermoelectric Materials $Ag_2(S_{1-x}Se_x)$

Saurabh SINGH, Keisuke HIRATA, Takuya MATSUNAGA, Dogyun BYEON, Masaharu MATSUNAMI, Tsunehiro TAKEUCHI

Toyota Technological Institute

F3-13-O16 15:40–15:55

Interface Engineering for solution processed $CsSnI_3$ thermoelectric film

Ajay Kumar BARANWAL[1], Shrikant SAINI[2], Daisuke HIROTANI[3], Tomohide YABUKI[2], Satoshi IIKUBO[3], Koji MIYAZAKI[2], Shuzi HAYASE[1]

[1]The University of Electro-Communications, 1-5-1 Chofugaoka, Chofu, Tokyo, 182-1515, Japan, [2]Kyushu Institute of Technology, 1-1 Sensuicho, Tobata, Kitakyushu, 804-8550, Japan, [3]Kyushu Institute of Technology, 2-4 Hibikino, Wakamatsu, Kitakyushu, 808-0196, Japan

F3-13-O17 15:55–16:10

Activated reactive consolidation as a new approach to fabricate highly pure intermetallic thermoelectric materials

Babak ALINEJAD, Yuma YAMAMOTO, Teruyuki IKEDA

Ibaraki University

December 13, 2019

Oral Session 9

Time 16:30–18:45 Room Work-2

Chairpersons Michihiro OHTA, Yoshiyuki NONOGUCHI

F3-13-I18 ▸Invited 16:30–16:50

Study on Thermoelectric Transport Properties of Tetrahedrite and Chalcopyrite based compounds

Xiaoyuan ZHOU

Chongqing University

F3-13-I19 ▸Invited 16:50–17:10

Enhanced Thermoelectric Property by use of Magnetic Interaction

Naohito TSUJII, Takao MORI

National Institute for Materials Science

F3-13-O20 17:10–17:25

Substitution Effect on Thermoelectric Properties of $CePd_3$

Fumitake OGAWA, Masaharu MATSUNAMI, Tsunehiro TAKEUCHI

Toyota Technological Institute

F3-13-O21 17:25–17:40

Thermoelectric properties of Ba substituted $SrSi_2$, $Sr_{1-x}Ba_xSi_2$

Motoharu IMAI, Shiva K. SINGH

National Institute for Materials Science

F3-13-I22 ▸Invited 17:40–18:00

Could ZnO Meet the Expectations for Thermoelectric Properties - What Needs to Be Done?

Slavko BERNIK[1], Guorong LI[2], Emmanuel GUILMEAU[3]

[1]Jožef Stefan Institute, [2]Shanghai Institute of Ceramics, Chinese Academy of Science, [3]CRISMAT/ENSICAEN Laboratory

F3-13-O23 18:00–18:15

Joint improvement of conductivity and Seebeck coefficient of atomic source assisted evaporated ZnO:Al films

Shiying LIU

Northeastern University

F3-13-O24 18:15–18:30

Doping of CaCo- and CaMn-Ceramics improves thermoelectric conversion efficiency

Wilfried WUNDERLICH[1], Helmut T. UCHIDA[2]

[1]Tokai University, Material Science Department, [2]Tokai University, Department Precision Eng.

F3-13-O25 18:30–18:45

Thermoelectric properties of $(Pr, Nd, Sm)_{1-x}Sr_xFeO_3$ $(0.1 \leqq x \leqq 0.5)$ oxides

Hiroshi NAKATSUGAWA[1], Shunta KAZAMA[1], Miwa SAITO[2], Yoichi OKAMOTO[3]

[1]Yokohama National University, [2]Kanagawa University, [3]National Defense Academy

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

F3-11-P01

Magnetic coupling contributing to the enhanced thermoelectric performance of $TiFe_2Sn$ Heusler alloys

Weihong GAO, Naohito TSUJII, Ramalingam Suresh KUMAR, Zihang LIU, Takao MORI
National Institute for Materials Science (NIMS)

F3-11-P02

Development of high performance thermoelectric thin films based on rare earth-free $CoSb_3$-Skutterudite

Cédric BOURGÈS, Isao OHKUBO, Naohito TSUJII, Takao MORI
National Institute for Materials Science (NIMS)

F3-11-P03

Low thermal conductivity and promising thermoelectric performance in A_xCoSb (A = V, Nb or Ta) half-Heuslers with inherent vacancies

Jan-Willem BOS[1], Daniella FERLUCCIO[1], Robert QUINN[1], John HALPIN[2], Donald MACLAREN[2]
[1]Heriot-Watt University, [2]University of Glasgow

F3-11-P04

Mg-pressure-controlled Annealing for Precise Control of Mg Content and Thermoelectric Properties of Mg_2Si-based Materials

Daisuke KATO[1], Kouta IWASAKI[1], Masahito YOSHINO[2], Tomoaki YAMADA[2], Takanori NAGASAKI[2]
[1]Toyota Boshoku Corporation, [2]Department of Energy Engineering, Nagoya University

F3-11-P05

Thermoelectric Performance of n-type Mg_2Si Grown by the Vertical Bridgman Method

Yuki KAYAMA, Seiya YAMAGUCHI, Takuya KODAMA, Hiroto HAMBA, Daishi SHIOJIRI, Tsutomu IIDA
Tokyo University of Science

F3-11-P06

Enhanced Thermoelectric Performance through Crystal Field Engineering in Transition Metal Doped GeTe

JING SHUAI
National Institute for Materials Science

F3-11-P07

Investigation of Thermoelectric Property of In_2Te_5 and The Origin of its Low Thermal Conductivity

Wenhao ZHANG[1,2], Naoki SATO[1], Takao MORI[1,2], Kaoru KIMURA[3], Kazuki TOBITA[3]
[1]National Institute of Material Science, [2]University of Tsukuba, [3]University of Tokyo

F3-11-P08

Chalcogenide-based Thermoelectrics: from Glasses and Ceramics to High Temperature Refractory Rare-Earth Materials

Bhuvanesh SRINIVASAN[1], David BERTHEBAUD[1], Franck GASCOIN[2], Catherine BOUSSARD-PLEDEL[3], Michael J. REECE[4], Bruno BUREAU[3], Takao MORI[5]
[1]CNRS-Saint Gobain-NIMS, UMI 3629, Laboratory for Innovative Key Materials and Structures (LINK), National Institute for Materials Science, Tsukuba 305-0044, Japan, [2]Laboratoire CRISMAT, Normandie Univ., ENSICAEN, UNICAEN, CNRS, 14000 Caen, France, [3]Univ. Rennes, CNRS, ISCR – UMR 6226, F-35000 Rennes, France, [4]Queen Mary University of London, London E1 4NS, UK, [5]WPI International Center for Materials Nanoarchitechtonics (WPI-MANA) and Center for Functional Sensor & Actuator (CFSN), National Institute for Materials Science (NIMS), Tsukuba 305-0044, Japan

F3-11-P09

First-principles Study on the Thermoelectric Performance of $LaO(PbS)BiS_2$ and Its Possible Enhancement in Analogous Compounds

Keiya KUREMATSU[1], Masayuki OCHI[1], Hidetomo USUI[2], Kazuhiko KUROKI[1]
[1]Osaka University, Japan, [2]Shimane University, Japan

F3-11-P10

Electron-phonon Scattering Effect on the Transport Properties of TiS_2: A First-principles Study

Hitoshi MORI[1], Masayuki OCHI[1], Hidetomo USUI[2], Kazuhiko KUROKI[1]
[1]Osaka University, [2]Shimane University

F3-11-P11

Experimental and theoretical investigations of thermoelectric properties of doped thiospinel $CuCr_2S_4$

Paulina KAMIŃSKA, Piotr ŚPIEWAK, Wojciech ŚWIĘSZKOWSKI
Faculty of Materials Science and Engineering, Warsaw University of Technology

F3-11-P12

Compositional Dependence Of The Thermoelectric Properties Of The Higher Boride REB_{66}

Philipp SAUERSCHNIG[1,2], Kantaro TSUCHIYA[1,2], Takaho TANAKA[1], Yuichi MICHIUE[1], Jean-Baptiste VANEY[1], Takashi AIZAWA[1], Toetsu SHISHIDO[3], Takao MORI[1,2]
[1]National Institute for Materials Science (NIMS), International Center for Materials Nanoarchitectonics (WPI-MANA), Namiki 1-1, Tsukuba 305-0044, Japan, [2]University of Tsukuba, Graduate School of Pure and Applied Sciences, 1-1-1 Tennoudai, Tsukuba 305-8671, Japan, [3]New Industry Creation Hatchery Center, Tohoku University, Sendai 980–8579, Japan

F3-11-P13

Fabrication of P-type Antimony Telluride Nanoparticles via Spontaneous Oxidation-Reduction Reaction

JUNYOUNG PARK, MASAYUKI TAKASHIRI
TOKAI UNIVERSITY

F3-11-P14

A Study on the Thermoelectric Performance and Stability of Cu_2Se-Reduced Graphene Oxide Composites

SeungHyun JIN[1], Jang-Yeul TAK[2], Woo Hyun NAM[2], YoungSoo LIM[1]
[1]Pukyoung National University, Busan, 48547, Korea, [2]Korea Institute of Ceramic Engineering and Technology, Jinju, 52851, Korea

F3-11-P15

Thermal Transport Properties of Single-Crystalline Bi_2Te_3 Nanoplate Films Determined by 3ω Method

Ryotaro MORI[1], Norimasa OGA[1], Takuya KUROKAWA[1], Saburo TANAKA[2], Koji MIYAZAKI[3], Masayuki TAKASHIRI[1]
[1]Graduate School of Engineering, Tokai University, [2]College of Engineering, Nihon University, [3]Graduate School of Engineering, Kyushu Institute of Technology

F3-11-P16

Influence of exchange-correlation functional and potential on thermoelectric transport calculations of d^0 perovskite oxides

Isao OHKUBO, Takao MORI
National Institute for Materials Science (NIMS)

F3-11-P17

Investigation of Interfacial Effect on Thermoelectric Properties of TiO_2 Based Layered Composite Materials

Hyoung-Won SON[1,2], Naoki SATO[1], Takao MORI[1,2]
[1]National Institute for Materials Science, [2]University of Tsukuba

F3-11-P18

Structural Characterization and Thermoelectric Properties of Composite Materials $(Ga,Al)_2O_3(ZnO)_m$-ZnO:Ga,Al

Yuichi MICHIUE[1], Hyoung-Won SON[1,2], Takao MORI[1,2]
[1]National Institute for Materials Science, [2]University of Tsukuba

F3-11-P19

Density Functional Calculations of Thermoelectricity using Nonequilibrium Green's Function Method

Nobuhiko KOBAYASHI[1], Hirokazu TAKAKI[1], Kenji HIROSE[2]
[1]University of Tsukuba, [2]NEC

F3-11-P20

NEGF+DFT Simulation on Thermoelectric Properties of Nitrogen-doped Carbon Nanotubes

Manaho MATSUBARA
Tokyo University of Science

F3-11-P21

Molecular Dynamics Study of Thermal Conducting Behavior in Nano Multilayer Films

Masato SHIMONO[1], Hirokazu TAKAKI[1,2], Kazuaki KOBAYASHI[1], Nobuhiko KOBAYASHI[2], Kenji HIROSE[3]
[1]National Institute for Materials Science, [2]University of Tsukuba, [3]Smart Energy Research Laboratories, NEC corporation

F3-11-P22

Theoretical Study on Thermoelectric Effects of Polycrystalline Bilayer Graphene

Hikaru HORII[1], Kenji SASAOKA[2], Takahiro YAMAMOTO[1,2], Hidetoshi FUKUYAMA[3]
[1]Faculty of Engineering, Tokyo University of Science, [2]RIST, Tokyo University of Science, [3]Tokyo University of Science

F3-11-P23

Thermoelectric Simulation for Carbon Nanotube film

Kotaro FUJISAKI
Tokyo University of Science

F3-11-P24

Electronic Band Structure of Various TiN (ScN) dot/MgO Superlattices

Kazuaki KOBAYASHI[1], Hirokazu TAKAKI[1,2], Masato SHIMONO[3], Nobuhiko KOBAYASHI[2], Kenji HIROSE[4]
[1]International Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science, [2]Institute of Applied Physics, University of Tsukuba, [3]Research Center for Structural Materials (RCSM), National Institute for Materials Science, [4]Smart Energy Research Laboratories, NEC corporation

F3-11-P25

MBE Fabrication of Magnesium Stannide Thin Films

Mariana LIMA[1,2], Takashi AIZAWA[1], Takeaki SAKURAI[2], Isao OHKUBO[1], Cedric BOURGES[1], Tetsuya BABA[1], Naoki SATOH[1], Takao MORI[1]
[1]National Institute for Materials Science, Tsukuba, 305-0044, Japan, [2]University of Tsukuba, Tsukuba, 305-8577, Japan

F3-11-P26

Fabrication and evaluation of magnetic chalcopyrite thermoelectric thin films

Hong PANG[1], Cédric BOURGÈS[1], Naohito TSUJII[1], Takao MORI[1,2]
[1]National Institute for Materials Science (NIMS), [2]University of Tsukuba, Graduate School of Pure and Applied Sciences

F3-11-P27

Thermoelectric Properties of Unfilled Skutterudite-Organic Hybrid Composite

Fainan FAILAMANI[1], Takao MORI[1,2]
[1]National Institute for Materials Science, [2]Graduate School of Pure and Applied Sciences, University of Tsukuba

F3-11-P28

Gate-tuned Thermoelectric Performances in Aligned Conducting Polymers

Katsuya WATANABE[1], Kaito KANAHASHI[2], Naoya TAKEKOSHI[1], Hisaaki TANAKA[1], Hiroshi ITO[1], Hiromichi OHTA[3], Taishi TAKENOBU[1,2]
[1]Nagoya University, [2]Waseda University, [3]Hokkaido University

F3-11-P29

Thermoelectric Properties of Carbon Nanotube with Local Distortion Deformation

Keiichiro MATSUMOTO, Takahiro YAMAMOTO
Tokyo University of Science

F3-11-P30

Ni-Based Alloy Thermoelectric Module As a Reliable Testing Reference For Power Generation

Raju CHETTY[1], Kazuo NAGASE[1], Makoto AIHARA[1], Priyanka JOOD[1], Hiroyuki TAKAZAWA[1,2], Michihiro OHTA[1], Atsushi YAMAMOTO[1]
[1]National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan, [2]Thermal Management Materials and Technology Research Association (TherMAT), Tokyo, Japan

F3-11-P31

Nanostructured PbTe- and Colusite-based Thermoelectric Power Generation: Materials and Modules

Michihiro OHTA[1], Raju CHETTY[1], Priyanka JOOD[1], Atsushi YAMAMOTO[1], Koichiro SUEKUNI[2], Mercouri G. KANATZIDIS[3]
[1]National Institute of Advanced Industrial Science and Technology (AIST), [2]Kyushu University, [3]Northwestern University and Argonne National Laboratory

December 13, 2019

Symposium F-4

Synchrotron X-ray Probes for Mesoscale Materials Science

[Organizers]

Yoshiharu SAKURAI (Japan Synchrotron Radiation Rserach Institute)
Toyohiko KINOSHITA (Japan Synchrotron Radiation Reserach Institute)
Di-Jing Huang (National Synchrotron Radiation Research Center)
Veijo Honkimäki (Europian Synchrotron Radiation Facility)
Chiu Tang (Diamond Light Source)

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Oral Session 7

Time 9:30–11:40 Room Port-4

Chairperson Toyohiko KINOSHITA

Introduction: Yoshiharu Sakurai
9:30–9:40

F4-13-I01 ▸Invited 9:40–10:10
Science Frontiers Developed by Diffraction-Limited Synchrotron Light Sources
Makina YABASHI
RIKEN SPring-8 Center

F4-13-I02 ▸Invited 10:10–10:40
X-ray Nano-Imaging at ESRF
Peter CLOETENS
ESRF

F4-13-I03 ▸Invited 10:40–11:10
XTIP – A dedicated beamline for synchrotron X-ray scanning tunneling microscopy
Nozomi SHIRATO, Michael FISHER, Ruben REININGER, Volker ROSE, Saw-wai HLA
Argonne National Laboratory

F4-13-I04 ▸Invited 11:10–11:40
X-ray studies of strong dimer phase in Li_2RuO_3
Je-Geun PARK
Seoul National University

December 13, 2019

Oral Session 8

Time 14:00–16:00 Room Port-4

Chairperson Yoshiharu SAKURAI

F4-13-I05 ▸Invited 14:00–14:30
Phase Transition Analysis of Lithium-ion Battery Cathodes by Using Time-Resolved X-ray Diffraction and Improvement of Rate Capability
Yoshiharu UCHIMOTO
Kyoto University

F4-13-I06 ▸Invited 14:30–15:00
In-situ studies of supercapacitors in operando condition using synchrotron X-ray
Yan-Gu LIN
National Synchrotron Radiation Research Center

F4-13-I07 ▸Invited 15:00–15:30

The Impacts of Synchrotron Characterization on Porous Absorbents and Catalysts

Shik Chi Edman TSANG
University of Oxford

F4-13-I08 ▸Invited 15:30–16:00

Identification of Ferrimagnetic Orbitals Preventing Jahn-Teller Distortions in $Li_xMn_2O_4$ Cathodes

Bernardo BARBIELLINI
LUT University (Finland)

December 13, 2019

Oral Session 9

Time 16:30–18:20 Room Port-4

Chairperson Di-Jing HUANG

F4-13-I09 ▸Invited 16:30–17:00

Multi-scale 3D Imaging of Strain and Structure with Dark-Field X-Ray Microscopy

Hugh SIMONS
Technical University of Denmark

F4-13-I10 ▸Invited 17:00–17:30

Intragranular 3D orientation and stress mapping for bulk steel

Yujiro HAYASHI
Toyota Central R&D Labs., Inc.

F4-13-O11 17:30–17:55

Hard X-ray Ptychography and Multi-Shot Coherent Diffraction Imaging with Coherent Projection Illumination Optics

Yuki TAKAYAMA[1], Keizo FUKUDA[1], Motoki KAWASHIMA[1], Yuki AOI[1], Shotaro OKA[2], Hiroshi ONO[2], Tatsuki AKADA[1], Takumi IKEDA[1], Yasushi KAGOSHIMA[1]
[1]University of Hyogo, [2]Toshiba Corporation

F4-13-O12 17:55–18:20

High-energy x-ray nano-CT for nondestructive multiscale 3D/4D imaging

Akihisa TAKEUCHI
JASRI / Japan

December 13, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

F4-13-P01

Direct observation of nucleation process of magnetic vortex structure by means of time-resolved photoemission electron microscopy

Takuo OHKOCHI[1,2], Masaki OURA[2], Hitoshi OSAWA[1], Akinobu YAMAGUCHI[2,3], Hidenori FUJIWARA[2,4], Akira SEKIYAMA[2,4], Toyohio KINOSHITA[1]
[1]Japan Synchrotron Radiation Research Institute, [2]RIKEN/SPring-8, [3]University of Hyogo, [4]Osaka University

F4-13-P02

Detecting Intramolecular Dynamics of GPCRs in Living Cells Using Diffracted X-ray Blinking Technique

Masaki ISHIHARA[1], Shoko FUJIMURA[2], Kouhei ICHIYANAGI[3,4], Shunsuke NOZAWA[3], Shinichi ADACHI[3], Ryo FUKAYA[3], Masahiro KURAMOCHI[1,2], Kazuhiro MIO[2], Yuji C SASAKI[1,2]
[1]Graduate School of Frontier Sciences, The Univ. Tokyo, [2]Operand OIL, National Institute of Advanced Industrial Science and Technology, [3]High Energy Accelerator Research Organization, [4]Jichii Medical Univ.

F4-13-P03

Detector Saturation by Infrared Synchrotron Radiation and Infrared Free Electron Laser Light Sources

Yuka IKEMOTO[1], Heishun ZEN[2]
[1]Japan Synchrotron Radiation Research Institute/Japan, [2]Kyoto University

F4-13-P04

Study on mechanism and control of uniaxial magnetic anisotropy induced in the ferromagnetic/ferroelectric heterojunction using XMCD-PEEM and XPS

Akinobu YAMAGUCHI[1,4], Ryo NAKAMURA[1,4], Shunya SAEGUSA[1,4], Aiko NAKAO[1], Yuichi UTSUMI[1], Keisuke YAMADA[2], Takuo OHKOCHI[3,4], Toyohiko KINOSHITA[3], Masaki OURA[4]
[1]University of Hyogo, [2]Gifu University, [3]Japan Synchrotron Radiation Research Institute, [4]RIKEN, SPring-8 Center

F4-13-P05

X-ray Absorption Spectroscopy investigation and computer simulation of Manganese Lithium borate-based glass

Pattarpong NIJAPAI
Suranaree University of Technology

F4-13-P06

Spin/orbital magnetization switching behaviour for CoFeB/MgO and CoFeB/Ta interface

Hiroshi SAKURAI[1], Kento HAISHI[1], Akane SHIBAYAMA[1], Kosuke SUZUKI[1], Kazushi HOSHI[1], Naruki TSUJI[2], Yoshiharu SAKURAI[2]
[1]Gunma University, [2]Japan Synchrotron Radiation Research Institute

F4-13-P07

Spin-Orbit Assisted Correlated Materials at High Pressure: Novel Phases and Phenomena

Yang DING
HPSTAR

F4-13-P08

Non-destructive Visualization of Lithiation State in the Real Batteries using Compton Scattering Imaging

Kosuke SUZUKI
Gunma University

F4-13-P09

Data driven analysis of the redox factor of $Li_xNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ based on feature selection from *in-situ* XAFS/XRD data by machine-learning

Takuya MORI[1], Takashi SEGI[1], Takayuki TSUBOTA[1], Lei LI[2], Kazushi YOKOYAMA[2]
[1]Kobelco research institute, inc., [2]Hyogo Science and Technology Associations

F4-13-P10

In-situ/Operando Synchrotron Radiation X-ray-based Multi-analytical Measurements for Polymer Electrolyte Fuel Cells

Kotaro HIGASHI[1], Oki SEKIZAWA[1,2], Tomohiro SAKATA[1], Takuma KANEKO[1], Nozomu ISHIGURO[3], Mizuki TADA[4], Tomoya URUGA[1,2], Yasuhiro IWASAWA[1]
[1]The University of Electro-Communications, [2]Japan Synchrotron Radiation Research Institute, [3]RIKEN Harima Branch, [4]Nagoya University

F4-13-P11

Soft x-ray microbeam ARPES and High-Resolution RFA: New Photoemission Endstations at BL25SU of SPring-8

Takayuki MURO
Japan Synchrotron Radiation Research Institute

F4-13-P12

Direct Observation of Anion Redox in Li-excess Oxides with Different Covalent and Ionic Characters by *operando* Soft/Hard X-ray Absorption Spectroscopy

Kentaro YAMAMOTO
Kyoto University

F4-13-P13

Reaction Distribution Analysis of Rechargeable Batteries using Two-dimensional X-ray Probe

Yuki ORIKASA
Ritsumeikan University

Cluster G

Materials for Smart Systems

Symposium

G-1 In-field Molecules for Next-generations Flexible Electronics

G-2 5th E&J BLS Materials Frontier for Transparent Advanced Electronics

G-3 Perovskite and Metal Halide Materials Based Photovoltaics and Optoelectronics

G-4 Plasmonic Materials: from Fundamentals to Applications

G-5 Synchrotron X-ray Characterization of Function Material Thin Films and Fine Particles

December 13, 2019

Symposium G-1

In-field Molecules for Next-generations Flexible Electronics

[Organizers]

Tsuyoshi SEKITANI (Osaka University)
Hiroshi YAMAMOTO (Institute for Molecular Science)

December 13, 2019

Oral Session 8

Time 14:00–16:20 Room Work-3

Chairperson Hiroshi YAMAMOTO

G1-13-I01 ▸Invited 14:00–14:20

Chiral Molecules Based Simple Spintronics

Yossi PALTIEL

The Hebrew University of Jerusalem

G1-13-I02 ▸Invited 14:20–14:40

A hidden role of the smallness of the material in flexible devices

Fumitaka KAGAWA

University of Tokyo & RIKEN CEMS

G1-13-O03 14:40–15:00

Carrier Transport in Hybrid PbS Colloidal Quantum Dot Transistors with Thiophene-Based Crosslinking Ligands

Ibuki WATANABE[1], Liming LIU[1], Satria Zulkarnaen BISRI[2], Ian JOHNSON[3], Yasuhiro ISHIDA[2], Jeremy BURROUGHES[3], Yoshihiro IWASA[1,2]

[1]University of Tokyo, [2]RIKEN-Center for Emergent Matter Science, [3]Cambridge Display Technolgy

G1-13-I04 ▸Invited 15:00–15:20

Effects of Dephasing upon Quantum Dynamical Phenomena in Condensed Phase Molecular Processes

Akihito ISHIZAKI

Institute for Molecular Science, National Institutes of Natural Sciences

G1-13-I05 ▸Invited 15:20–15:40

Gate- and strain-induced superconductivity in an organic strongly correlated transistor

Yoshitaka KAWASUGI[1,2], Kazuhiro SEKI[3], Jiang PU[4], Taishi TAKENOBU[4], Seiji YUNOKI[2,3], Hiroshi YAMAMOTO[5], Reizo KATO[2]

[1]Toho University, [2]RIKEN, [3]RIKEN CEMS, [4]Nagoya University, [5]Institute for Molecular Science

G1-13-I06 ▸Invited 15:40–16:00

Development of Organic-semiconductor injection laser

Hidekazu SHIMOTANI[1], Kanagasekaran THANGAVEL[2], Shun ONUKI[1], Taiki MIURA[1], Katsumi TANIGAKI[1,2]

[1]Dept. Physics, Tohoku University, [2]AIMR, Tohoku University

G1-13-O07 16:00–16:20

Biocompatible gel for EEG measurement with high S/N ratio

Yuki NODA, Hirokazu IIDA, Toshikazu NEZU, Teppei ARAKI, Shunsuke YOSHIMOTO, Tsuyoshi SEKITANI

Osaka University

December 13, 2019

Oral Session 9

Time 16:30–18:30 Room Work-3

Chairperson Tsuyoshi SEKITANI

G1-13-I08 ▸Invited 16:30–16:50

Artificial Intelligence-Nanopore for Infection Control

Masateru TANIGUCHI

Osaka University

G1-13-I09 ▸Invited 16:50–17:10

Ultra-flexible Organic photonic system

Tomoyuki YOKOTA, Takao SOMEYA

The University of Tokyo

G1-13-O10 17:10–17:30

Biosignal Monitoring Systems with Bio-Conformable Organic Amplifier

Takafumi UEMURA[1,2], Naoko NAMBA[1,2], Masaya KONDO[1,2], Masahiro SUGIYAMA[1,2], Mihoko AKIYAMA[1], Shusuke YOSHIMOTO[1], Yuki NODA[1], Teppei ARAKI[1,2], Tsuyoshi SEKITANI[1,2]

[1]The Institute of Scientific and Industrial Research, Osaka University, [2]Advanced Photonics and Biosensing Open Innovation Laboratory, AIST

G1-13-I11 ▸Invited 17:30–17:50

Understanding and Designing High-Performance Thin-Film Transistors with Heterostructures

Chuan LIU

Sun Yat-sen University

G1-13-O12 17:50–18:10

The Effect of Energy Levels on Doping Processes in Organic Semiconductors

Ross WARREN[1], Alberto PRIVITERA[1], Moritz RIEDE[1], Jenny NELSON[2]

[1]University of Oxford, [2]Imperial College London

G1-13-O13 18:10–18:30

Flexible and Transparent Electrodes toward Implantable Electronics

Teppei ARAKI, Yuki NODA, Takafumi UEMURA, Shusuke YOSHIMOTO, Shintaro IZUMI, Tsuyoshi SEKITANI

Osaka University

December 13, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

G1-13-P01

Role of the molecular configuration on the electronic structure of organic crystals: A combined DFT and GW study

Susumu YANAGISAWA[1], Ikutaro HAMADA[2]
[1]University of the Ryukyus, [2]Osaka University

G1-13-P02

Advancement of two-ply CNT Yarn supercapacitor properties by wet coated molybdenum oxide

Tatsuki MARUI, Yuta NISHINA, Masaki HADA, Takeshi NISHIKAWA, Yoshifumi YAMASHITA, Yasuhiko HAYASHI
Okayama University

G1-13-P03

Structure changing of residual amorphous carbon in twisted Double-Helix carbon nanotube yarns by joule heating

Shogo IEMOTO[1], Tomohiro NAKAGAWA[1], Hirotaka INOUE[1], Karthik Paneer SELVAM[1], Masaki HADA[1,2], Takeshi NISHIKAWA[1], Yoshifumi YAMASHITA[1], Yasuhiko HAYASHI[1]
[1]Okayama University, [2]University of Tsukuba

December 11–13, 2019

Symposium G-2

5th E&J BLS

Materials Frontier for Transparent Advanced Electronics

[Organizers]

Yuzo SHIGESATO (Aoyama Gakuin University)
Andreas KLEIN (Technische Universität Darmstadt)
Nobuto OKA (Kindai University)

December 11, 2019

Oral Session 1

Time 9:00–11:30 Room Work-1

Chairpersons Yuzo SHIGESATO, John D. PERKINS, Marius GRUNDMANN

[Preparation 9:00–9:30]

G2-11-K01 ▸Keynote 9:30–10:00

Technologies for a clean and healthy Indoor environment

G. KIRIAKIDIS
IESL, FORTH and Univ. of Crete

G2-11-I02 ▸Invited 10:00–10:30

Functionalizing transparent conducting oxides for solar cells: from disordered oxides to epitaxial perovskites

Monica MORALES MASIS, Yury SMIRNOV, Guus RIJNDERS
University of Twente. MESA+ Institute

G2-11-O03 10:30–10:45

Transparent conducting La-doped $BaSnO_3$: Impact of Substrate and Annealing on Optoelectrical Properties

Yury SMIRNOV, Phu Tran Phong LE, Johan E. TEN ELSHOF, Guus RIJNDERS, Monica MORALES-MASIS
MESA+ Institute for Nanotechnology, University of Twente

G2-11-I04 ▸Invited 10:45–11:15

Developments of CuI Films as a Widegap p-Type Semiconductor.

Naoomi YAMADA
Chubu University

G2-11-O05 11:15–11:30

A Study of Heterojunction Structure for In–Ga–Zn–O thin-film transistor

Daichi KORETOMO[1], Shuhei HAMADA[1], Marin MORI[1], Mamoru FURUTA[1,2]
[1]Kochi University of Technology, [2]Center for Nanotechnology, Research Institute

December 11, 2019

Oral Session 2

Time 14:00–16:00 Room Work-1

Chairpersons Monica MORALES-MASIS, Naoomi YAMADA

G2-11-I06 ▸Invited 14:00–14:30

Combining Theory, Experiment and Data Analytics to Accelerate Materials Development

John PERKINS
Materials Science Center, National Renewable Energy Laboratory

G2-11-I07 ▸Invited 14:30–15:00

Material design concept of nano-crystal embedded transparent oxide semiconductors to realize exceptional and incompatible properties for organic electronics

Nobuhiro NAKAMURA[1], Junghwan KIM[2], Hideo HOSONO[2]
[1]New Product R&D Center, AGC Inc., [2]Materials Research Center for Element Strategy, Tokyo Institute of Technology

G2-11-I08 ▸Invited 15:00–15:30

Amorphous Transparent N-Type and P-Type Electronic Semiconductors for Thin Film Devices

Marius GRUNDMANN
Universität Leipzig

G2-11-I09 ▸Invited 15:30–16:00

Effect of Metal to Semiconductor Contact Property on the Performance of Amorphous Oxide SiZnSnO Semiconductor Thin Film Transistor

Sang Yeol LEE
Cheongju University

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Work-1

Chairpersons George KIRIAKIDIS, Sang Yeol Lee

G2-11-K10 ▸Keynote 16:30–17:00

Perspectives of Novel Applications of Ferroelectric/ Piezoelectric Thin Films for Smart Systems

Norifumi FUJIMURA
Osaka Prefecture Univ.

G2-11-I11 ▸Invited 17:00–17:30

Impedancemetric Thick-Film Gas Sensor Based on Layered Cuprate

Youichi SHIMIZU
Kyushu Institute of Technology

G2-11-I12 ▸Invited 17:30–18:00

Exploration of bi-functional electrode materials for oxygen reduction and oxygen evolution

Masayoshi YUASA, Miu TANAKA, Mamia YOSHIDA, Masayo SHIMIZU
Kindai University

G2-11-I13 ▸Invited 18:00–18:30

Local Structure of Conductive Vanadate Glass and its Application to the Rechargeable Batteries

Nobuto OKA, Hajime MIYAMOTO, Ryoya SUGIMOTO, Sayaka MASUDA, Masayoshi YUASA, Tetsuaki NISHIDA
Kindai University

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Miel-2

Chairpersons Andreas KLEIN, Hiroshi YANAGI

Preparation
9:00–9:30

G2-12-I01 ▸Invited 9:30–10:00

Solution-processed Colloidal Quantum Dot-based Infrared Photovoltaics toward Ultra-high Efficiency

Takaya KUBO
The University of Tokyo

G2-12-I02 ▸Invited 10:00–10:30

Nanostructure and properties of solution processed oxide semiconductor films for transparent conductive electrodes

Yoshiko TSUJI, Naoya TSUTSUMI, Yuuki KOMINAMI
The University of Tokyo

G2-12-O03 10:30–10:45

Numerical Simulation of Nanoparticle Network Formation in Transparent Conductive Coating

Rei TATSUMI[1], Osamu KOIKE[2], Yukio YAMAGUCHI[2], Yoshiko TSUJI[1]
[1]The University of Tokyo, [2]Products Innovation Association

G2-12-O04 10:45–11:00

Fabrication of Transparent ZnO/(CuZn)O Heterojunction Diodes by Electrochemical Deposition

Mansoureh KEIKHAEI, Masaya ICHIMURA
Nagoya Instituite of Technology

G2-12-I05 ▸Invited 11:00–11:30

Hydrogenated Indium-based and Indium-free TCOs

Luis PEREIRA, Diana GASPAR, Marco MOREIRA, Jonas DEUERMEIER, Elvira FORTUNATO, Rodrigo MARTINS
CENIMAT/I3N, Faculdade de Ciências e Tecnologia, Universidade NOVA de Lisboa

December 12, 2019

Oral Session 5

Time 14:00–16:00 Room Miel-2

Chairpersons Takaya KUBO, Luis PEREIRA

G2-12-K06 ▸Keynote 14:00–14:30

Performance and Fermi Level Limits in Oxides

Andreas KLEIN
Technische Universität Darmstadt

G2-12-I07 ▸Invited 14:30–15:00

Electron Affinity and Ionization Potential Tuning of Amorphous Cd–In–Ga–O Films

Hiroshi YANAGI, Minseok KIM, Ryota FUJIMOTO, Kei NAKAMURA
University of Yamanashi

G2-12-I08 ▸Invited 15:00–15:30

Effects of Mechanical and Bias Stress on Dual-gate a-IGZO-TFTs

Qun ZHANG[1], Jianwen YANG[1], Ting-Chang CHANG[2], Po-Yung LIAO[2]
[1]Fudan University, [2]National Sun Yat-Sen University

G2-12-I09 ▸Invited 15:30–16:00

Amorphous IGZO Thin-Film Transistors with AlO_x:H Dielectrics for Emerging Functional Applications

Shi-Jin DING
Fudan University

December 13, 2019

Oral Session 8

Time 14:00–16:00 Room Trade-1

Chairpersons Shijie WANG, Hui YE

G2-13-I01 ▸Invited 14:00–14:30

ZnO Based Semiconductors for Excitonic Devices

Naho ITAGAKI, Kunihiro KAMATAKI, Kazunori KOGA, Masaharu SHIRATANI
Kyushu University

G2-13-I02 ▸Invited 14:30–15:00

Functionalization of oxide-based mixed anion compound thin films

Yasushi HIROSE[1]
[1]The University of Tokyo, [2]Kanagawa Academy of Science and Technology

G2-13-I03 ▸Invited 15:00–15:30

Toward understanding the defect-functionality relationship in bipolar SnO thin films

Junjun JIA[1], Yuzo SHIGESATO[2]
[1]Waseda University, [2]Aoyama Gakuin University

G2-13-I04 ▸Invited 15:30–16:00

Improved environmental stability of high-mobility In_2O_3 films fabricated at low process temperatures

Takashi KOIDA, Yuko UENO, Hajime SHIBATA
National Institute of Advanced Industrial Science and Technology (AIST)

December 13, 2019

Oral Session 9

Time 16:30–17:30 Room Trade-1

Chairpersons Takashi KOIDA, Yasushi HIROSE

G2-13-I05 ▸Invited 16:30–17:00

The Dopant Localization in ZnO Materials

Shijie WANG
Institute of Materials Research and Engineering (IMRE), A*STAR (Agency for Science, Technology, and Research)

G2-13-I06 ▸Invited 17:00–17:30

Transparent conductive oxides: Near infrared epsilon near zero materials

Hui YE
Zhejiang University

December 12, 2019

Poster Session

Time 16:30–18:00 Room Trade-0

G2-12-P01

Comparison of window layers in Cu(In,Ga)Se_2 solar cells and mini-modules

Takashi KOIDA, Yuko UENO, Jiro NISHINAGA, Yukiko KAMIKAWA, Hirofumi HIGUCHI, Masayuki IIOKA, Hideki TAKAHASHI, Hajime SHIBATA
National Institute of Advanced Industrial Science and Technology (AIST)

G2-12-P02

Amperometric Nitrite-Ion Sensing Properties of Perovskite-Type Oxide Based Thick-Film Electrode

Youichi SHIMIZU[1], Mikako MORIYAMA[1], Yasunari SHINODA[1], Haruna SHIMOJI[1], Satoko TAKASE[1], Norahim IBRAHIM[2]
[1]Kyushu Institute of Technology, [2]Universiti Teknologi Malaysia

G2-12-P03

Nanocarbon Catalyst synthesized by the Solution Plasma Process for the Air-electrode of Metal-Air Battery

Ryota IMAMURA, Tomoya OKAMURA, Sayaka MASUDA, Yui IYOKU, Ryoya SUGIMOTO, Masayoshi YUASA, Tetsuaki NISHIDA, Nobuto OKA
Kindai University

G2-12-P04

Bifunctional Air-Electrode Catalyst composed of Ni-containing Conductive Vanadate Glass developed for Metal-Air Battery

Ryoya SUGIMOTO, Hajime MIYAMOTO, Takahisa SAKURAGI, Sayaka MASUDA, Masayoshi YUASA, Tetsuaki NISHIDA, Nobuto OKA
Kindai University

G2-12-P05

Carbon -doped TiO_2 Nanoparticles synthesized as the Visible-light Active Photocatalyst by Hydrothermal Method

Ryoya SUGIMOTO, Rika MIYOSHI, Sayaka MASUDA, Tetsuaki NISHIDA, Nobuto OKA
Kindai University

G2-12-P06

Electrocatalyst for glucose oxidation and oxygen evolution using transition metal composite oxides

Masayoshi YUASA, Kouki SHIBAYAMA, Yusuke TAKIMIYA, Shogo ASAYAMA
Kindai University

G2-12-P07

New Cathode Active Material using Vanadate Glass for High-capacity Li ion Battery

Sayaka MASUDA[1], Syunsuke MATSUSAKO[1], Ryoya SUGIMOTO[1], Honami INADA[2], Hikaru HAYAKAWA[2], Tetsuaki NISHIDA[1], Nobuto OKA[1]
[1]Kindai University, [2]MORESCO Corporation

G2-12-P08

Local Structure and Electrical Conductivity of Highly Conductive Vanadate Glass containing Tin or Indium Oxides

Sayaka MASUDA[1], Yuki FUJITA[1], Naomi YAMAGUCHI[1], Syunsuke MATSUSAKO[1], Ryoya SUGIMOTO[1], Sachiya SHIBA[2], Shiro KUBUKI[2], Tetsuaki NISHIDA[1], Nobuto OKA[1]
[1]Kindai University, [2]Tokyo Metropolitan University

G2-12-P09

Antibacterial activity of new ABC semiconductor and the effect of light irradiation

J. MIYAMOTO[1], K. ITO[2], K. TANAKA[1]
[1]Kindai University, [2]Ito Research Institute Co.,Ltd.

G2-12-P10

TiO_2/WO_3 multi-layered photocatalyst with the metallic nano-particles as co-catalyst

Yuya KATO[1], Kenta TANIYAMA[1], Yuka KITAZAWA[1], Makoto KASHIWAGI[1], Jyunjyun JIA[2], Shinichi NAKAMURA[3], Yuzo SHIGESATO[1]
[1]Graduated School of Science and Engineering, Aoyama Gakuin University, [2]Faculty of Science and Engineering, Waseda University, [3]Center for Instrumental Analysis, College of Science and Engineering, Aoyama Gakuin University

G2-12-P11

Electrical and Optical Properties of Nb-doped TiO_2 Films Deposited by Reactive Sputtering using Ni-Ti alloy target with impedance control systems

Nobuto OKA[1,2], Yuta SANNO[2], Junjun JIA[2], Yuzo SHIGESATO[2]
[1]Kindai University, [2]Aoyama Gakuin University

G2-12-P12

Solution-Processed Al-doped ZnO (AZO) Multilayer Thin-Film Transistors using Composition Controlled AZO Buffer toward Transparent Electronics

Kazuyori OURA, Keisuke TAKANO, Masatoshi KOYAMA, Toshihiko MAEMOTO, Shigehiko SASA
Osaka Institute of Technology

G2-12-P13

Plasma Posttreatment of Transparent Conductive Electrodes

Oleg SERGEEV, Hosni MEDDEB, Hyo-Jei CHO, Kai GEHRKE, Martin VEHSE
DLR Institute of Networked Energy Systems

G2-12-P14

Evaluation of gas barrier properties for amorphous ZnSnOx and SiNx films using transparent conductive oxide films

Keisuke TSUSHIMA[1], Makoto KASHIWAGI[1], Junjun JIA[2], Daisuke ONO[3], Shigeki MATSUNAKA[3], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, [3]Shibaura Mechatronics Corporation

G2-12-P15

Transparent diamond-like carbon films deposited by sputtering

Azuma NISHIZAWA[1], Nanako ISHIGURO[1], Makoto KASHIWAGI[1], Junjun JIA[2], Manami KUROSE[3], Hironobu MACHINAGA[3], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University, [3]Core Technology Research Center, Nitto Denko Corporation

G2-12-P16

Electrical and Optical Properties of Transparent p-Type CuI Alloyed with CuBr

Yuta TANIDA, Shogo YOSHIDA, Naoomi YAMADA
University of Chubu

G2-12-P17

Zirconium oxy-sulfide: a disperse valence band, p-type transparent conductor

Angela N. FIORETTI[1], Sebastian SIOL[2], Christophe BALLIF[1], Mathieu BOCCARD[1], Monica MORALES-MASIS[3]
[1]Photovoltaics and Thin Film Electronics Laboratory, Institute of Microengineering, Ecole Polytechnique Federale de Lausanne, Neuchatel, Switzerland, [2]Empa–Swiss Federal Laboratories for Materials Science and Technology, Dubendorf, Switzerland, [3]University of Twente, MESA+ Institute for Nanotechnology, Enschede, The Netherlands

G2-12-P18

Sputter deposition high-mobility and low-resistive amorphous In_2O_3:Sn films by using nitrogen impurities

Naho ITAGAKI, Soichiro MURAOKA, Daisuke YAMASHITA, Kunihiro KAMATAKI, Kazunori KOGA, Masaharu SHIRATANI
Kyushu University

G2-12-P19

Homogeneous and Low-Resistivity ZnO Films by Zn Insertion

Yasuji YAMADA[1], Orkut SANCAKOGLU[1,2], Rei SUGIURA[1], Shuhei FUNAKI[1], Yumika YAMADA[1]
[1]Shimane University, [2]Metallurgical and Materials Engineering, Dokuz Eylul University

G2-12-P20

Thermal Conductivity of Ti or W-doped Diamond-like carbon thin films

Takahiro SUZUKI[1], Yuichiro YAMASHITA[1,2], Takashi YAGI[1,2], Naoyuki TAKETOSHI[1,2], Junjun JIA[3], Makoto KASHIWAGI[1], Yuzo SHIGESATO[1]
[1]Aoyama Gakuin University, [2]National Institute of Advanced Industrial Science and Technology, [3]Waseda University

G2-12-P21

Fabrication of P-doped SnO_2 thin films by pulsed laser deposition

M. FUKUMOTO, S. NAKAO, Y. HIROSE, T. HASEGAWA
Department of Chemistry, The University of Tokyo

G2-12-P22

Crystallization Behavior of Doped Amorphous Indium Oxide Films

Shimpei IWASAKI[1], Junjun JIA[2], Toshihiro OKAJIMA[3], Shin-ichi NAKAMURA[4], Shingo YAMAMOTO[1], Makoto KASHIWAGI[1], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Waseda University, [3]Kyushu Synchrotron Light Research Center, [4]Center for Instrumental Analysis, Aoyama Gakuin University

G2-12-P23

Optical properties of TiO_2, TiO_{2-x} and Nb-doped TiO_2 films analyzed by scanning ellipsometry

Yuzo SHIGESATO[1], Haruka YAMAMOTO[1], Junjun JIA[2], Hiroshi NISIYAMA[1]
[1]Aoyama Gakuin University, [2]Waseda University

G2-12-P24

Thermal conductivity of polycrystalline rutile $Ti_{1-x}Sn_xO_2$ films

Hiroki KOIZUMI[1], Takashi YAGI[2], Yuichiro YAMASHITA[2], Makoto KASHIWAGI[1], Junjun JIA[3], Yuki OGUCHI[1], Naoyuki TAKETOSHI[2], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]National Metrology Institute of Japan (NMIJ), AIST, [3]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University

G2-12-P25

Thermophysical property of Y-Mg alloy switchable mirror thin films

Hina SAITO[1], Yuichiro YAMASHITA[1,2], Takashi YAGI[1,2], Makoto KASHIWAGI[1], Junjun JIA[3], Naoyuki TAKETOSHI[1,2], Yuzo SHIGESATO[1]
[1]Graduate school of Science and Engineering, Aoyama Gakuin University, [2]National Metrology Institute of Japan (NMJ), National Insitute Science and Technology (AIST), [3]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University Building 61-414

G2-12-P26

Thermophysical and optical properties of Al_2O_3-based amorphous complex oxides films deposited by co-sputtering

Chinami ABE[1], Yuichiro YAMASHITA[1,2], Yukimi TANAKA[2], Takashi YAGI[1,2], Makoto KASHIWAGI[1], Junjun JIA[3], Koichiro HATTORI[2], Naoyuki TAKETOSHI[1,2], Yuki OGUCHI[1], Yuzo SHIGESATO[1]
[1]Graduate School of Science & Engineering, Aoyama Gakuin University, [2]National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology (AIST), [3]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University

G2-12-P27

Development of electrochromic thin films for thermal switching devices

Koichi SAKATA[1], Takashi YAGI[1,2], Yuichiro YAMASHITA[1,2], Makoto KASHIWAGI[1], Junjun JIA[3], Naoyuki TAKETOSHI[1,2], Yuzo SHIGESATO[1]
[1]Graduate school of Science and Engineering, Aoyama Gakuin University, [2]National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology (AIST), [3]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University

G2-12-P28

Approaches to fabricate the all-solid-state electrochromic windows

Yuki SHIRAKURA[1], Kento TERASHIMA[1], Makoto KASHIWAGI[1], Junjun JIA[2], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University

G2-12-P29

Electrochromic properties of doped IrO_2 films deposited by co-sputtering

Yuna SUGA[1], Makoto KASHIWAGI[1], Junjun JIA[2], Shin-ichi NAKAMURA[3], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University, [3]Center for Instrumental Analysis, College of Science and Engineering, Aoyama Gakuin University

G2-12-P30

Gas sensing properties of SnO_2 films deposited by rf magnetron sputtering

Shuhei NISHIKAWA[1], Makoto KASHIWAGI[1], Junjun JIA[2], Akira NAKAMURA[3], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineer, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University, [3]MITSUMI ELECTRIC CO., LTD

G2-12-P31

H_2 gas sensing properties of Al-doped ZnO films deposited by rf magnetron sputtering

Hiroki SONE[1], Shuhei NISHIKAWA[1], Makoto KASHIWAGI[1], Junjun JIA[2], Akira NAKAMURA[3], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University, [3]MITSUMI ELECTRIC CO., LTD.

G2-12-P32

Deposition of stoichiometric MgF_2 films by rf magnetron sputtering

Kohei OGURA[1], Makoto KASHIWAGI[1], Junjun JIA[2], Hironobu MACHINAGA[3], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University Building 61-414, [3]Core Technology Research Center, Nitto Denko Corporation

G2-12-P33

Polytetrafluoroethylene (Teflon) films deposited by rf magnetron sputtering

Yuri OTANI[1], Makoto KASHIWAGI[1], Jia JUNJUN[2], Hironobu MACHINAGA[3], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University Building 61-414, [3]Core Technology Research Center, Nitto Denko Corporation

G2-12-P34

Self-powered Ultraviolet Photodetector Based on CuI/a-IGZO Heterojunction

Takahiro KONDO, Yuumi KONDO, Yuuta TANIDA, Naoomi YAMADA
Chubu University

G2-12-P35

Enhance Open-circuit Voltage of PbS Quantum Dot Solar Cells with Organic Surface Passivated ZnO Nanowires

Haibin WANG
The University of Tokyo

G2-12-P36

Gd and Gd-Mg alloy films deposited by sputtering for all-solid state switchable mirror devices

Kento TERASHIMA[1], Yuji SHITAYANAGI[1], Makoto KASHIWAGI[1], Junjun JIA[2], Shin-ichi NAKAMURA[3], Yuzo SHIGESATO[1]
[1]Graduate school of Science of Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University, [3]Center for Instrumental Analysis, College of Science and Engineering, Aoyama Gakuin University

G2-12-P37

Study of MoO_3 thin film with low thermal conductivity

Yuzuki AOKI[1], Yuichiro YAMASHITA[1,2], Takashi YAGI[1,2], Junjun JIA[1,3], Makoto KASHIWAGI[1], Yuki OGUCHI[1], Naoyuki TAKETOSHI[1,2], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]National Metrology Institute of Japan (NMIJ), AIST, [3]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University

G2-12-P38

Dielectric Function of Slightly-reduced Molybdenum Oxide (MoO_{3-x}) Films Deposited by Reactive Sputtering

Shota CHOMEI[1], Junjun JIA[2], Makoto KASHIWAGI[1], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, 5-10-1, Fuchinobe, Sagamihara, Kanagawa, 252-5258 Japan., [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University Building 61-414, 3-4-1 Okubo, Shinjuku-ku, Tokyo, 169-8555 Japan.

G2-12-P39

Piezoelectric properties of the doped ZnO and AlNx films deposited by rf co-sputtering

Kentaro TANAKA[1], Ryota MAEDA[1], Junjun JIA[2], Makoto KASHIWAGI[1], Yuzo SHIGESATO[1]
[1]Graduate School of Science and Engineering, Aoyama Gakuin University, [2]Global Center for Science and Engineering, Faculty of Science and Engineering, Waseda University

G2-12-P40

Thin-Film Growth of Rocksalt-Type MgSnN2

Kenta MATSUURA, Naoomi YAMADA
Chubu University

G2-12-P41

Growth of Halogen Doped n-Type SnS Single Crystals Using Self-Flux

H. YANAGI[1], Y. IGUCHI[1], K. SATO[1], K. INOUE[1], I. SUZUKI[2], S. KAWANISHI[2]
[1]University of Yamanashi, [2]Tohoku University

G2-12-P42

Highly Efficient Inverted OLED with Judiciously Designed Dielectric/Metal/Dielectric Transparent Electrodes

Li-Wei CHEN, Hao-Wu LIN
Department of Materials Science and Engineering, National Tsing Hua University

December 12–13, 2019

Symposium G-3

Perovskite and Metal Halide Materials Based Photovoltaics and Optoelectronics

[Organizers]

Tsutomu MIYASAKA (Toin University of Yokohama)
Yoshihiko KANEMITSU (Kyoto University)
Udo BACH (Monash University)
Hyun Suk JUNG (Sungkyunkwan University)
Hao-Wu LIN (National Tsing Hua University)
Tetsuhiko MIYADERA (AIST)
Hideo OHKITA (Kyoto University)
Taiho PARK (POSTECH)
Atsushi WAKAMIYA (Kyoto University)

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December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Miel-1

Chairpersons Atsushi WAKAMIYA, Masayuki CHIKAMATSU

Opening talk
9:00–9:05

G3-12-I01 ▸Invited 9:05–9:30

Progress of Lead Halide Perovskite Solar Cells and Next Directions of Research by Compositional Engineering

Tsutomu MIYASAKA
Toin University of Yokohama

G3-12-I02 ▸Invited 9:30–9:55

Organic-Inorganic Halide Perovskites for Solar Fuel Production

Jingshan LUO
Nankai University

G3-12-I03 ▸Invited 9:55–10:20

Up-Scaling Strategies for Metal Halide Perovskite Solar Cells and Modules

Luis Katsuya ONO, Yabing QI
Okinawa Institute of Science and Technology Graduate University

G3-12-I04 ▸Invited 10:20–10:45

Optical and Device Engineering in All Vacuum Deposited Perovskite Solar Cells and Artificial Retina

Hao-Wu LIN
National Tsing Hua University

G3-12-O05 10:45–11:00

Back-Contact Perovskite Solar Cells

Xiongfeng LIN, Udo BACH
Monash University

G3-12-O06 11:00–11:15

Light-Induced Performance Decrease in Perovskite Photovoltaics

Eiji KOBAYASHI, Ryoto FUNAYAMA, Akito ENDO
Kishu Giken Kogyo Co., Ltd.

G3-12-O07 11:15–11:30

Effect of Low Energy Ion Irradiation on the Optical and Electronic Properties of Perovskite Solar Cells

Hironori OGATA[1,2,3], Tomoaki NISHIMURA[2], Yuki FUKAZAWA[1], Masato GOCHO[1], Kazunori ITO[1], Toshiya KOBAYASHI[1], Ryusuke UMEDA[1]
[1]Grad.School Sci. Technol., Hosei University, [2]Res. Center of Ion Beam Technology, Hosei University, [3]Res. Center for Micro-Nano Technol., Hosei University

December 12, 2019

Oral Session 5

Time 14:00–16:00 Room Miel-1

Chairpersons Tetsuhiko MIYADERA, Takeru BESSHO

G3-12-I08 ▸Invited 14:00–14:25

Passivation and Interface Engineering of Lead Halide Perovskite for High Performance Solar Cells

Peng GAO

Fujian Institute of Research on the Structure of Matter

G3-12-I09 ▸Invited 14:25–14:50

Surface Termination of the Solution-Processed $CH_3NH_3PbI_3$ Perovskite Film

Hiroyuki YOSHIDA, Abduheber MIRZEHMET

Chiba University

G3-12-I10 ▸Invited 14:50–15:15

How to Use Synchrotron Soft X-Ray For Analysis of Perovskite Solar Cell

Seigo ITO

University of Hyogo

G3-12-O11 15:15–15:30

Open-Circuit Voltage in Tin-Based Perovskite Solar Cells

Hideo OHKITA[1], Hyung Do KIM[1], Yongyoon CHO[1,2]

[1]Kyoto University, [2]University of New South Wales

G3-12-O12 15:30–15:45

Defect and Trap Passivation of Tin Halide Perovskite with Lewis Base

Muhammad Akmal KAMARUDIN[1], Daisuke HIROTANI[2], Kengo HAMADA[2], Kohei NISHIMURA[1], Qing SHEN[1], Taro TOYODA[1], Satoshi IIKUBO[2], Takashi MINEMOTO[3], Kenji YOSHINO[4], Shuzi HAYASE[1]

[1]The University of Electro-Communications, [2]Kyushu Institute of Technology, [3]Ritsumeikan University, [4]Miyazaki University

G3-12-O13 15:45–16:00

Tin-Based Perovskite Solar Cells using Precursor Materials Purified by Reducing Agents

Tomoya NAKAMURA, Shinya YAKUMARU, Jiewei LIU, Taketo HANDA, Yoshihiko KANEMITSU, Richard MURDEY, Atsushi WAKAMIYA

Institute for Chemical Research, Kyoto University

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Miel-1

Chairpersons Hao-Wu LIN, Sheigo ITO

G3-12-I14 ▸Invited 16:30–16:55

Study of Potassium Doping to the Organometal Halide Perovskite Properties and Less Hysteresis Photovoltaics with Monolithic Structure

Takeru BESSHO

The University of Tokyo

G3-12-I15 ▸Invited 16:55–17:20

Photovoltaic Parameters in Lead-Based Perovskite Solar Cells

Hyung Do KIM, Hideo OHKITA

Kyoto University

G3-12-I16 ▸Invited 17:20–17:45

Precise Control of Semiconductor Interfaces in Perovskite Solar Cells

Masayuki CHIKAMATSU

AIST

G3-12-O17 17:45–18:00

Investigations of Crystallinity and Morphology of the Perovskite Films Fabricated by Inkjet Prints with Different Solvents

Ryoto FUNAYAMA, Eiji KOBAYASHI, Akito ENDO

Kishu Giken Kogyo Co., Ltd.

G3-12-O18 18:00–18:15

Factors Determining the Vertical Orientation of Two-Dimensional Perovskites

Yuko TAKEOKA

Sophia University

G3-12-O19 18:15–18:30

Highly Sensitive Photodetector Based on a Metal Complex Hybridized Structure with Perovskite Nanoparticles

Ayumi ISHII[1,2], Ajay K. JENA[1], Tsutomu MIYASAKA[1]

[1]Toin University of Yokohama, [2]JST, PRESTO

December 13, 2019

Oral Session 8

Time 14:00–16:00 Room Miel-3

Chairpersons Hideo OHKITA, Akinori SAEKI

G3-13-I01 ▸Invited 14:00–14:25

The Photophysics of the Disruptive Perovskites

Tze-Chien SUM

Nanyang Technological University

G3-13-I02 ▸Invited 14:25–14:50

Direct Observation of Charge Transfer at the Interface between Perovskite and PEDOT:PSS Layers

Kazuhiro MARUMOTO
University of Tsukuba

G3-13-I03 ▸Invited 14:50–15:15

Light-Induced Refractive Index Changes in Metal Halide Perovskites

Hirokazu TAHARA, Taketo HANDA, Yoshihiko KANEMITSU
Kyoto University

G3-13-O04 15:15–15:30

Ultrafast Interfacial Electron and Hole Transfer Dynamics from $FAPbI_3$ Perovskite Quantum Dots to Electron and Hole Transport Layers

Chao DING[1], Feng LIU[1], Yaohong ZHANG[1], Daisuke HIROTANI[2], Xing RIN[1], Yukiko KITABATAKE[3], Taro TOYODA[1], Shuzi HAYASE[1,2], Takashi MINEMOTO[4], Taizo MASUDA[5], Kenji KATAYAMA[3], Qing SHEN[1]
[1]Faculty of Informatics and Engineering, The University of Electro-Communications, [2]Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology, [3]Department of Applied Chemistry, Chuo University, [4]Department of Photonics, Ritsumeikan University, [5]X-Frontier Division, Toyota Motor Corporation

G3-13-O05 15:30–15:45

Enhanced Near-Infrared Emission from $Cs(Pb/Sn)I_3$ Quantum Dots by Sodium Doping

FENG LIU, CHAO DING, Yaohong ZHANG, Qing SHEN
The University of Electro-Communications

G3-13-O06 15:45–16:00

Non-Toxic Materials for Light-Emitting Diodes

Yu-Chiang CHAO
National Taiwan Normal University

December 13, 2019

Oral Session 9

Time 16:30–18:40 Room Miel-3

Chairpersons Yoshihiko KANEMITSU, Tsutomi MIYASAKA

G3-13-I07 ▸Invited 16:30–16:55

Less-Defect Perovskite Quantum Dots: Synthesis, Optical Properties and Application to Optoelectronic Devices

Qing SHEN, Feng LIU, Yaohong ZHANG, Chao DING, Taro TOYODA, Shuzi HAYASE
The University of Electro-Communications

G3-13-I08 ▸Invited 16:55–17:20

Anion Exchange Perovskite Quantum-Dots for Highly Efficient Light-Emitting-Devices

Takayuki CHIBA
Yamagata University

G3-13-I09 ▸Invited 17:20–17:45

Unique Optoelectronic Properties of Pb/Sn Perovskites

Akinori SAEKI
Osaka University

G3-13-I10 ▸Invited 17:45–18:10

Excitonic Properties of $CH_3NH_3PbX_3$ [X = I, Br, Cl] Lead Halide Perovskites Revealed by Magnetoreflectance Spectroscopy

Yasuhiro YAMADA[1], Hirofumi MINO[1], Kenichi OTO[1], Yoshihiko KANEMITSU[2]
[1]Chiba University, [2]Kyoto University

G3-13-O11 18:10–18:25

Mechanism of Efficient anti-Stokes Photoluminescence in Lead-Halide Perovskite Single Crystals

Takumi YAMADA, Yoshihiko KANEMITSU
Institute for Chemical Research, Kyoto University

G3-13-O12 18:25–18:40

Polarization-Resolved Optical Spectroscopy in Lead Halide Perovskite $CH_3NH_3PbX_3$ [X = I, Br] Single Crystals

Nanako IGARASHI[1], Shunichi SAKAGUCHI[1], Kenichi OTO[1], Yoshihiko KANEMITSU[2], Yasuhiro YAMADA[1]
[1]Chiba University, [2]Kyoto University

December 13, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

G3-13-P01

Mixed-Organic-Cation Perovskite Solar Cells Fabricated by All-Vacuum Deposition

LIN YANG, CHIEN-YU CHEN, HAO-WU LIN
National Tsing Hua University

G3-13-P02

High Performance Cesium Lead Halide Perovskite Quantum Dots Fabricated by Hot Spray Synthesis Technique

Bo-Wei HSU, Yung-Tang CHUANG, Hao-Wu LIN
Materials Science and Engineering/National Tsing Hua University, Taiwan

G3-13-P03

Metal Halide Based Artificial Synaptic Devices with Multi-Tunable-States

Wei-Chun WANG, Li-Wei CHEN, Hao-Wu LIN
Department of Materials Science and Engineering, National Tsing Hua University

G3-13-P04

Efficient Hole Transporting Layers for All Vacuum Processed Perovskite Solar Cell

Dan WANG, Hao-Wu LIN
Department of Materials Science and Engineering, National Tsing Hua University

G3-13-P05

Perovskite Solar Cells: Global and Local Structure

Jintara PADCHASRI[1], Pinit KIDKHUNTHOD[2], Taras KOLODIAZHNYI[3], Rattikorn YIMNIRUN[4], Saroj RUJIRAWAT[1]
[1]Suranaree University of Technology, [2]Synchrotron Light Research Institute, [3]National Institute for Materials Science, [4]Vidyasirimedhi Institute of Science and Technology

G3-13-P06

Synthesis and Properties of Hybrid Perovskite $CH_3NH_3PbI_{3-x}Cl_x$ Solar Cell Materials

Phitsamai KAMONPHA, Saroj RUJIRAWAT
Reaserch Network NANOTEC-SUT on Advanced Nanomaterials and Characterization, School of Physics, Institute of Science, Suranaree University of Technology

G3-13-P07

Molecular Dynamics in the Hybrid Organic-Inorganic Perovskite $MAPbI_3$ Probed by Muon Spin Relaxation Technique

Akihiro KODA[1], Masatoshi HIRAISHI[1], Hirotaka OKABE[1], Ryosuke KADONO[1], Seung-Hun LEE[2], Joshua J. CHOI[2], Katelyn A. DAGNALL[2]
[1]KEK, [2]University of Virginia

G3-13-P08

Influence of the Different Substrates on Spiro-OMeTAD Layer Orientation

Hiroyuki MAEKAWA
University of Hyogo

G3-13-P09

Evaluation of Thermal Durability and Radiation Resistance of MA-Free Perovskite Solar Cells

Yuma NAGANO
University of Hyogo

G3-13-P10

Improving V_{oc} and Stabilizing Black Phase for All-inorganic $CsPbX_3$ Perovskite Solar Cells

Zhanglin GUO
Toin University of Yokohama

G3-13-P11

Evaluation of Durability of Perovskite Solar Cells with Mixed Cations and Halide Anions

Yuki FUKAZAWA, Masato GOCHO, Kazunori ITO, Toshiya KOBAYASHI, Ryusuke UMEDA, Hironori OGATA
Grad. Sch. Sci. and Engin., Hosei Univ.

G3-13-P12

Fabrication and Properties of Inverted Perovskite Solar Cells with Surface-Treated Nickel Oxide Films

Toshiya KOBAYASHI[1], Masato GOCHO[1], Kazunori ITO[1], Yuki FUKAZAWA[1], Ryusuke UMEDA[1], Hironori OGATA[1,2,3]
[1]Graduate School of Science and Engineering, Hosei University, [2]Dept. Chem.Sci. and Technol., Hosei University, [3]Research Center for Micro-Nano Technology, Hosei University

G3-13-P13

Withdrawal

G3-13-P14

Transparent Organic Hole-Transporting Materials Containing Partially Oxygen-Bridged Triphenylamine Skeletons: Synthesis and Application for Perovskite Solar Cells

Minh Anh TRUONG, Richard MURDEY, Atsushi WAKAMIYA
Institute for Chemical Research, Kyoto University

G3-13-P15

Observation of High-Order Harmonic Generation from Hybrid Lead Halide Perovskites

Hideki HIRORI[1], Peiyu XIA[2], Yasushi SHINOHARA[2], Tomohito OTOBE[3], Yasuyuki SANARI[1], Hirokazu TAHARA[1], Nobuhisa ISHII[2], Jiro ITATANI[2], Yoshihiko KANEMITSU[1]
[1]Kyoto University, [2]University of Tokyo, [3]QST

G3-13-P16

Crystal Growth Dynamics of $CH_3NH_3PbI_3$ in Vacuum Deposition Process

Tetsuhiko MIYADERA[1], Yuto AUCHI[1,2], Kohei YAMAMOTO[1], Noboru OHASHI[1], Tomoyuki KOGANEZAWA[3], Hiroyuki YAGUCHI[3], Yuji YOSHIDA[1], Masayuki CHIKAMATSU[1]
[1]National Institute of Advanced Industrial Science and Technology, [2]Saitama University, [3]Japan Synchrotron Radiation Research Institute

G3-13-P17

Anion-Exchange Blue Perovskite Quantum Dots LED with Metal Halide

Jun SATO
Yamagata University

G3-13-P18

High Efficiency of Blue Perovskite Quantum Dots LED Using Adamantane Additive

Shota ISHIKAWA
Yamagata University

G3-13-P19

Single Exciton Dynamics in Lead Halide Perovskite Nanocrystals: Single Dot Spectroscopy

Yoshihiko KANEMITSU, Sojiro MASADA, Hirokazu TAHARA, Masaki SARUYAMA, Tokuhisa KAWAWAKI, Ryota SATO, Toshiharu TERANISHI
Institute for Chemical Research, Kyoto University

G3-13-P20

AFM Nano-Processing in Lead Halide Perovskites

Keisuke KUMAGAI[1], Shunichi SAKAGUCHI[1], Kenichi OTO[1], Yoshihiko KANEMITSU[2], Yasuhiro YAMADA[1]
[1]Chiba University, [2]Kyoto University

December 12–13, 2019

Symposium G-4

Plasmonic Materials: from Fundamentals to Applications

[Organizers]

Toshiharu TERANISHI (Kyoto University)
Tatsuya TSUKUDA (The University of Tokyo)
Jwa-Min NAM (Seoul National University)
Jill E. MILLSTONE (University of Pittsburgh)
Keiko TAWA (Kwansei Gakuin University)

December 12, 2019

Oral Session 5

Time 14:00–16:00 Room Miel-5

Chairperson Toshiharu TERANISHI

G4-12-I01 ▸Invited 14:00–14:30

Hybrid Nanomaterials for Plasmon-Enhanced Fluorescence Spectroscopy Biosensors

Jakub DOSTALEK
AIT-Austrian Institute of Technology

G4-12-I02 ▸Invited 14:30–15:00

Application of a Plasmonic Chip to the Brighter Fluorescence Microscopy

Keiko TAWA
Kwansei Gakuin University

G4-12-I03 ▸Invited 15:00–15:30

Assembling Activatable Plasmonic Nanoantennas in Live Cells for Targeted SERS and Photoacoustic Imaging

Fabien PINAUD[1], Tugba KOKER[1], Nathalie TANG[2], Chao TIAN[3], Wei ZHANG[3], Xueding WANG[3], Richard MARTEL[2]
[1]University of Southern California, [2]University of Montréal, [3]University of Michigan

G4-12-I04 ▸Invited 15:30–16:00

Free-Standing 2D Plasmonic Nanoassemblies

Wenlong CHENG
Monash University

December 12, 2019

Oral Session 6

Time 16:30–18:05 Room Miel-5

Chairperson Tatsuya TSUKUDA

G4-12-K05 ▸Keynote 16:30–17:05

Enhanced Water Splitting under Modal Strong Coupling Conditions

Hiroaki MISAWA[1,2]
[1]Hokkaido University, [2]National Chiao Tung University

G4-12-I06 ▸Invited 17:05–17:35

Plasmonic Nanogap-Enhanced Raman Scattering for Biomedical Applications

Jwa-Min NAM
Seoul National University

G4-12-I07 ▸Invited 17:35–18:05

Exotic Non-Zero Wavevector Electronic Excitation by Localized Surface Plasmon

Kei MURAKOSHI
Hokkaido University

December 13, 2019

Oral Session 8

Time 14:00–16:05 Room Work-4

Chairperson Keiko TAWA

G4-13-I01 ▸Invited 14:00–14:30

Nanoplasmonic Materials and Structures for Bio Sensing

Hiroyuki YOSHIKAWA, Eiichi TAMIYA
Osaka University

G4-13-I02 ▸Invited 14:30–15:00

Colloidal Plasmonic Metal Nanocrystals

Jianfang WANG
The Chinese University of Hong Kong

G4-13-I03 ▸Invited 15:00–15:30

Imaging, Control, Impact of Chiral Plasmons

Hiromi OKAMOTO
Institute for Molecular Science

G4-13-K04 ▸Keynote 15:30–16:05

Hot-Electron Effects in Electrically-Driven Plasmonic Nanostructures: Light, Sensing and Artificial Synapses

Alexey KRASAVIN, Anatoly ZAYATS, Yunlu JIANG, Pan WANG, Mazhar NASIR
King's College London

December 13, 2019

Oral Session 9

Time 16:30–18:00 Room Work-4

Chairperson Jwa-Min NAM

G4-13-I05 ▸Invited 16:30–17:00

Plasmon-Boosted Cooperative Effect in Quantum-Emitter Assembly

Hajime ISHIHARA
Osaka University

G4-13-I06 ▸Invited 17:00–17:30

Plasmonics-Assisted Metasurfaces and Structured Interfaces

Yang CHEN[1], Cheng-Wei QIU[2]
[1]NUS Suzhou Research Institute, [2]National University of Singapore

G4-13-I07 ▸Invited 17:30–18:00

Alternative Plasmonic Materials for SERS and Metasurface Applications

Shangjr GWO
Academia Sinica

December 13, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

G4-13-P01

Emergence of Plasmonic Behavior in Free Silver Clusters, Ag_N^+, Studied by Photofragmentation Spectroscopy in the Size Range up to N = 70

Takuya HORIO[1], Shuhei FUJIMOTO[1], Satoshi KONO[1], Masashi ARAKAWA[1], Tomokazu YASUIKE[2,3], Akira TERASAKI[1]
[1]Department of Chemistry, Faculty of Science, Kyushu University, [2]Department of Liberal Arts, The Open University of Japan, [3]ESICB, Kyoto University

G4-13-P02

Two-photon Emission Detection of Quantum Dots with the Silver Plasmonic Chip

Yuki OMURA, Keiko TAWA
Kwansei Gakuin University

G4-13-P03

Fluorescence Detection of a Single Exosome with a Bull's Eye Plasmonic Chip under Microscope

Eri FUJIMOTO, Keiko TAWA
Kwansei Gakuin University

G4-13-P04

Evaluation of Labeled Molecules in Immunosensor with an Epi-Fluorescence Microscope

Makiko YOSHIDA, Keiko TAWA
Kwansei Gakuin University

G4-13-P05

Graphene Oxide Film Isolated Raman Spectroscopy for Subnano Particles Analysis and Application

Yuansen TANG[1], Akiyoshi KUZUME[2], Kimihisa YAMAMOTO[1,2]
[1]Laboratory for Chemistry and Life science, Institute of Innovative Research, Tokyo Institute of Technology, [2]JST-ERATO in Tokyo Institute of Technology

G4-13-P06

Stabilization of Copper Nanoparticle for Novel Red Overglaze

Shohei SHIOMI[1], Yuki OKAZAKI[1], Hajime TAGUCHI[1], Eiichiro MATSUBARA[2]
[1]Kyoto Municipal Institute of Industrial Technology and Culture, [2]Kyoto University

G4-13-P07

Toroidal Plasmons of Multilayer Metal Nanorings

T. Thuy TRINH, Toshiharu TERANISHI
Institute for Chemical Research, Kyoto University

G4-13-P08

Microspectroscopic Analysis of a Fluorescence Enhancement by the Plasmonic Chip

Hinako CHIDA, Keiko TAWA
Kwansei Gakuin University

G4-13-P09

Extraordinary Field Enhancement at TiO_2 Nanogap: Plasmon-Free Enhancement up to 2000-Fold and Its High Reproductivity

Kaito HANATANI[1], Masanori SAKAMOTO[1], Kumi YOSHIHARA[1], Ken-ichi SAITOW[2]
[1]Department of Chemistry, Graduate school of science, Hiroshima Univ., [2]N-BARD, Hiroshima Univ.

G4-13-P10

Localized Surface Plasmon Resonance of Ultrathin Gold Nanorods

Ryo TAKAHATA[1,2], Tatsuya TSUKUDA[1]
[1]The University of Tokyo, [2]Kyoto University

G4-13-P11

Colloidal Au Nanocups with Magnetic Plasmon Resonance

Han ZHANG, Jianfang WANG
The Chinese University of Hong Kong

G4-13-P12

Synergistically Improvement of the Plasmonic Enhancement Effect Using by Carrier-Selective Blocking Layer

Tokuhisa KAWAWAKI[1], Tatsuo NAKAGAWA[3], Masanori SAKAMOTO[2], Toshiharu TERANISHI[2]
[1]Department of Applied Chemistry, Faculty of Science, Tokyo University of Science, [2]Institute for Chemical Research, Kyoto University, [3]Optical Instruments Division, Unisoku Co., Ltd.

G4-13-P13

Coloration of Gold Leaf using Gold Nanoparticles

Kazuhiro SHIMADA[1], Kimihiro NUMANO[2], Shinya MAENOSONO[2]
[1]Industrial Research Institute of Ishikawa, [2]School of Materials Science, Japan Advanced Institute of Science and Technology

G4-13-P14

Theory of Optical Response Measurement of Single Nanoparticles by Photoinduced Force Microscopy

Hidemasa YAMANE[1], Nobuhiko YOKOSHI[1], Hajime ISHIHARA[1,2]
[1]Osaka Prefecture University, [2]Osaka University

G4-13-P15

Chiral Optical Near-Fields Created by Plasmonic Nanostructures

Shun HASHIYADA[1], Tetsuya NARUSHIMA[2], Hiromi OKAMOTO[2]
[1]Innovative Photon Manipulation Research Team, RIKEN Center for Advanced Photonics, [2]Institute for Molecular Science and The Graduate University for Advanced Studies (Sokendai)

G4-13-P16

Two-Photon Fluorescence of Rhodamine 6G and Eu-diketonate Complex Enhanced by Silver Nanoprisms

Janice B. RABOR, Koki KAWAMURA, Yasuro NIIDOME
Kagoshima University

G4-13-P17

Developments of Nano-Structured Semi-Conductor-Assisted (NASSCA) Optical Tweezers toward Manipulation of Plasmonic Nanoparticles

Sawa KOMOTO[1], Tatsuya SHOJI[1], Saulius JUODKAZIS[2], Yasuyuki TSUBOI[1]
[1]Osaka City University, [2]Swinburne University of Technology

G4-13-P18

Size Selective Optical Trapping of Polystyrene Nanoparticles using Plasmonic and Non-plasmonic nanostructures

Sayaka HASHIMOTO[1], Tatsuya SHOJI[1], Saulius JUODKAZIS[2], Yasuyuki TSUBOI[1]
[1]Osaka City University, [2]Swinburne University of Techology

G4-13-P19

Ligand Effect of Porphyrin-Protected Gold Clusters and Nanoparticles in the Electrochemical Hydrogen Evolution Reaction

Daichi EGUCHI[1], Masanori SAKAMOTO[2], Toshiharu TERANISHI[2]
[1]Kwansei Gakuin University, [2]Institute for Chemical Research, Kyoto University

G4-13-P20

Promoting Electrocatalytic Oxygen Reduction Reaction of Octahedral Au@Pt Core-Shell Nanoparticles by Surface Plasmon Excitation

Tatsuya KAMEYAMA, Kentaro SATO, Tsukasa TORIMOTO
Nagoya University

G4-13-P21

Plasmonic and Non-Plasmonic Optical Trapping of Thermoresponsive Polymer Chains Using Nanostructured Solid Substrates

Tatsuya NAGAI[1], Tatsuya SHOJI[1], Denver LINKLATER[2], Saulius JUODKAZIS[2], Yasuyuki TSUBOI[1]
[1]Osaka City University, [2]Swinburne University of Technology

G4-13-P22

Novel Latex Particles Decorated with Au or Pt Nanoparticles as Probes for Lateral Flow Immunochromatographic Strips with Enhanced Sensitivity

Yasufumi MATSUMURA[1], Yasushi ENOMOTO[1], Mari TAKAHASHI[2], Shinya MAENOSONO[2]
[1]NIPPON STEEL Chemical & Material Co.,Ltd., [2]School of Materials Science, JAIST

G4-13-P23

A Study of Colorimetric Biosensor by use of Plasmonic Full Color

Yuichiro MIYAKE[1], Sou RYUZAKI[1], Yusuke ARIMA[1], Koichi OKAMOTO[2], Kaoru TAMADA[1]
[1]Kyushu University, [2]Osaka Prefecture University

G4-13-P24

Transferrin-Modified Magnetic-Plasmonic Hybrid Nanoparticles Designed for Organelle Targeting

Mari TAKAHASHI, Youren WANG, Kazuaki MATSUMURA, Shinya MAENOSONO
School of Materials Science Japan Advanced Institute of Science and Technology

G4-13-P25

Plasmonic Chiroptical Responses of 3D Continuous Chiral Nanoparticles

Hyo-Yong AHN[1,2], Shun HASHIYADA[1], Tetsuya NARUSHIMA[1,3], Hye-Eun LEE[2], Ki Tae NAM[2], Hiromi OKAMOTO[1,3]
[1]Institute for Molecular Science, Okazaki, Japan, [2]Seoul National University, Seoul, Korea, [3]The Graduate University for Advanced Studies, Okazaki, Japan

G4-13-P26

Chemical Induced Permittivity-Change (CIP) Effects for Metal Nanoparticles

S. RYUZAKI[1,2], N. SAITO[1], Y. NOGUCHI[3], Y. TSUJI[1], K. YOSHIZAWA[1], K. OKAMOTO[4], K. TAMADA[1]
[1]Kyushu University, [2]PRESTO, JST, [3]Meiji University, [4]Osaka Prefecture University

G4-13-P27

Coherent Acoustic Phonon Vibration and Phonon Beat in Gold Nanopolyhedrons

Li WANG[1], Shohei TAKEDA[1], Masanori SAKAMOTO[2], Toshiharu TERANISHI[2], Naoto TAMAI[1]
[1]Kwansei Gakuin University, [2]Institute for Chemical Research, Kyoto University

G4-13-P28

Isotopic Hydrogen Evolution Reactions Driven by Plasmon-Induced Charge Transfer

Hiro MINAMIMOTO, Daiki SATO, Kei MURAKOSHI
Hokkaido University

G4-13-P29

Electrochemical Control of the Strong Coupling State between Dye Molecules and Surface Lattice Resonance

Shunpei OIKAWA, Hiro MINAMIMOTO, Kei MURAKOSHI
Hokkaido University

G4-13-P30

Control of Emission photon Statistics of Single Quantum Dots Using Plasmonic Nanostructures

Yoshua Albert DARMAWAN, Takaki NAKAGAWA, Mitsuaki YAMAUCHI, Sadahiro MASUO
Kwansei Gakuin University

G4-13-P31

Near-Field Optical Imaging of Plasmon Modes Induced in Two-Dimensional Gold Nanoplates

Keisuke IMAEDA, Takuya MATSUURA, Seiju HASEGAWA, Kohei IMURA
Waseda University

G4-13-P32

Ionization Assisting Ability of Plasmonic Particles and Magnetic Nanoparticles as Matrices for Mass Spectrometry

Kota AOKI, Sota HAMADA, Shota MORIMOTO, Kouhei KANDA, Akito OSHIMA, Yuko ICHIYANAGI
Yokohama National University

G4-13-P33

Plasmon Enhanced Molecular Fluorescence Near Single Gold Mesoplates

Seiju HASEGAWA, Keisuke IMAEDA, Kohei IMURA
Waseda University

G4-13-P34

Optical Coupling of Short-range Ordered Nanopores Through Surface Plasmons

Dung Thi VU, Takumi SANNOMIYA
Tokyo Institute of Technology

G4-13-P35

Wide Controllability of Localized Surface Plasmon Resonance Wavelength for Au-Ag Nanorings from Visible to Near-infrared Light Region

Kosuke SASAMOTO, Tatsuya KAMEYAMA, Tsukasa TORIMOTO
Graduate School of Engineering, Nagoya University

G4-13-P36

Alchemy for Plasmonics: Coinage Metal-Free Visible-Plasmonic Nanoalloys

Ryota SATO[1], Kenji IIDA[2], Tokuhisa KAWAWAKI[3], Katsuyuki NOBUSADA[2], Toshiharu TERANISHI[1]
[1]Kyoto University, [2]Institute for Molecular Science, [3]Tokyo University of Science

December 13, 2019

Symposium G-5

Synchrotron X-ray Characterization of Function Material Thin Films and Fine Particles

[Organizers]

Ichiro HIROSAWA (Japan Synchrotron Radiation Research Institute)
Toyohiko KINOSHITA (Japan Synchrotron Radiation Reserach Institute)
Jong Hyun Kim (Pohang Accelerator Laboratory)
Anna Stenstam (CR Competence)

[Sponsors]

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December 13, 2019

Oral Session 8

Time 14:00–16:10 Room Work-8

Chairperson Norimichi SANO

Introduction: Ichiro Hirosawa
14:00–14:05

G5-13-I01 ▸Invited 14:05–14:25

Time Resolved X-ray Reflectivity Study of the Early Process of Iron Passivation

Yusuke WAKABAYASHI
Tohoku University

G5-13-O02 14:25–14:40

MI2 approach to modeling atmospheric corrosion of steel by using synchrotron measurement

Takahiro OZAWA[1], Shintaro YAMAMOTO[1], Takuya MORI[2], Mitsutoshi YOKOMIZO[2], Yoshimasa URUSHIHARA[3], Masashi YOSHIMURA[3], Kazushi YOKOYAMA[3]
[1]Kobe Steel , Ltd., [2]KOBELCO research institute, [3]University of Hyogo

G5-13-I03 ▸Invited 14:40–15:00

Synchrotron Structure Analysis on Amorphous Oxide Semiconductors

Akihiko FUJIWARA
Kwansei Gakuin University

G5-13-I04 ▸Invited 15:00–15:20

In-Situ Observation of Thin Film Growth of Organic Semiconductors by 2D- X-ray Diffraction

Noriyuki YOSHIMOTO[1], Daiki KUZUHARA[1], Mamoru KIKUCHI[1], Tomoyuki KOGANEZAWA[2], Ichiro HIROSAWA[2]
[1]Iwate University, [2]JASRI

G5-13-I05 ▸Invited 15:20–15:40

Characterization of Local Strain in Group-IV Semiconductor Nanostructures using Microdiffraction

Osamu NAKATSUKA
Nagoya University

G5-13-O06 15:40–15:55

Investigation of Phonon Dispersion Curve for Silicon Germanium Alloy by Using Inelastic X-ray Scattering

Ryo YOKOGAWA[1,2], Kazutoshi YOSHIOKA[1], Haruki TAKEUCHI[1], Yasutomo ARAI[3], Hiroshi UCHIYAMA[5], Atsushi OGURA[1]
[1]Meiji University, [2]JSPS Research Fellow DC, [3]JAXA, [4]Toshiba Memory Corporation, [5]JASRI

G5-13-O07 15:55–16:10

Synchrotron Radiation X-ray Diffraction Study on $Co_{50}Pt_{50}$ Thin Films Annealed by Rapid Thermal Annealing

Ryo TOYAMA[1], Shiro KAWACHI[1,2], Soshi IIMURA[1], Jun-ichi YAMAURA[1,2], Youichi MURAKAMI[1,2], Hideo HOSONO[1], Yutaka MAJIMA[1]
[1]Tokyo Institute of Technology, [2]KEK

December 13, 2019

Oral Session 9

Time 16:30–18:20 Room Work-8

Chairperson Takeshi WATANABE

G5-13-I08 ▸Invited 16:30–16:50

Synchrotron x-ray characterization of highly functionalized catalysts and devices for a hydrogen society

Hideto IMAI
NISSAN ARC Ltd.

G5-13-I09 ▸Invited 16:50–17:10

Spectroscopy Measurements in Home lab Environment: HAXPES and Ambient Pressure for the Future

Susanna ERIKSSON
Scienta Omicron

G5-13-I10 ▸Invited 17:10–17:30

Operando and *in-situ* Analyses of Materials for Polymer Electrolyte Fuel Cells

Junji INUKAI
University of Yamanashi

G5-13-I11 ▸Invited 17:30–17:50

In situ X-ray Raman Scattering Spectroscopy of a Graphite Electrode for Li-ion Batteries

Takamasa NONAKA, Hiroyuki KAWAURA, Yoshinari MAKIMURA, Yusaku F. NISHIMURA, Kazuhiko DOHMAE
Toyota Central R&D Labs., Inc.

G5-13-O12 17:50–18:05

Distinct Electronic Character and Selective Control of Localized vs. Delocalized Carriers at (001) Surface of Anatase TiO_2

Jun FUJII[1], Chiara BIGI[1,2]
[1]CNR-IOM, [2]Università degli Studi di Milano

G5-13-O13 18:05–18:20

Synchrotron-based X-ray Absorptions Studies Diamond-like Carbon Films by Ar/CH_4 flow rates Dependence of PECVD Technique

Thanun CHUNJAEMSRI[1], Narong CHANLEK[1,2], Pinit KIDKHUNTHOD[1,2], Hideki NAKAJIMA[2], Sarayut TUNMEE[2], Rattikorn YIMNIRUN[3], Saroj RUJIRAWAT[1]
[1]Suranaree University of Technology, [2]Synchrotron Light Research Institute, [3]Vidyasirimedhi Institute of Science and Technology

December 13, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

G5-13-P01

Transmission Soft X-Ray Absorption Spectroscopy on Thin Films for Li-Ion Battery

Koji HORIBA[1], Miho KITAMURA[1], Kazunori NISHIO[2], Ryota SHIMIZU[2], Taro HITOSUGI[1], Hiroshi KUMIGASHIRA[1,3]
[1]Photon Factory, Institute of Materials Structure Science, High Energy Accelerator Research Organization, [2]School of Materials and Chemical Technology, Tokyo Institute of Technology, [3]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University

G5-13-P02

Laboratory Scale Hard X-ray Photoelectron Spectroscopy in Comparison with SPring-8

Tappei NISHIHARA[1], Hiroki KANAI[1], Takefumi KAMIOKA[1], Toshiro OKAWA[2], Ichiro HIROSAWA[3], Satoshi YASUNO[3], Koji USUDA[4]
[1]Meiji University, [2]Scientaomicron, [3]JASRI, [4]Toshiba Memori Co.

G5-13-P03

Characterization of Au/Ni Ohmic Contact on p-GaN Using Hard X-ray Photoelectron Spectroscopy and 2D-X-ray Diffraction

Satoshi YASUNO[1], Tomoyuki KOGANEZAWA[1], So KUROYANAGI[2], Naotaka IWATA[2]
[1]Japan Synchrotron Radiation Research Institute, [2]Toyota Technological Institute

G5-13-P04

Development of instrumentation for operando hard X-ray photoemission spectroscopy of organic thin film transistors

Takeshi WATANABE[1], Satoshi YASUNO[1], Noriyuki YOSHIMOTO[2], Ichiro HIROSAWA[1]
[1]Japan Synchrotron Radiation Research Institute, [2]Iwate University

G5-13-P05

Quantitative analysis of energy loss process for the core level intensities in Hard X-ray Photoemission

Takehisa KONISHI[1], Shigenori UEDA[2], Toyohiko KINOSHITA[3]
[1]Department of Chemistry, Chiba University, [2]Synchrotron X-ray Group, National Institute for Materials Science (NIMS), [3]Japan Synchrotron Radiation Research Institute (JASRI)

G5-13-P06

XPS and Reflectivity Investigation of Silicon Oxide Thin Film Sputtered on Aluminum Layer

Ekachai CHONGSEREECHAROEN
Suranaree University of Technology

G5-13-P07

Non-distractive Characterization of Thin Amorphous Film on Substrate by Grazing-incidence X-ray Scattering

Ichiro HIROSAWA, Satoshi YASUNO
Japan Synchrotron Radiation Research Institute

G5-13-P08

Thickness-Dependent Properties of Ultrathin Diamond-like Carbon Films Prepared by Filtered Cathodic Vacuum Arc.

Warintorn CHATARAT
Suranaree University of Technology

G5-13-P09

Stabilization of Charge Order Structure in Stoichiometric $YbFe_2O_4$

Kosuke FUJIWARA[1,2], Pierre-Eymeric JANOLIN[3], Stéphane GRENIER[4], Jean-Michel KIAT[3], Naoshi IKEDA[2]
[1]Japan Synchrotron Radiation Research Institute(JASRI), [2]Graduate School of Natural Science and Technology, Okayama University, [3]CentraleSupélec, [4]Institut NÉEL

G5-13-P10

Evaluation of Temperature and Ge Concentration Dependence of EXAFS Oscillations in SiGe thin Films

Kazutoshi YOSHIOKA[1], Ryo YOKOGAWA[1,2], Yuki TAKAHASHI[1], Haruki TAKEUCHI[1], Ichiro HIROSAWA[3], Takeshi WATANABE[3], Atsushi OGURA[1]
[1]Meiji University, [2]JSPS Research Fellow DC, [3]Japan Synchrotron Radiation Research Institute (JASRI)

Cluster H

Green Technology and Processing

Symposium

H-1 Advanced Water Science and Technology

H-2 Plasma-Based Synthesis, Processing and Characterization of Materials for Energy and Environment

H-3 5th E&J BLS Advanced Functional Oxides: Processing, Characterization and Devices

H-4 A3+ Lead-free Piezoelectric Materials and Applications

H-5 Intelligent Material Processes with Low Environmental Load and Energy Consumption

December 11–12, 2019

Symposium H-1

Advanced Water Science and Technology

[Organizers]

Osamu TAKAI (Kanto Gakuin University)
Katsuya TESHIMA (Shinshu University)

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December 11, 2019

Oral Session 1

Time 9:00–11:45 Room Miel-3

Chairpersons Katsuya TESHIMA, Norifumi ISU, Osamu TAKAI

Opening Talk: Osamu Takai
9:00–9:05

H1-11-I01 ▸Invited 9:05–9:25

Progress in Solution Plasma Research

Osamu TAKAI
Materials and Surface Engineering Research Institute, Kanto Gakuin University

H1-11-I02 ▸Invited 9:25–9:45

Antibacterial Ceramics and Uncertainty of Antibacterial Test Method

Norifumi ISU
LIXIL Corp.

H1-11-I03 ▸Invited 9:45–10:05

H_2O_2 Synthesis Using 3D Integrated Micro Solution Plasma and Improvement of Its Efficiency by Combining with Ion Exchange Resin

Tatsuru SHIRAFUJI, Shoma MIYAMOTO, Jun-Seok OH
Osaka City University

H1-11-I04 ▸Invited 10:05–10:25

Atmospheric-pressure Plasma Reactor Generated Plasma-activated Water

Jun-Seok OH, Yusuke SASAKI, Soshi IMAI, Tatsuru SHIRAFUJI
Osaka City University

H1-11-I05 ▸Invited 10:25–10:45

Selective Permeation of Solutes through Microporous Polymer Membranes prepared by Chemical Vapor Deposition

Mutsumi KIMURA
Shinshu University

H1-11-K06 ▸Keynote 10:45–11:15

A Perspective on Heterogeneous Integrated Edge Devices for Internet of Things (IOT) to Enable Green Energy Water Nexus

G.P. LI
University of California, Irvine

H1-11-O07 11:15–11:30

Solution Plasma Process: a novel method for wastewater treatment

MONGKOL TIPPLOOK[1], HYMIN KIM[2], SANGWOO CHAE[1,4], PHUWADEJ PORNAROONTHAM[1,4], NAGAHIRO SAITO[1,3,4,5]

[1]Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [2]LG Chem, Ltd., [3]Conjoint Research Laboratory in Nagoya University, Shinshu University, [4]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [5]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H1-11-O08 11:30–11:45

The Hardness of Single Crystal Sapphire under Controlled High Temperature

Toshiro OKAWA[1,2], Katsuhiko TASHIRO[2,3], Hideo HONMA[2,3], Osamu TAKAI[2,3]

[1]ScientaOmicron Inc., [2]Materials & Surface Engineering Research Institute, Kanto Gakuin University, [3]Research Advancement and Management Organization, Kanto Gakuin University

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Miel-3

Chairpersons Chiaki TERASHIMA, Masahiro MOTOSUKE

H1-11-I09 ▸Invited 16:30–16:50

Blood Flow Characterization for Advanced Diagnostics

Masahiro MOTOSUKE

Tokyo University of Science

H1-11-I10 ▸Invited 16:50–17:10

Development of Polymer Nano-Film Synthesized on Self-Assembled Phospholipid Layer Fabricated by Plasma-Assisted Method

Shin-ichi KONDO[1], Yasushi SASAI[1], Naoki DOI[1], Yukinori YAMAUCHI[2], Masayuki KUZUYA[3]

[1]Gifu Pharmaceutical University, [2]College of Pharmaceutical Sciences, Matsuyama University, [3]Faculty of Human Welfare, Chubu Gakuin University

H1-11-I11 ▸Invited 17:10–17:30

Preparation of Corrosion Resistant Composite Hydroxide Films on Magnesium Alloys by Steam Coating

Takahiro ISHIZAKI, Tomohiro MIYASHITA, Momo INAMURA, Yuma NAGAHIMA

Shibaura Institute of Technology

H1-11-I12 ▸Invited 17:30–17:50

A Superhydrophilic Property and Antireflectivity of a Hierarchical Nanoporous Layer Glass

Takuya FUJIMA[1,2], Erika TABATA[1], Takumi ITO[1], Yuki USHIODA[1]

[1]Department of Mechanical Engineering, Tokyo City University, [2]Advanced Research Laboratories, Tokyo City University

H1-11-I13 ▸Invited 17:50–18:10

Photofuel Cells Using Porous Titania Anodes

Hiromasa NISHIKIORI

Shinshu University

H1-11-I14 ▸Invited 18:10–18:30

Direct Pattern Plating on UV-modified Resins by Electroless Plating Method

Yoshio HORIUCHI[1], Michinori TAKAGI[2], Mikio USHIYAMA[3], Manabu YASUI[3], Mitsuhiro WATANABE[1], Osamu TAKAI[1], Hideo HONMA[1]

[1]Materials and Surface Engineering Research Institute, Kanto Gakuin University, [2]Azuma, [3]Kanagawa Institute of Industrial Science and Technology

December 12, 2019

Oral Session 4

Time 9:00–12:25 Room Miel-3

Chairpersons Tomonaga UENO, Tomohito SUDARE, Yosuke KAGESHIMA

H1-12-I01 ▸Invited 9:00–9:20

Enhanced Photoelectrochemical Water Reduction on the Photocathode Modified with Pt-Loaded TiO_2 Nanoparticles

Yosuke KAGESHIMA

Shinshu University

H1-12-I02 ▸Invited 9:20–9:40

Tunable Heteroatom-doped Carbon as Economic and Efficient Oxygen Evolution Reaction Catalysts in Water Electrolysis

Oi Lun Helena LI, Wenui YAO, Jihoon KIM

Pusan National University

H1-12-I03 ▸Invited 9:40–10:00

Solar light-driven Photocatalysis/Photoelectrocatalysis Water Pollutant Treatment: Pathways to Circular Economy

Sudhagar PITCHAIMUTHU

Swansea University

H1-12-I04 ▸Invited 10:00–10:20

High Speed Nickel plating using Watt Nickel plating solution

Yasushi UMEDA

Kanto Gakuin University Materials & Surface Engineering Research Institute

H1-12-I05 ▸Invited 10:20–10:40

Efficient water purification by synergetic effect on mesoporous TiO_2/BDD hybrid electrode

Norihiro SUZUKI[1], Akihiro OKAZAKI[2], Aiga HARA[1], Yuiri HIRANO[1], Yukihiro NAKABAYASHI[1], Nitish ROY[1], Haruo KURIYAMA[2], Izumi SERIZAWA[2], Chiaki TERASHIMA[1], Kazuya NAKATA[1], Ken-ichi KATSUMATA[1], Takeshi KONDO[1], Makoto YUASA[1], Akira FUJISHIMA[1]

[1]Tokyo University of Science, [2]ORC Manufacturing Co., Ltd

H1-12-I06 ▸Invited 10:40–11:00

Deposition of Copper on Glass Substrates Using a Titanium Oxide Adhesion Layer

Christopher E. J. CORDONIER, Kyohei OKABE, Hideo HONMA
Kanto Gakuin University, Materials & Surface Engineering Research Institute

H1-12-I07 ▸Invited 11:00–11:20

Adsorption-induced Electrochromic Phenomenon of Indium-nitride Films in Aqueous Solutions

Yasushi INOUE
Chiba Institute of Technology

H1-12-I08 ▸Invited 11:20–11:40

Aqueous Solution-based Self-Assembly of 3D Carbon Nanotube Network For High Energy Density Lithium Ion Batteries

Nobuyuki ZETTSU, Dae-wook KIM, Hye-min KIM, Katsuya TESHIMA
Shinshu University

H1-12-O09 11:40–11:55

Fabrication of Three-Dimensional Structure by High-Speed Copper Sulfate Plating

Yohei SUZUKI, Yasushi UMEDA, C.E.J CORDONIER, Hideo HONMA, Osamu TAKAI, Joo-Hyong NOH
Kanto Gakuin University

H1-12-O10 11:55–12:10

Surface Modification of Di-Electric Material using Photo Pretreatment

JONG-YOUNG PARK[1,2,3], YOUNG-JAE KIM[2,3], HIDEO HONMA[1,2,3], JOO-HYONG NOH[1,2,3]
[1]Department of Materials and Surface Engineering, Graduate School of Engineering, Kanto Gakuin University, [2]Materials and Surface Engineering Research Institute, Kanto Gakuin University, [3]Daeduck Electronics Co. Ltd

H1-12-O11 12:10–12:25

Intelligent manipulation and transportation of water in the magnetic tubular microactuators(MTMAs)

Wenwei LEI[1,2], Norihiro SUZUKI[1], Chiaki TERASHIMA[1], Akira FUJISHIMA[1], Lei JIANG[2]
[1]Tokyo University of Science, [2]Beihang University

December 12, 2019

Oral Session 5

Time 14:00–16:00 Room Miel-3

Chairpersons Tatsuru SHIRAFUJI, Jun-Seok OH

H1-12-I12 ▸Invited 14:00–14:20

Flash Lamp Annealing Method for Plated Films on Resin Substrates

Joo-Hyong NOH[1,2], YUSUKE MIYAZEKI[1,3], JONG-YOUNG PARK[1,2,4], YOSHIO HORIUCHI[1], TARO ARAKAWA[3], OSAMU TAKAI[1], HIDEO HONMA[1,2]
[1]Materials and Surface Engineering Research Institute, Kanto Gakuin University, [2]Graduate School of Engineering, Kanto Gakuin University, [3]Graduate School of Engineering, Yokohama National University, [4]Daeduck Electronics Co. Ltd.

H1-12-I13 ▸Invited 14:20–14:40

Formation of High Adhesion Metal Films on ABS Resin by Closed Systemized Fine Bubble Low Ozonated Water

Katsuhiko TASHIRO
Kanto Gakuin University

H1-12-I14 ▸Invited 14:40–15:00

Paper-based Biofuel Cell for Next Generation Energy Harvester and Wearable Healthcare Device

Isao SHITANDA
Tokyo University of Science

H1-12-I15 ▸Invited 15:00–15:20

Green and sustainable anticorrosive coating technology using steam on Aluminum alloys

Ai SERIZAWA, Kohei WATANABE, Takeo KOIKE, So Yoon LEE, Takahiro ISHIZAKI
Shibaura Institute of Technology

H1-12-I16 ▸Invited 15:20–15:40

Water Freezing Behavior on Aluminum Alloy Modified with Various Functional Groups

Junko HIEDA
Nagoya University

H1-12-I17 ▸Invited 15:40–16:00

Transformation of bulk alloys to metal-organic and ceramic nanowires

Kostiantyn TURCHENIUK, Fujia WANG, Shunrui LUO, Danni LEI, Jim BENSON, Alexandre MAGASINSKY, Gleb YUSHIN, Ting ZHU, Baolin WANG
Georgia Institute of Technology

December 12, 2019

Oral Session 6

Time 16:30–18:40 Room Miel-3

Chairpersons Nobuyuki ZETTSU, Takahiro ISHIZAKI, Ai SERIZAWA

H1-12-K18 ▸Keynote 16:30–17:00

Engineering Perspectives of Water and Ionic Solution Constrained at Interfacial Nanostructures

Katsumi KANEKO
Shinshu University

H1-12-I19 ▸Invited 17:00–17:20

Molecular Recognition of Water Isotopes on Porous Coordination Polymer

Hideki TANAKA[1], Shotaro HIRAIDE[2], Kazuhiro NAGAI[2], Abhishek BAGUSETTY[3], J. Karl JOHNSON[3], Minoru T. MIYAHARA[2], Katsumi KANEKO[1], Katsuya TESHIMA[1]
[1]Shinshu University, [2]Kyoto University, [3]University of Pittsburgh

H1-12-I20 ▸Invited 17:20–17:40

Synthesis of Activated carbon with iron for water treatment

Yuki KAMIMOTO
Nagoya University

H1-12-I21 ▸Invited 17:40–18:00

Boron-Doped Diamond Powder as a Functional Electrode Material

Takeshi KONDO
Tokyo University of Science

H1-12-I22 ▸Invited 18:00–18:20

Separation and Purification Using Microporous Materials

Takeshi HAGIO[1,2], Supinya NIJPANICH[2], Hiroto KUNISHI[2], Takaaki SAKASHITA[2], Yuki KAMIMOTO[1], Ryoichi ICHINO[1,2,3]
[1]Institute of Materials Innovation, Institutes of Innovation for Future Society, Nagoya University, [2]Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [3]Green Mobility Research Institute, Institutes of Innovation for Future Society, Nagoya University

H1-12-I23 ▸Invited 18:20–18:40

Selective Removal of Nitrate ions by F-Substituted Layered Double Hydroxides (LDHs): Purification of Waste Water

Tomohito SUDARE[1], Masahiro KIYAMA[2], Fumitaka HAYASHI[2], Katsuya TESHIMA[1,2]
[1]Research Initiative for Supra-Materials, Shinshu University, [2]Department of Materials Chemistry, Faculty of Engineering, Shinshu University

December 11, 2019

Poster Session

Time 11:30–13:00 Room Trade-0

H1-11-P01 ▸Invited

Anti-algae Effect of Water Treated by In-liquid Plasma Bubbled with Air

Chiaki TERASHIMA
Tokyo University of Science

H1-11-P02

Advantages of Stimuli-responsive Amphiphiles for Removal of Noble-metal Nanoparticles from Water

Clara IMURA, Yuko ANDA, Saki IIJIMA
Ochanomizu University

H1-11-P03

Development of solution plasma technology for sustainable nitrogen circulation system

Genji OKADA[1,2,3], Norihiro SUZUKI[2,3], Ken-ichi KATSUMATA[2,3], Yoshimi NISHIMURA[4], Takeshi KONDO[1,2], Makoto YUASA[1,2,3], Akira FUJISHIMA[2], Chiaki TERASHIMA[2,3,5]
[1]Tokyo University of Science, [2]Photocatalysis International Research Center, TUS, [3]Research Center for Space Colony, TUS, [4]Kurita Manufacturing Co.,Ltd, [5]Research Initiative for Supra-Materials, Shinshu University

H1-11-P04

Pharmaceuticals Decomposition by Solution Plasma for Application to Water Purification Technology

Yuki HIRAMI[1,2,3], Vicente Rodriguez GONZALEZ[2,4], Norihiro SUZUKI[2,3], Ken-ichi KATSUMATA[2,3], Takeshi KONDO[1,2], Yoshimi NISHIMURA[5], Makoto YUASA[1,2,3], Akira FUJISHIMA[2], Chiaki TERASHIMA[2,3,6]
[1]Graduation School of Science and Technology, Tokyo University of Science, [2]Photocatalysis International Research Center, [3]Research Center for Space Colony, [4]Institute for Science and Technological Research of Sun Luis Potosi, [5]Kurita Manufacturing Co. Ltd., [6]Research Initiative for Supra-Materials

H1-11-P05

Evaluation of Formic Acid Adsorption Performance at the Surface of Hydro-garnet Materials by First Principles Calculation

Kunihiro ISHIDA[1], Kentarou WATANABE[1], Naoto TANIBATA[1,2], Masanobu NAKAYAMA[1,2,3], Hirotaka MAEDA[1]
[1]Nagoya Institute of Technology, [2]Kyoto University ESICB of Elements Strategy Initiative for Catalysts and Batteries, [3]MaDiS/CMi2 , NIMS of National Institute for Materials Science

H1-11-P06

Production of Liquid Fertilizer by Flow-type In-liquid Plasma Device

Mao SASAKI[1], Shoki SUZUKI[1,2,3], Norihiro SUZUKI[2,3], Ken-ichi KATSUMATA[2,3], Yoshimi NISHIMURA[4], Takeshi KONDO[1,2], Makoto YUASA[1,2,3], Akira FUJISHIMA[2], Chiaki TERASHIMA[2,3,5]
[1]Tokyo University of Science, [2]Photocatalysis International Research Center, [3]Research Center for Space Colony, [4]Kurita Manufacturing Co.,Ltd., [5]Research Initiative for Supra-Materials

H1-11-P07

Spectroscopic Study for Fluorescein Adsorbed on TiO_2 Surface by Surface-Enhanced Infrared Absorption Spectroscopy

Hayato KONDO[1], Yosuke KAGESHIMA[1,2], Katsuya TESHIMA[1,2], Hiromasa NISHIKIORI[1,2]
[1]Department of Materials Chemistry, Faculty of Engineering, Shinshu University, [2]Research Initiative for Supra-Materials (RISM), Shinshu University

H1-11-P08

Effective Utilization of Cellulose Thin Film Deposited on Porous TiO_2 Photoanode in a Photofuel Cell

Takumi YOSHIMURA[1], Yosuke KAGESHIMA[1,2], Katsuya TESHIMA[1,2], Hiromasa NISHIKIORI[1,2]
[1]Department of Materials Chemistry, Faculty of Engineering, Shinshu University, [2]Research Initiative for Supra-Materials (RISM), Shinshu University

H1-11-P09

Advanced oxidation process for water purification using deep-ultraviolet light TiO2 nano composite electrode

Akihiro OKAZAKI[1], Haruo KURIYAMA[1], Izumi SERIZAWA[1], Aiga HARA[2], Yuiri HIRANO[2], Yukihiro NAKABAYASHI[2], Nitish ROY[2], Norihiro SUZUKI[2], Chiaki TERASHIMA[2], Kazuya NAKATA[2], Ken-ichi KATUMATA[2], Akira FUJISHIMA[2]
[1]ORC Manufacturing, [2]Tokyo University of Science

H1-11-P10

Formation of a silane/$Mg(OH)_2$ corrosion resistant composite film on flame-resistant AX41 alloy by combination of steam coating and spin coating treatments

Tomohiro MIYASHITA[1], Momo INAMURA[1], Hiraku MUTO[1], Takahiro ISHIZAKI[2]
[1]Materials Science and Engineering, Graduate School of Engineering and Science, Shibaura Institute of Technology, [2]Department of Materials Science and Engineering, College of Engineering, Shibaura Institute of Technology

H1-11-P11

Corrosion resistance of films formed on thermally treated Mg-6Al-1Zn-2Ca alloy by steam coating

Momo INAMURA[1], Tomohiro MIYASHITA[1], Hiraku MUTO[1], Takahiro ISHIZAKI[2]
[1]Materials Science and Engineering, Graduate School of Engineering and Science, Shibaura Institute of Technology, [2]Department of Materials Science and Engineering, College of Engineering, Shibaura Institute of Technology

H1-11-P12

Fabrication of Structural Controlled Carbon Nanotube Ultralight Material

Kazuki MATSUSHIMA, Naoto SHIOURA, Tomonaga UENO
Nagoya University

H1-11-P13

Effects of Particle Size of $(ZnSe)_{0.85}(CuIn_{0.7}Ga_{0.3}Se_2)_{0.15}$ on Photoelectrochemical Performances in Sunlight-Driven Water Reduction

Fumiaki TAKAGI[1], Yosuke KAGESHIMA[1,2], Katsuya TESHIMA[1,2], Kazunari DOMEN[1,2], Hiromasa NISHIKIORI[1,2]
[1]Faculty of Engineering, Shinshu University, [2]Research Initiative for Supra-Materials (RISM), Shinshu University

H1-11-P14

Corrosion resistance of composite hydroxides film formed on Al-Zn-Mg alloy by steam coating

Hiraku MUTO[1], Tomohiro MIYASHITA[1], Momo INAMURA[1], Takahiro ISHIZAKI[2]
[1]Materials Science and Engineering, Graduate School of Engineering and Science, Shibaura Institute of Technology, [2]Department of Materials Science and Engineering, Faculty of Engineering, Shibaura Institute of Technology

H1-11-P15

Generation of Hydrophobic Effect on Nickel 3D Structure by Electroplating

Shinya TAKO[1], Tomofumi MOCHIZUKI[2], Masahiro NAKAYAMA[3], Yohei KOTSUCHIBASHI[4], Katsuhiko TASHIRO[5,6], Hideo HONMA[5,6], Osamu TAKAI[5,6]
[1]Kanto Gakuin University Graduate School of Engineering, [2]Hamamatsu Industrial Research Institute, [3]Nakayama Precious Metal Plating Co. Ltd., [4]Shizuoka Institute of Science and Technology, Department of Materials and Life Science, [5]Kanto Gakuin University Materials and Surface Engineering Research Institute, [6]Research Advancement and Management Organization, Kanto Gakuin University

H1-11-P16

One-pot Synthesis of MnO_2-Carbon Hybrids For Enhancement of the Cationic Dyes Removal

Hymin KIM[1], Seulgee LEE[2,3], Nagahiro SAITO[2,4,5,6]
[1]LG chem., [2]Department Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [3]Division of Marine Engineering, Koream maritime and ocean University, [4]Conjoint Research Laboratory in Nagoya University, Shinshu University, [5]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [6]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H1-11-P17

Molecular orientation control in a PEDOT transparent conductive film by hydrodynamic interaction

Yushi FUJITA[1], Keita YASUMORO[1], Takuya FUJIMA[1,2]
[1]Department of Mechanical Engineering / Tokyo City University, [2]Advanced Research Laboratories, Tokyo City University

H1-11-P18

Flux Growth of Layered Sodium Titanate Crystals with Hierarchical Structure for Water Purifier Application

Taichi SAKAMAKI[1], Fumitaka HAYASHI[1], Tomohito SUDARE[2], Katsuya TESHIMA[1,2]
[1]Department of Materials Chemistry, Shinshu University, [2]Research Initiative for Supra-Materials, Shinshu University

H1-11-P19

Highly-stable Glucose/Oxygen Biofuel Cell based on Carbon Cloth Electrodes modified with Poly(glycidyl methacrylate)-grafted MgO-templated Porous Carbon

Takanao KATO[1], Yoshinao HOSHI[1], Isao SHITANDA[1,2], Masayuki ITAGAKI[1,2], Seiya TSUJIMURA[2,3]
[1]Department of Pure and Applied Chemistry, Faculty of Science and Technology, Tokyo University of Science, [2]Research Institute for Science and Technology, Tokyo University of Science, [3]Division of Material Science, Faculty of Pure and Applied Science

H1-11-P20

Durability of Hirarchical Nanoporous Layer Glass Functionality at High Temperature

Takumi ITO[1], Erika TABATA[1], Yuki USHIODA[1], Takuya FUJIMA[1,2]
[1]Department of Mechanical Engineering, Tokyo City University, [2]Advanced Research Laboratories, Tokyo City University

H1-11-P21

Flux Growth of Single-Crystalline, Layered $K_2Ti_2O_5$ Particles and Their Ion Exchange Property

Nanako TATEWAKI[1], Fumitaka HAYASHI[1], Tomohito SUDARE[2], Katsuya TESHIMA[1,2]
[1]Department of Materials Chemistry, Shinshu University, [2]Research Initiative for Super-Materials, Shinshu University

H1-11-P22

Gas-Liquid Interfacial Plasma Polymerization of EDOT

Jun-Seok OH, Shunta HIRANO, Ryoga KONISH, Tatsuru SHIRAFUJI
Osaka City University

H1-11-P23

Renovation Water Permeability of a Continuous Porous Dielectric Using Propagation of Plasma Bullets

Tatsuru SHIRAFUJI, Yuki HAMAMOTO, Ryo MATOBA, Jun-seok OH
Osaka City University

H1-11-P24

Screen-printing of Chitosan Film for Improvement of Paper-based Lactate Biofuel Cell Stability

Kanako ODA[1], Yoshinao HOSHI[1], Isao SHITANDA[1,2], Masayuki ITAGAKI[1,2], Seiya TSUJIMURA[2,3], Abdelkader ZEBDA[4]
[1]Department of Pure and Applied Chemistry, Faculty of Science and Technology, Tokyo University of Science, [2]Research Institute for Science and Technology, Tokyo University of Science, [3]Division of Material Science, Faculty of Pure and Applied Science, University of Tsukuba, [4]UGA-Grenoble 1/CNRS/INSERM/TIMC-IMAG UMR 5525

H1-11-P25

Development of a highly durable PEDOT transparent conductive film using a macro-separated composition

Keita YASUMRO[1], Yushi FUJITA[1], Takuya FUJIMA[1,2]
[1]Department of Mechanical Engineering, Tokyo City University, [2]Advanced Research Laboratories, Tokyo City University

December 11, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

H1-11-P26 ▸Invited

Flux Crystal Growth Innovation for Advanced Water Science and Technology

Katsuya TESHIMA
Shinshu University

H1-11-P27

Synthesis of Phosphorus-doped Diamond by In-liquid Microwave Plasma CVD Process

Akihiro UCHIDA[1], Chiaki TERASHIMA[1,2], Hiroshi UETSUKA[1,3], Norihiro SUZUKI[1], Ken-ichi KATSUMATA[1], Masayuki ITAGAKI[1], Isao SHITANDA[1], Yoshinao HOSHI[1], Takeshi KONDO[1], Akira FUJISHIMA[1]
[1]Tokyo University of Science, [2]Shinshu University, [3]Asahi Diamond Industrial Co., Ltd.

H1-11-P28

Development of photocatalytic $HTiO_{2-x}$ by plasma treatment in liquid

Junki ISHII[1,2], Shoki SUZUKI[1,2], Norihiro SUZUKI[2], Ken-ichi KATSUMATA[2], Kazuya NAKATA[1,2], Takeshi KONDO[1,2], Makoto YUASA[1,2], Akira FUJISHIMA[2], Chiaki TERASHIMA[2]
[1]Tokyo University of Science, [2]Photocatalysis International Research Center

H1-11-P29

Protection of the important cultural property using a self-cleaning effect by the photocatalyst

Kazuki KATO[1,2], Chiaki TERASHIMA[2], Norihiro SUZUKI[2], Ken-ichi KASTUMATA[2], Takeshi KONDO[1,2], Makoto YUASA[1,2], Akira FUZISHIMA[2], Tomonori SUZUKI[3]
[1]Department of Pure and Applied Chemistry, Tokyo University of Science, [2]Photocatalysis International Research Center, Tokyo University of Science, [3]Department of Applied Biological Science, Tokyo University of Science

H1-11-P30

Development of Selective Hydrophilic / Hydrophobic Surface Treatment for Semiconductor Substrate

Hiroshi IKARI[1], Chiaki TERASHIMA[2], Norihiro SUZUKI[2], Ken-ichi KATSUMATA[2], Takeshi KONDO[1,2], Makoto YUASA[1,2], Akira FUJISHIMA[2]
[1]Graduate School of Science and Technology, Tokyo University of Science, [2]Photocatalysis International Research Center

H1-11-P31

Fabrication of Ni-Co Layered Double Hydroxides via Topotactic Reaction for Efficient Removal of Nitrate Ions : Purification of Waste Water

Shuhei TAMURA[1], Tomohito SUDARE[2], Fumitaka HAYASHI[1], Katsuya TESHIMA[1,2]
[1]Department of Materials Chemistry, Shinshu University, [2]Research Initiative for Supra-Materials, Shinshu University

H1-11-P32

Concentration of trace components in the environmental water using freezing and melting process of eutectics of salt and water

Yuko NISHIMOTO, Masaru ARAI
Kanagawa Univ.

H1-11-P33

Analysis on Biocathode based on MgO-templated Carbon-modified Carbon Cloth by 3D Impedance Spectroscopy

Hiromichi INOUE[1], Yoshinao HOSHI[1], Isao SHITANDA[1,2], Masayuki ITAGAKI[1,2], Seiya TSUJIMURA[2,3]
[1]: Department of Pure and Applied Chemistry, Faculty of Science and Technology, Tokyo University of Science, [2]Research Institute for Science and Technology, Tokyo University of Science, [3]Division of Material Science, Faculty of Pure and Applied Science, University of Tsukuba

H1-11-P34

Liquid Phase Plasma Synthesis of Amino-Rich Carbonaceous as an Efficient Adsorbent for Removal of Heavy Metal Ions

Mongkol TIPPLOOK[1], Andres Eduardo ROMERO VALENZUELA[1], Nagahiro SAITO[1,2,3,4]
[1]Department of Chemical System Engineering. Graduate School of Engineering. Nagoya University, [2]Conjoint Research Laboratory in Nagoya University, Shinshu University, [3]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [4]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H1-11-P35

Fabrication of Porous Silica / Carbon Nanotube Composite Materials for Thermal Insulator

Naoto SHIOURA[1], Kazuki MATSUSHIMA[1], Tomoki OSATO[1], Tomonaga UENO[1], Norifumi ISU[2], Takeshi HASHIMOTO[3], Takumi YANA[3]
[1]Nagoya University, [2]LIXIL Corp., [3]Meijo Nano Carbon Co., Ltd.

H1-11-P36 ▸Invited

Pattern formation in heterostructured medium by reaction-diffusion system

Tomonaga UENO
Nagoya University

H1-11-P37

Capillary Condensation on Hierarchical Nanoporus Layer Glass

Erika TABATA[1], Yuki USHIODA[1], Takumi ITO[1], Takuya FUJIMA[1,2]
[1]Faculty of Engineering, Tokyo City University, [2]Advanced Research Laboratries, Tokyo City University

H1-11-P38

Surface modification of B-doped diamond using H_2O RF plasma

Yukihiro SAKAMOTO
Chiba Institute of Technology

H1-11-P39

A Porous Layer Formation on Glaze for a Superhydrophilic Anti-Fouling Tile

Yuki USHIODA[1], Erika TABATA[1], Takumi ITO[1]
[1]Department of Mechanical Engineering Tokyo City University, [2]Advanced Research Laboratories Tokyo City University

H1-11-P40

Study on Aging Effect of Adhesion Strength between Polyimide Film and Copper Layer

Changmyeon LEE[1,2], Hongkee LEE[2], Hideo HONMA[1,3], Osamu TAKAI[3], Joo-Hyong NOH[1,3], Jun-Mi JEON[2]
[1]Graduate School of Engineering/Kanto Gakuin University, [2]Surface treatment group/Korea Institute of Industrial Technology, [3]Materials and Surface Engineering Research Institute/Kanto Gakuin University

H1-11-P41 ▸Invited

Protein adsorption behavior on reduced graphene oxide and boron-doped diamond

Madoka TAKAI[1], Chiaki TERASHIMA[2], Yixuan HUANG[1]
[1]The University of Tokyo, [2]Tokyo University of Science

H1-11-P42

Flash Lamp Annealing Effect on low-dielectric thin film

Byeong-Jae CHOI[1,2], Jong-Young PARK[1,2,3], Hideo HONMA[1,2], Joo-Hyong NOH[1,2]
[1]Graduate School of Engineering, Kanto Gakuin University, [2]Materials and Surface Engineering Research Institute, Kanto Gakuin University, [3]Daeduck Electronics Co. Ltd.

H1-11-P43

Flux Growth of Crystalline Titanosilicate $K_2TiSi_3O_9$ Hexagonal Plates for Water Purifier Application

Fumitaka HAYASHI[1], Mizuho KIYOHARA[1], Yongsu KIM[1], Tomohito SUDARE[2], Katsuya TESHIMA[1,2]
[1]Department of Materials Chemistry, Shinshu University, [2]Research Initiative for Supra-Materials, Shinshu University

H1-11-P44

Ion Exchange Properties of NiFe Layered Double Hydroxides Crystals Fabricated via Topotactic Reaction: Purification of Waste Water

Kazuki HIRONO[1], Tomohito SUDARE[2], Fumitaka HAYASHI[1], Katsuya TESHIMA[1,2]
[1]Department of Materials Chemistry, Shinshu University, [2]Research Initiative for Supra-Materials, Shinshu University

H1-11-P45

Painted Diamond Electrode for Electrolytic Water Treatment

Takeshi KONDO[1], Haruka NAKAJIMA[1], Shuji EZURA[1], Eiichi KANEDA[2], Toshifumi TOJO[1], Makoto YUASA[1]
[1]Tokyo University of Science, [2]A1 Technica Co., Ltd.

H1-11-P46

Sensitive Detection of Ciplofloxacin at Screen-Printed Diamond Electrode by Control of Surface Termination of Boron-Doped Diamond Powder

Tomohiro MATSUNAGA, Takeshi KONDO, Toshifumi TOJO, Makoto YUASA
Tokyo University of Science

H1-11-P47

Application of Boron-Doped Nanodiamond to Aqueous Supercapacitors

Seiya SUGAI[1], Kenjo MIYASHITA[1], Takeshi KONDO[1], Masahiro NISHIKAWA[2], Takehiro TEI[2], Toshifumi TOJO[1], Makoto YUASA[1]
[1]Tokyo University of Science, [2]Daicel Corporation

H1-11-P48

Evaluation of Wettability and Corrosion Resistance of SiO:CH Coatings Deposited on SUS304 Substrate by PECVD

Mamoru YAZAKI[1], Masahiro KANNO[1], Kyosuke KUREHA[1], Yasushi INOUE[1], Osamu TAKAI[2]
[1]Chiba Institute of Technology, [2]Kanto Gakuin University

H1-11-P49

Analysis of Local Ion Concentration Near Membrane by Dynamic Complex Impedance Measurement in Electrolyte / Reverse Osmosis Membrane System

Atsushi TANAKA[1,2], Hirosuke TATSUMI[3], Katsuya TESHIMA[1,2]
[1]Research Initiative for Supra-Materials, Shinshu University, [2]Grobal Aqua innovation Center, Shinshu University, [3]Department of Science, Shinshu University

H1-11-P50

Study of Bacterial Adhesion Strength on Phospholipid Copolymer Coating Surfaces by Analysis with Microchannel

Madoka TAKAI[1], Zhou LU[1], Tsukuru MASUDA[1], Norifumi ISU[2]
[1]The University of Tokyo, [2]LIXIL corporation

December 11–13, 2019

Symposium H-2

Plasma-Based Synthesis, Processing and Characterization of Materials for Energy and Environment

[Organizers]

Masaharu SHIRATANI (Kyushu University)
Kunihiro KAMATAKI (Kyushu University)
Kazuo TERASHIMA (The University of Tokyo)
Yuichi SETSUHARA (Osaka University)
Jin-Hyo BOO (Sungkyunkwan University)
Uroš CVELBAR (Jožef Stefan Institute)

December 11, 2019

Oral Session 1

Time 9:00–11:30 Room Mont-3

Chairperson Hajime SHIRAI

H2-11-I01 ▸Invited 9:00–9:30

Low Temperature Plasma Deposition Processes: From Amorphous Silicon to Epitaxial Growth and Nanowires

Pere ROCA I CABARROCAS

LPICM, CNRS, Ecole polytechnique

H2-11-O02 9:30–9:45

Defect Control of Plasma Synthesized Free-standing Silicon Nanocrystals

Shogo SHIBATA, Shuhei WAKAMATSU, Firman Bagja JUANGSA, Tomohiro NOZAKI

Tokyo Institute of Technology

H2-11-O03 9:45–10:00

Printable Organic-Inorganic Hybrid Solar Cell via Silicon Inks

Munechika OTSUKA[1], Yi DING[2], Shogo SHIBATA[1], Firman Bagja JUANGSA[1], Yuki KUROKAWA[3], Takehito KATO[3], Tomohiro NOZAKI[1]

[1]Department of Mechanical Engineering, Tokyo Institute of Technology, [2]Institute of Photoelectronic Thin Film Devices and Technology, Nankai University, [3]Department of Mechanical Engineering, National Institute of Technology, Oyama College

H2-11-I04 ▸Invited 10:00–10:30

Highly transparent Pt-free dye-sensitized solar cells

Hyunwoong SEO

Department of Energy Engineering, Inje University

H2-11-O05 10:30–10:45

Therma- and plasma-ALD Al_2O_3/n-Si field effect inversion layer for PEDOT:PSS/n-Si heterojunction solar cells

Md Enamul KARIM[1], Arifuzzaman RAJIB[1], Tomofumi UKAI[2], A.T.M. Saiful ISLAM[1], Shunji KUROSU[2], Yasuhiko FUJII[2], Masahide TOKUDA[2], Tatsuro HANAJIRI[2], Ryo ISHIKAWA[1], Keiji UENO[1], Hajime SHIRAI[1]

[1]Saitama University, [2]Toyo University

H2-11-I06 ▸Invited 10:45–11:15

Plasma Process Silicon Quantum Dots and Perovskites Hybrids for PV

Vladimir SVRCEK[1], Calum MCDONALD[1], Conor ROCKS[1,2], Davide MARIOTTI[2], Takuya MATSUI[1]

[1]AIST Tsukuba, [2]University of Ulster, BT37 0QB, Northern Ireland, UK

H2-11-O07 11:15–11:30

Highly-transparent photovoltaic cell based on atomically thin 2D materials

Xing HE[1], Yoshiki YAMAGUCHI[1], Toshiro KANEKO[1], Toshiaki KATO[1,2]

[1]Tohoku University, [2]JST-PRESTO

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Mont-3

Chairperson Kunihiro KAMATAKI

H2-11-I08 ▸Invited 16:30–17:00

Photoelectrochemical Water Splitting for Hydrogen Production with Ternary Oxide Materials

Min-Kyu SON

Kyushu University

H2-11-O09 17:00–17:15

Kinetic study of plasma mediated heterogeneous catalysis of biogas

Yoshiki WATANABE, Kenta SAKATA, Seigo KAMESHIMA, Zunrong SHENG, Tomohiro NOZAKI

Tokyo Institute of Technology

H2-11-O10 17:15–17:30

Non-thermal plasma as a powerful tool to synthesize bio-effective materials in solutions

Hiromasa TANAKA, Masaaki MIZUNO, Kenji ISHIKAWA, Hiroki KONDO, Hiroshi HASHIZUME, Yasumasa OKAZAKI, Shinya TOYOKUNI, Kae NAKAMURA, Nobuhisa YOSHIKAWA, Hiroaki KAJIYAMA, Fumitaka KIKKAWA, Masaru HORI

Nagoya University

H2-11-I11 ▸Invited 17:30–18:00

Plasmon-Enhanced Plasma Processing of N-doped Graphene for Fuel-cell Catalysts

Takeshi KITAJIMA, Ginga SATOH, Toshiki NAKANO

National Defense Academy

H2-11-I12 ▸Invited 18:00–18:30

Investigation of Impact of Plasma Fluctuation Driven by Amplitude Modulated VHF Discharge on Growth of Nanoparticles in Reactive Plasma

Kunihiro KAMATAKI, Ryosuke IWAMOTO, Hayate TANAKA, Daisuke YAMASHITA, Naho ITAGAKI, Kazunori KOGA, Masaharu SHIRATANI
Kyushu University

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Work-3

Chairperson Hiroki KONDO

H2-12-I01 ▸Invited 9:00–9:30

Facile improvement in cycle capacity with PFE Si:SnOx nanocomposites for lithium secondary batteries

Makoto KAMBARA
The University of Tokyo

H2-12-I02 ▸Invited 9:30–10:00

High-Speed Visualization of Metal Oxide Precursor in Thermal Plasma during Nanoparticle Synthesis Process

Manabu TANAKA, Yuki SAITO, Takayuki WATANABE
Kyushu University

H2-12-O03 10:00–10:15

Formation Mechanism of Tungsten Boride Nanoparticles by Induction Thermal Plasma

Libei LIU, Yuta TANOUE, Manabu TANAKA, Takayuki WATANABE
Kyushu University

Break
10:15–10:30

H2-12-O04 10:30–10:45

Reaction Mechanisms of High-Fluorine-Content Reactive Ion etching (RIE) and Atomic Layer Etching (ALE) of Si and SiO_2

Erin Joy Capdos TINACBA
Osaka University

H2-12-O05 10:45–11:00

Energy distribution measurement of substrate incident charged particles in DC magnetron discharge of oxide target

Masaki ISHIBA
Graduate School of Engineering, Nagasaki University

H2-12-I06 ▸Invited 11:00–11:30

Development of a direct bonding process by using high-frequency Ar plasma jet

Giichiro UCHIDA[1], Rikuro MACHIDA[2], Kosuke TAKENAKA[2], Yuichi SETSUHARA[2]
[1]Meijo University, [2]Osaka University

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Work-3

Chairperson Takeshi KITAJIMA

H2-12-I07 ▸Invited 16:30–17:00

Synthesis of Carbon Nanostrucures using Microwave-Exited Atmospheric Pressure Plasma

Mineo HIRAMATSU[1], Koki MIYASHITA[1], Taishu OYAMA[1], Keigo TAKEDA[1], Hiroki KONDO[2], Masaru HORI[2]
[1]Meijo University, [2]Nagoya University

H2-12-O08 17:00–17:15

Apparent Activation Energy of Sabatier Reaction in Low Pressure Plasma-Catalyst Gas Conversion

Masaharu SHIRATANI
Kyushu University

H2-12-O09 17:15–17:30

Atomic hydrogen exposures of radical-injection CH_4/H_2 plasma-enhanced chemical vapor deposited amorphous carbon films

Yasuyuki OHASHI, Hiroki KONDO, Kenji ISHIKAWA, Takayoshi TSUTSUMI, Makoto SEKINE, Masaru HORI
University of Nagoya

H2-12-O10 17:30–17:45

Utilization of microwave-induced plasma in extremely fast activation for preparation of activated carbon with large surface area

Purichaya KUPTAJIT, Noriaki SANO
Kyoto University

H2-12-O11 17:45–18:00

Fabrication of graphene nanoribbon-based quantum device with plasma CVD

Mizuki SEO[1], Wakana OKITA[1], Hiroo SUZUKI[1], Toshiro KANEKO[1], Toshiaki KATO[1,2]
[1]Tohoku University, [2]JST-PRESTO

H2-12-O12 18:00–18:15

Chirality selective growth of (6,4) single-walled carbon nanotubes by plasma CVD

Satoru SHIINA[1], Takuya SHIMA[1], Bin XU[1], Toshiro KANEKO[1], Toshiaki KATO[1,2]
[1]Tohoku University, [2]JST-PRESTO

H2-12-O13 18:15–18:30

Synthesis and crystallinity of nanographene using in-liquid plasma of ethanol

Ryo HAMAJI[1], Hiroki KONDO[1], Takayoshi TSUTSUMI[1], Kenji ISHIKAWA[1], Makoto SEKINE[1], Keigo TAKEDA[2], Mineo HIRAMATSU[2], Masaru HORI[1]
[1]University of Nagoya, [2]University of Meijo

December 13, 2019

Oral Session 7

Time 9:00–11:30 Room Work-3

Chairperson Giichiro UCHIDA

H2-13-O01 9:00–9:15

Decomposition of vanillin and lignin using pulsed low current arc in ambient air for production of biocellulosic ethanol

Vladislav GAMALEEV[1], Naoyuki IWATA[1], Ginji ITO[1], Motoyuki SHIMIZU[2], Masashi KATO[2], Mineo HIRAMATSU[1], Masafumi ITO[1]
[1]Faculty of Sicence and Technology, Meijo University, [2]Faculty of Agriculture, Meijo University

H2-13-O02 9:15–9:30

Modification of lipid metabolism in *Coccomyxa sp.* treated by non-equilibrium atmosphere pressure plasma

Takumi KATO
Nagoya University

H2-13-O03 9:30–9:45

Role Of Water For The Mist-CVD Of Al_2O_3

Arifuzzaman RAJIB[1], Md Enamul KARIM[1], Koki IMAI[1], Tomofumi UKAI[2], Shunji KUROSU[2], Yasuhiko FUJII[2], Masahide TOKUDA[2], Tatsuro HANAJIRI[2], Ryo ISHIKAWA[1], Keiji UENO[1], Hajime SHIRAI[1]
[1]Saitama University, [2]Toyo University

H2-13-O04 9:45–10:00

Growth Promotion Effect of Oxygen-Radical-Treated Phenylalanine Solutions

Naoyuki IWATA[1], Vladislav GAMALEEVE[1], Hiroshi HASHIZUME[2], Jun-Seok OH[3], Takayuki OHTA[1], Kenji ISHIKAWA[2], Masaru HORI[2], Masafumi ITO[1]
[1]Meijo University, [2]Nagoya University, [3]Osaka City University

H2-13-I05 ▸Invited 10:00–10:30

Changes of resistive elements during degradation of carbon nanowalls electrodes for fuel cell synthesized employing a CH_4/H_2 mixture gas plasma

Hiroki KONDO[1], Shun IMAI[1], Takayoshi TSUTSUMI[1], Kenji ISHIKAWA[1], Makoto SEKINE[1], Mineo HIRAMATSU[2], Masaru HORI[1]
[1]Nagoya University, [2]Meijo University

H2-13-O06 10:30–10:45

Fabrication of SiNx films using SiH_4+N_2 multi hollow discharge plasma CVD method: Effects of total gas flow rate

Yusuke SASAKI
Kyushu University

H2-13-I07 ▸Invited 10:45–11:15

Sputtering Deposition with Impurities: Another Key Parameter to Control Film Structures

Naho ITAGAKI, Kunihiro KAMATAKI, Kazunori KOGA, Masaharu SHIRATANI
Kyushu University

Closing Remarks
11:15–11:30

December 12, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

H2-12-P01

Two-dimentional functional thin film preparation by sputtering deposition using powder targets

Hiroharu KAWASAKI
National Institute of Technology, Sasebo College

H2-12-P02

Thin film preparation for preventing hydrogen embrittlement using sputtering deposition method

Hiroharu KAWASAKI
National Institute of Technology, Sasebo College

H2-12-P03

Influence of Solute Atom Radius on Adsorption-induced Electrochromic Phenomenon of InN Films

Masahiro HOMMA[1,2,3], Yasushi INOUE[1], Osamu TAKAI[4]
[1]Chiba Institute of Technology, [2]The Japan Society of Applied Physics, [3]Materials Science Society of Japan, [4]Kantou Gakuin Univ

H2-12-P04

Preparation of Transparent Conductive Oxide Thin Film Using Mixed Powder Target by Sputtering Method: Control of Mixing Ratio

Tamiko OHSHIMA[1], Masaki NAKAMURA[1], Hiroharu KAWASAKI[1], Masanori SHINOHARA[1], Yoshihito YAGYU[1], Takeshi IHARA[1], Yoshiaki SUDA[2]
[1]National Institute of Technology, Sasebo College, [2]National Institute of Technology, Ishikawa College

H2-12-P05

Plasma-assisted Reactive Process for Fabrication of High Mobility IGZO Thin Film Transistor at Low-Temperature

Kosuke TAKENAKA[1], Hiroyuki HIRAYAMA[1], Giichiro UCHIDA[2], Akinori EBE[3], Yuichi SETSUHARA[1]
[1]Joining and Welding Research Institute, Osaka University, [2]Faculty of Science and Technology, Meijo University, [3]EMD Corporation

H2-12-P06

Plasma Surface Modification towards Application of Polymers to Biomaterials

Kosuke TAKENAKA, Yuichi SETSUHARA
Osaka University

H2-12-P07

Influence of Substrate Morphology on Microstructure of InN Films Fabricated by Glancing-angle Reactive Sputtering

Masashi HOSOYA[1], Yasushi INOUE[1], Osamu TAKAI[2]
[1]Chiba Institute Of Technology, [2]Kanto Gakuin University

H2-12-P08

Comparison of Deposited Layers Using Three Different Thermal Sprays

Yasuyuki KAWAGUCHI
Kyushu University

H2-12-P09

Surface Modification of Molybdenum Disulfide Synthesized from Molybdenum Thin Film

Akihisa OGINO, Masachika TSUZUKI
Shizuoka University

H2-12-P10

Electromechanically High Sensitive Dielectric Elastomer as Composite of Polyrotaxane/Solution Plasma Surface Modified Graphene Aligned with External Electric Field.

Kaito NAGAYAMA[1], Taku GOTO[1,2], Koichi MAYUMI[1], Kazuto HATAKEYAMA[2], Yoshiki SHIMIZU[2], Tsuyohito ITO[1], Kohzo ITO[1], Yukiya HAKUTA[2], Kazuo TERASHIMA[1,2]
[1]The University of Tokyo, [2]National Institute of Advanced Industrial Science and Technology

H2-12-P11

Preparation of Carbon Nanomaterials by Atmospheric Pressure Gliding Arc Discharge

Shin-ichi AOQUI
Sojo University

H2-12-P12

Reduction of graphene oxide by gas-liquid interface plasma

Takayuki OHTA[1], Ikumi OHSAWA[1], Takahiro SAIDA[2]
[1]Department of Electrical and Electronic Engineering, Meijo University, [2]Department of Applied Chemistry, Meijo University

H2-12-P13

Effects of Pulse Bias Voltage on Characteristics of a-C:H Film Deposited by High Pressure Ar+CH_4 Plasma CVD Process

SungHwa HWANG[1], Ryosuke IWAMOTO[1], Kunihiro KAMATAKI[1], Naho ITAGAKI[1], Kazunori KOGA[1,2], Masaharu SHIRATANI[1]
[1]Kyushu University, [2]National Institutes of Natural Science

H2-12-P14

Effects of higher-order silane molecules on Si-H_2 bond and Si-H bond densities in a-Si:H films.

Hisayuki HARA, Yuan HAO, Kohei ABE, Daisuke YAMASHITA, Kunihiro KAMATAKI, Naho ITAGAKI, Kazunori KOGA, Masaharu SHIRATANI
Kyushu University

H2-12-P15

Developing Prediction of Amorphization Condition Models from Sputter Deposition Experimental Results by Machine Learning Method

Kunihiro KAMATAKI, Ryosuke IWAMOTO, Sakyo OKUNAGA, Soichiro MURAOKA, Daisuke YAMASHITA, Naho ITAGAKI, Kazunori KOGA, Masaharu SHIRATANI
Kyushu University

H2-12-P16

Plasma-assisted CO_2 methanization in cryogenic condition

Hayato KASAGAWA
The University of Tokyo

December 11–13, 2019

Symposium H-3

5th E&J BLS

Advanced Functional Oxides: Processing, Characterization and Devices

[Organizers]

Tetsuya YAMAMOTO (Kochi University of Technology)
Nobuyuki IWATA (Nihon University)
Kohei FUJIWARA (Tohoku University)
Valentin Craciun (National Institute for Laser, Plasma and Radiation Physics and Extreme Light Infrastructure-NP)
Hiroaki NISHIKAWA (Kindai University)
Tetsuo TSUCHIYA (National Institute of Advanced Industrial Science and Technology)
Florencio Sanchez (Institut de Ciencia de Materials de Barcelona)
Robert L. Z. Hoye (University of Cambridge)
Shunichi ARISAWA (National Institute for Materials Science)

December 11, 2019

Oral Session 1

Time 9:00–11:20 Room Miel-2

Chairpersons Tetsuya YAMAMOTO, Hiroshi KAGEYAMA, Tetsuo TSUCHIYA

[Opening Talk 9:00–9:10]

H3-11-K01 ▸Keynote 9:10–10:10

New Frontiers in Oxides Science with Multiple Anions

Hiroshi KAGEYAMA
Kyoto University

[Break 10:10–10:20]

H3-11-O02 10:20–10:35

Unique electronic structure of ZnO crystals with the retained Ar atoms

Tetsuya YAMAMOTO[1], Hisao MAKINO[1], Junichi NOMOTO[2], Tomohiko NAKAJIMA[2], Tetsuo TSUCHIYA[2]
[1]Kochi University of Technology, [2]National Institute of Advanced Industrial Science and Technology

H3-11-O03 10:35–10:50

Characterization of planar ZnO microcavities for the near ultraviolet polariton laser operatable at room temperature

Kohei SHIMA, Kentaro FURUSAWA, Kazunobu KOJIMA, Shigefusa F CHICHIBU
Tohoku University

H3-11-O04 10:50–11:05

Light-Stimulated Synaptic Functionality in Solution Processed Zinc-Tin Oxide (ZTO) Thin Film Transistor

Jen-Sue CHEN[1], Ting-Ruei LIN[1], Po-Jen CHENG[1], Sheng-Rong LIN[1], Yen-Hsun SU[1], Jih-Jen WU[2], Chao-Cheng KAUN[3]
[1]National Cheng Kung University, Dept. Materials Science and Engineering, [2]National Cheng Kung University, Dept. Chemical Engineering, [3]Academia Sinica, Research Center for Applied Sciences

H3-11-O05 11:05–11:20

Growth and characterization RS-ZnCdO thin films on MgO(100) substrates by molecular beam epitaxy

Jang HYOCHANG[1], Katsuhiko SAITO[1], Qixin GUO[1], Tooru TANAKA[1], Man Yu KIM[2], Wladek WALUKIEWICZ[3,4]
[1]Saga University, [2]City University of Hong Kong, [3]Lawrence Berkeley National Laboratory, [4]University of California at Berkeley

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Miel-2

Chairpersons Valentin CRACIUN, Florencio SANCHEZ

H3-11-I06 ▸Invited 16:30–17:05

New Capabilities and Characterization Tools for Atmospheric Pressure Spatial Deposition of Oxide Thin films

Kevin MUSSELMAN[1,2], Kissan MISTRY[1,2], Alexander JONES[1,2], Abdullah ALSHEHRI[1,2], Jhi YONG LOKE[1]
[1]Dept. of Mechanical and Mechatronics Engineering, University of Waterloo, [2]Waterloo Institute for Nanotechnology, University of Waterloo

H3-11-O07 17:05–17:20

Carrier transport of ultrathin Sn-doped In_2O_3 films grown by reactive plasma deposition

Yutaka FURUBAYASHI[1], Makoto MAEHARA[2], Hisashi KITAMI[1,2], Toshiyuki SAKEMI[2], Hisao MAKINO[1], Tetsuya YAMAMOTO[1]
[1]Kochi University of Technology, [2]Sumitomo Heavy Industries, Ltd.

H3-11-O08 17:20–17:35

Manipulation of carrier density for Sn-doped In_2O_3 films by irradiation of negatively ionized oxygen ions

Yutaka FURUBAYASHI[1], Makoto MAEHARA[2], Hisashi KITAMI[1,2], Toshiyuki SAKEMI[2], Hisao MAKINO[1], Tetsuya YAMAMOTO[1]
[1]Kochi University of Technology, [2]Sumitomo Heavy Industries, Ltd.

[Break 17:35–17:45]

H3-11-O09 17:45–18:00

In_2O_3-based Thin Film Transistor Fabricated by Direct Nanoimprint Technique

Eisuke TOKUMITSU

Japan Advanced Institute of Science and Technology

H3-11-O10 18:00–18:15

Comparative Studies of the Composition and Structure of Various Tungsten Oxide Thin Films

Valentin CRACIUN[1,6], Hisao MAKINO[2], Doina CRACIUN[1], Petronela GAROI[1], Maria Diana DRACEA[3], Dan PANTELICA[3], Nathan C. OU[4], Lisa MCELWEE-WHITE[4], Marian MOGILDEA[5], George MOGILDEA[5]

[1]National Institute for Laser, Plasma and Radiation Physics, [2]Kochi University of Technology, [3]Horia Hulubei National Institute for Physics and Nuclear Engineering, [4]University of Florida, [5]Institute of Space Science, [6]Extreme Light Infrastructure for Nuclear Physics

H3-11-O11 18:15–18:30

Optical properties and Rietveld refinement of Ca_3WO_6 : Eu^{3+} phosphors

Takahito OTSUKA, Tomokatsu HAYAKAWA

Nagoya Institute of Technology

December 12, 2019

Oral Session 4

Time 9:00–11:25 Room Work-2

Chairpersons Shunichi ARISAWA, Robert L.Z. HOYE

H3-12-I01 ▸Invited 9:00–9:35

Effect of air processing on the transport properties of ZnO:Al thin films. A new conductivity model

David MUÑOZ-ROJAS, Viet Huong NGUYEN, Daniel BELLET

Laboratoire des Matériaux et du Génie Physique (CNRS - Grenoble INP)

H3-12-O02 9:35–9:50

Manipulation of growth and oxygen-related point defects of Ga-doped ZnO polycrystalline films by controlling direct-current arc plasma

Hisashi KITAMI[1,3], Junichi NOMOTO[2], Toshiyuki SAKEMI[1], Yutaka FURUBAYASHI[3], Hisao MAKINO[3], Tetsuya YAMAMOTO[3]

[1]Sumitomo Heavy Industries, Ltd., [2]National Institute of Advanced Industrial Science and Technology (AIST), [3]Kochi University of Technology

H3-12-O03 9:50–10:05

Sequential Compensation Effect of Anion/Cation Vacancies on Thermal Stability of Electrical Conductivity of Al-doped ZnO Nanofilms

Ruolin YAN, Tsunaki TAKAHASHI, Masaki KANAI, Takuro HOSOMI, Guozhu ZHANG, Kazuki NAGASHIMA, Takeshi YANAGIDA

Kyushu University

Break 10:05–10:15

H3-12-I04 ▸Invited 10:15–10:50

Upconversion phosphors for optical thermometer and solar cells

Hendrik C SWART, Ashwini KUMAR, RE KROON, JJ TERBLANS, Govind B NAIR

University of the Free State

H3-12-I05 ▸Invited 10:50–11:25

Novel materials for stable perovskite solar cells

Antonio ABATE

Helmholtz-Zentrum Berlin

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Work-2

Chairpersons Kohei FUJIWARA, Masahiro YOSHIMURA

H3-12-I06 ▸Invited 16:30–17:05

Why Lattices and High Valence States. are Stabilized in Perovskite-Type Oxides by Madelung Lattice Site Potentials ?

Masahiro YOSHIMURA

National Cheng Kung University

H3-12-I07 ▸Invited 17:05–17:40

Tuning Nb-doped $SrTiO_3$ surfaces and interfaces by chemical and electrical means

Gunkel FELIX, Christoph BÄUMER, Regina DITTMANN

Forschungszentrum Juelich GmbH

H3-12-I08 ▸Invited 17:40–18:15

Construction of hierarchical oxide nanostructures for solar energy conversion

Jih-Jen WU, Jih-Sheng YANG, Shih-Yu CHEN

National Cheng Kung University

H3-12-O09 18:15–18:30

Fabrication of ZnO/Co_3O_4 Heterojunction by Electrochemical Deposition

Yuzuki TOMITA, Masaya ICHIMURA

Nagoya Institute of Technology

December 13, 2019

Oral Session 7

Time 9:00–11:30 Room Miel-2

Chairpersons Yu SHIRATSUCHI, Jacobo SANTAMARIA

H3-13-K01 ▸Keynote 9:00–10:00

Tailoring interface electronic states in tunnel devices based on correlated oxides

Jacobo SANTAMARIA

Universidad Complutense

Break 10:00–10:10

H3-13-I02 ▸Invited 10:10–10:45

Dynamic control of antiferromagnetic domain state based on magnetoelectric effect

Yu SHIRATSUCHI

Osaka University

H3-13-O03 10:45–11:00

Cross correlation of Ferromagnetism and Ferroelectricity in $BiFeO_3$

Shiro KAWACHI, Shin MIYAHARA, Toshimitsu ITO, Atsushi MIYAKE, Nobuo FURUKAWA, Jun-ichi YAMAURA, Masashi TOKUNAGA

Tokyo Institute of Technology

H3-13-O04 11:00–11:15

Epitaxial Growth of (111) ITO films for Top/bottom Electrodes of Ferroelectric Films

Kento SHIMAMOTO, Kohei MIURA, Junpei TANAKA, Daisuke KIRIYA, Takeshi YOSHIMURA, Atushi ASHIDA, Norifumi FUJIMURA

Osaka Prefecture University

H3-13-O05 11:15–11:30

Influence of Al_2O_3 ultrathin layer insertion at the interface of electrolyte and electrode in all-solid-state lithium batteries using anatase Nb-doped TiO_2 epitaxial thin films

Daisuke IMAZEKI[1], Kazunori NISHIO[1], Ryota SHIMIZU[1,2], Taro HITOSUGI[1]

[1]Tokyo Institute of Technology, [2]JST-PRESTO

December 13, 2019

Oral Session 8

Time 14:00–15:40 Room Miel-2

Chairpersons Hiroaki NISHIKAWA, Nobuyuki IWATA

H3-13-I06 ▸Invited 14:00–14:35

Novel Functionalities in Atomically Controlled Oxide Heterostructures by Pulsed Laser Deposition

Guus RIJNDERS

University of Twente

Break 14:35–14:45

H3-13-O07 14:45–15:00

Influence of the film thickness on the formation of multilayer structures via spinodal decomposition in $(Ti,V)O_2/TiO_2(100)$ films

Takahiro FUKUDA[1], Kensei TERASHIMA[2], Takanori WAKITA[3], Takayoshi YOKOYA[3], Yuji MURAOKA[3]

[1]Okayama University, [2]National Institute for Materials Science, [3]Okayama University

H3-13-O08 15:00–15:15

M-I Transition Control of VO_2 Thin Film by Excimer Laser assisted Metal Organic deposition (ELAMOD)

Tetsuo TSUCHIYA

National Institute of Advanced Industrial Science and Technology (AIST)

H3-13-O09 15:15–15:30

Growth and characterization of VO_2 thin films on hexagonal boron nitride

Hidekazu TANAKA[1], Mahito YAMAMOTO[1], Koji SHIGEMATSU[2], Shodai ARITOMI[3], Ryo NOUCHI[4,5], Teruo KANKI[1], Kenji WATANABE[6], Takashi TANIGUCHI[6], Yasukazu MURAKAMI[2], Shingo GENCHI[1]

[1]Osaka University, [2]The Ultramicroscopy Research Center, Kyushu University, [3]Department of Applied Quantum Physics and Nuclear Engineering, Kyusyu University, [4]Osaka Prefecture University, [5]JST PRESTO, [6]National Institute for Materials Science

Closing Remarks 15:30–15:40

December 12, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

H3-12-P01

Reactive sputtering deposition of distorted rutile-type MO_2 films (M = Nb, Mo, and W)

Kohei FUJIWARA, Atsushi TSUKAZAKI
Tohoku University

H3-12-P02

Fe_2O_3-based pn junction solar cell fabricated by electrochemical deposition

Masaya ICHIMURA, Satoshi KOBAYASHI
Nagoya Institute of Technology

H3-12-P03

Synthesis of Stoichiometric La-doped $SrTiO_3$ from Bimetallic Complexes

Ebube OYEKA, Daichi OKA, Tomoteru FUKUMURA
Tohoku University

H3-12-P04

A Solution Route for Epitaxial Growth of β-Bi_2O_3 Nanostructures

Zaichun SUN[1], Daichi OKA[1], Tomoteru FUKUMURA[1,2]
[1]Department of Chemistry, Graduate School of Science, Tohoku University, [2]WPI Advanced Institute for Materials Research and Core Research Cluster, Tohoku University

H3-12-P05

Metal-insulator transition in anti-$ThCr_2Si_2$-type La_2O_2Bi via excess oxygen incorporation

Kota MATSUMOTO[1], Hideyuki KAWASOKO[1], Tomoteru FUKUMURA[1,2]
[1]Tohoku University, [2]WPI-Advanced Institute for Materials Research and Core Research Cluster

H3-12-P06

Photorechargeable Properties of α-Fe_2O_3/WO_3/FTO Triple-layer Coaxial Nanofibers

Taito KUMAMOTO
Kagoshima University

H3-12-P07

Application of Ce-doped $BiFeO_3$ Thin Film to Photoelectric Conversion in Photorechargeable Battery

Seiga UENO
Kagoshima University

H3-12-P08

Vertically Aligned Electrospun ITO Nanofibers and Their Application for Dye-sensitized Solar Cells

Kohei KOBAYASHI
Kagoshima University

H3-12-P09

Acceptor Doping of ZnO Films by NO Gas Decomposition on Heated Ir Wire Surface in a Catalytic Reaction-Assisted CVD

Kanji YASUI[1], Ryuta IBA[1], Koichiro OISHI[2], Hironori KATAGIRI[2], Ariyuki KATO[1]
[1]Nagaoka University of Technology, [2]National Institute of Technology, Nagaoka College

H3-12-P10

Total conductivity of yttria-stabilized lanthanum germanate fabricated by solid-state reaction method

Takaya TERAI[1], Kiyoshi KOBAYASHI[1,2], Tohru HIGUCHI[1], Tohru SUZUKI[2]
[1]Tokyo University of Science, [2]National Institute for Materials Science

H3-12-P11

Low Temperature Growth of Rutile RuO_2 Epitaxial Thin Films by Pulsed Laser Deposition

Zainab FATIMA[1], Daichi OKA[1], Tomoteru FUKUMURA[1,2]
[1]Department of Chemistry, Graduate School of Science, Tohoku University, [2]WPI-Advanced Institute for Materials Research and Core Research Cluster, Tohoku University

H3-12-P12

Eliminating Carrier Compensating Defect in Doped ZnO Film by Zn Doping

Yasuji YAMADA, Yumika YAMADA, Rei SUGIURA, Shuhei FUNAKI
Shimane University

H3-12-P13

Impedance Measurements of $12CaO{\cdot}7Al_2O_3$–$12SrO{\cdot}7Al_2O_3$ Solid Solutions Prepared by High-pressure Synthesis

Masashi MIYAKAWA, Kiyoshi KOBAYASHI, Takashi TANIGUCHI
National Institute for Materials Science

H3-12-P14

Low Resistivity Doping-free Titanium Oxide Films Fabricated by Plasma-Assisted Deposition

Takahisa ICHINOHE, Hideki OHNO, Kouta SANO, Tadashi UEYAMA
National Institute of Technology, Tokyo College

H3-12-P15

Electric and Magnetic Properties at the Hetero-interface between $LaFeO_3$ and $SrTiO_3$

Hiroaki NISHIKAWA
Kindai University

H3-12-P16

Growth and Characterization of Tm Doped Gallium Oxide Films

Qixin GUO, Shunsuke MOTOMURA, Katsuhiko SAITO, Tooru TANAKA
Saga University

H3-12-P17

Aerosol-Sprayed Submicrometer Metal Oxide Spheres as Electromagnetic Resonators

Xizhe CHENG, Jianfang WANG
The Chinese University of Hong Kong

H3-12-P18

Magnetic and electric properties of near stoichiometric $YbFe_2O_4$ thin films fabricated by PLD using stoichiometric $YbFe_2O_4$ target with Fe_2O_3

Junpei TANAKA, Kouhei MIURA, Daisuke KIRIYA, Takeshi YOSHIMURA, Atsushi ASHIDA, Norifumi FUJIMURA
Osaka Prefecture University

H3-12-P19

Behaviors of physical property in multiferroic $0.7BaTiO_3$-$0.3Pr_{0.65}Ca_{0.35}MnO_3$ core shell under laser light

Osami YANAGISAWA[1], Takashi FUJIMOTO[2], Kazuhiro KITAMURA[3]
[1]Maritime Technology Department, National Institute of Technology, Yuge College, [2]Electronic Mechanical Engineering Department, National Institute of Technology, Yuge College, [3]Aichi University of Education

H3-12-P20

UV Light Detecting Properties of ZnO Nanorods Grown on Ion-plated Ga Doped ZnO Seed Layers by Chemical Bath Deposition

Tomoaki TERASAKO[1], Shohei OBARA[1], Suguru NAMBA[1], Naoto HASHIKUNI[1], Masakazu YAGI[2], Yutaka FURUBAYASHI[3], Tetsuya YAMAMOTO[3]
[1]Ehime University, [2]National Institute of Technology (KOSEN), Kagawa College, [3]Kochi University of Technology

H3-12-P21

Influence of Seed Layers on Structural and Morphological Properties of Nickel Hydroxide Nanowalls Grown by Chemical Bath Deposition

Tomoaki TERASAKO[1], Yutaka FURUBAYASHI[2], Tetsuya YAMAMOTO[2]
[1]Ehime University, [2]Kochi University of Technology

H3-12-P22

Systematic Control of Current Transport in Metal/Oxide Schottky Junctions Using Highly Uniform Layers of TaO_x

Atsushi FUKUCHI, Yusuke TSUTA, Masashi ARITA, Yasuo TAKAHASHI
Hokkaido University

H3-12-P23

Sol-gel Deposition and Direct Patterning of ZnO Thin Films

Koji ABE, Yasuhiro MORIMOTO
Nagoya Institute of Technology

H3-12-P24

Thin Iron Oxide Films Grown by Pulsed Laser Deposition

Valentin CRACIUN[1,4], M. KOMPITSAS[2], P. KORALLI[2], G. MOUSDIS[2], G. DORCIOMAN[1], Stefan IRIMICIUC[1], Bianca HODOROABA[1,3], D. CRACIUN[1], P GAROI[1], M.D. DRACEA[5], D PANTELICA[5]
[1]National Institute for Laser, Plasma and Radiation Physics, [2]National Hellenic Research, Foundation, Theor. and Phys./ Chem. Institute, [3]University of Bucharest, [4]Extreme Light Infrastructure-Nuclear Physics, [5]Horia Hulubei National Institute for Physics and Nuclear Engineering

H3-12-P25

Properties of Titanium Oxide/Titanium Composite Thin Films Formed on Transparent Plastic Substrates Using Magnetron DC Sputtering

Akira WATAZU, Tsutomu SONODA, Kei TERAOKA
National Institute of Advanced Industrial Science and Technology

H3-12-P26

Coupled Oscillation of VO_2 Layered Devices without Coupling Capacitor

Ryuta TOBE, Kunio OKIMURA, Md. Suruz MIAN
Tokai University

H3-12-P27

A Novel Floating Gate Memory with High Speed based on High-K Material

Lurong GAN
Fudan University

H3-12-P28

Magnetic Properties of Ferromagnetic Materials/*r*-plane oriented Cr_2O_3 Multilayers grown on $YAlO_3$(001) Substrate

Yukiya KUBOTA, Tomohiro TATENO, Hiroki KASHIMOTO, Takeru SATO, Nobuyuki IWATA
Nihon University

H3-12-P29

The Growth of $YbFe_2O_4$ Thin Films Prepared by Pulsed Laser Deposition Method with Different Energy Density at the Target Surface and Different Oxygen Partial Pressure

Kyouya HIRAOKA, Takuya OKAMOTO, Takehiro TERAJI, Koudai SAKAMOTO, Syunpei YAMADA, Nobuyuki IWATA
Nihon University

H3-12-P30

Flexible Epitaxial Thin Films of Transparent Conducting Oxides

Akihiro HIRAOKA[1], Kohei FUJIWARA[2], Hiroaki NISHIKAWA[3]
[1]Graduate School of Biology-Oriented Science and Technology, Kindai University, [2]Tohoku University, [3]Faculty of Biology-Oriented Science and Technology, Kindai University

H3-12-P31

Electronic Structure Characterization of Spinels $NiCo_2X_4$ (X = O and S): GGA and QSGW *ab-initio* Calculations

Hasan AL RASYID[1], Masao OBATA[1,2], Indra PARDEDE[1], Marleni WIRMAS[1], Takao KOTANI[2], Tatsuki ODA[1,3]
[1]Graduate School of Natural Science and Technology, Kanazawa University, [2]Institute of Science and Engineering, Kanazawa University, [3]Tottori University

H3-12-P32

In-plane Orientations of non *c*-axis Thin Films of $Bi_2Sr_2CaCu_2O_{8+\delta}$ and their Characterizations by scanning SQUID Microscopy

Shunichi ARISAWA[1], Kazuhiro ENDO[2], Petre BADICA[3]
[1]National Institute for Materials Science, [2]Kanazawa Institute of Technology, [3]National Institute of Materials Physics

H3-12-P33

Characteristics of High-energy H_2O Beam Generated by Catalytic Reaction for the Growth of Metal Oxide Thin Films

Taro SAITO[1], Ryuta IBA[1], Abdul Manaf HASHIM[2], Kanji YASUI[1]
[1]Nagaoka University of Technology, [2]MJIIT, Universiti Teknologi Malaysia

H3-12-P34

Adsorption of Amino Acids at TiO_x Particles on $SrTiO_3$ Surfaces Deposited Using Pulsed Laser Deposition

Takuya IMI[1], Hiroaki NISHIKAWA[2]
[1]Graduate School of Biology-Oriented Science and Technology, Kindai University, [2]Faculty of Biology-Oriented Science and Technology, Kindai University

December 11–13, 2019

Symposium H-4

A3+ Lead-free Piezoelectric Materials and Applications

[Organizers]

Hajime NAGATA (Tokyo University of Science, Japan)
Ichiro FUJII (University of Yamanashi, Japan)
Satoshi WADA (University of Yamanashi, Japan)
Yasuhiro YONEDA (Japan Atomic Energy Agency / SPring-8, Japan)
Jing-Feng Li (Tsinghua University, China)
Guorong Li (Shanghai Institute of Ceramics, China)
Jae-Ho Jeon (Korea Institute of Materials Science, Korea)
Shujun Zhang (University of Wollongong, Australia)
Naratip Vittayakorn (King Mongkut's Institute of Technology Ladkrabang, Thailand)

December 11, 2019

Oral Session 3

Time 16:30–18:30 Room Miel-4

Chairpersons Takuya HOSHINA, Shujun ZHANG

H4-11-I01 ▸Invited 16:30–17:00

Temperature- and Field-Dependent Local Structure in $BaTiO_3$ Materials Studied by Synchrotron X-Ray Absorption Spectroscopy

Rattikorn YIMNIRUN
VISTEC

H4-11-I02 ▸Invited 17:00–17:30

Structural Modeling Technique for Crystalline Metal Nanoparticles by X-ray Total Scattering Data

Satoshi HIROI[1], Koji OHARA[2], Osami SAKATA[1]
[1]National Institute for Materials Science, [2]Japan Synchrotron Radiation Research Institute

H4-11-I03 ▸Invited 17:30–18:00

Relationship between Structure and Physical Properties of Phosphate Glasses

Hirokazu MASAI[1], Shinji KOHARA[2], Yohei ONODERA[3], Takahiro OHKUBO[4], Akitoshi KOREEDA[5]
[1]National Institute of Advanced Industrial Science and Technology, [2]National Institute for Materials Science, [3]Kyoto University, [4]Chiba University, [5]Ritsumeikan University

H4-11-O04 18:00–18:15

Structural Phase Transitions and Improper Ferroelectricity in Aluminate-Sodalite-type Oxides

Hiroki TANIGUCHI[1], Chikako MORIYOSHI[2], Hiroki MORIWAKE[3], Ichiro TERASAKI[1]
[1]Nagoya University, [2]Hiroshima University, [3]Japan Fine Ceramics Center

H4-11-O05 18:15–18:30

Local structure analysis of $(Na_{0.5}K_{0.45}Li_{0.05})NbO_3$-based system with tetragonal structure

Yasuhiro YONEDA
Japan Atomic Energy Agency

December 12, 2019

Oral Session 4

Time 9:00–11:00 Room Miel-4

Chairpersons Jing-Feng LI, Satoshi WADA

H4-12-I01 ▸Invited 9:00–9:30

Ferroelectric Structural Phase Transition and Staggered Phase Transition in Lead-Free Piezoelectric KNN

Takayuki MATSUOKA, Masato YAMAZAKI
NGK SPARK PLUG CO., LTD.

H4-12-I02 ▸Invited 9:30–10:00

The electric fatigue resistance and temperature-dependent piezoresponse of KNN-based ceramics

Jiwei ZHAI
Tongji University

H4-12-I03 ▸Invited 10:00–10:30

Lead-free Potassium-Sodium Niobate Ceramics: From Property to Devices

Jiagang WU
Sichuan University

H4-12-O04 10:30–10:45

Fabrication and piezoelectric properties of $(K_{0.5}Na_{0.5})NbO_3$ single crystals by solid-state crystal growth method

Ichiro FUJII, Shintaro UENO, Satoshi WADA
University of Yamanashi

H4-12-O05 10:45–11:00

Composition design, structure and properties of niobate-based ceramics

Dong YANG
Tsinghua University

December 12, 2019

Oral Session 6

Time 16:30–18:45 Room Miel-4

Chairpersons Yasuhiro YONEDA, Rattikorn YIMNIRUN

H4-12-I06 ▸Invited 16:30–17:00

$AgNbO_3$-based Lead-free Antiferroelectrics for Energy Storage Applications

Jing-Feng LI
Tsinghua University

H4-12-I07 ▸Invited 17:00–17:30

Crystal Structures and Dielectric Properties of Perovskite-Type Mixed-Anion Compound

Takuya HOSHINA, Hiroaki TAKEDA, Takaaki TSURUMI
Tokyo Institute of Technology

H4-12-I08 ▸Invited 17:30–18:00

Bismuth Ferrite based solid solution piezoelectric/ ferroelectric materials and their applications

Zhenxiang CHENG
University of Wollongong

H4-12-O09 18:00–18:15

Electromechanical and electrocaloric properties of $NaNbO_3$ and $(Pb,La)(Zr,Ti)O_3$ ceramics

Hiroshi MAIWA, Atsushi SAKURAI, Yugeng LIU
Shonan Institute of Technology

H4-12-I10 ▸Invited 18:15–18:45

Improve photocatalysis property of ferroelectric oxides

Yaodong YANG, Bian YANG
Xi'an Jiaotong University

December 13, 2019

Oral Session 7

Time 9:00–11:00 Room Miel-4

Chairpersons Naratip VITTAYAKORN, Hajime NAGATA

H4-13-I01 ▸Invited 9:00–9:30

Processing and Properties of $(Bi_{1/2}K_{1/2})TiO_3$-based Piezoelectric Ceramics

Manabu HAGIWARA, Makoto ITO, Shinobu FUJIHARA
Keio University

H4-13-I02 ▸Invited 9:30–10:00

Large electrostrain response in Mn-modified $0.94(Bi_{0.5}Na_{0.5})TiO_3$-$0.06BaTiO_3$ lead-free piezoceramics

Danyang WANG, Le ZHANG, Haoyu WANG
UNSW Sydney

H4-13-I03 ▸Invited 10:00–10:30

Combustion Synthesis and Properties of $0.94Bi_{0.5}Na_{0.5}TiO_3$-$0.06Ba_{0.85}Ca_{0.15}Ti_{0.90}Zr_{0.10}O_3$ ceramics doped with Bi_2FeCrO_6

Theerachai BONGKARN
Naresuan University

H4-13-O04 10:30–10:45

Perovskite $Na_{0.5}Bi_{0.5}TiO_3$: Potential Family of Peculiar Lead-free Electrostrictors

Jie YIN
Sichuan University

H4-13-O05 10:45–11:00

AC Poling Treatment in Grain-oriented BT-BNT Piezoceramics

Satoshi WADA
University of Yamanashi

December 13, 2019

Oral Session 8

Time 14:00–15:30 Room Miel-4

Chairpersons Ichiro FUJII, Theerachai BONGKARN

H4-13-I06 ▸Invited 14:00–14:30

NBT and KNN based textured and non-textured lead free ceramics

Shujun ZHANG[1], Xiaoyi GAO[1,2], Hua HAO[2], Hanxing LIU[2], Nannan DONG[2], Peng LI[3], Jiwei ZHAI[3]
[1]University of Wollongong, [2]Wuhan University of Technology, [3]Tongji University

H4-13-I07 ▸Invited 14:30–15:00

Conceivable strategies for making Lead-free piezoelectrics practical

Wook JO
Ulsan National Institute of Science and Technology

H4-13-O08 15:00–15:15

A Template-free Salt-flux-assisted Synthesis of Tetragonal $BaTiO_3$ Nanowires and Its Piezoelectric Response for Flexible Nanogenerators

Thitirat CHAROONSUK[1], Saichon SRIPHAN[1], Chanisa NAWANIL[2], Narong CHANLEK[3], Wanwilai VITTAYAKORN[1], Utchawadee PHARINO[1], Naratip VITTAYAKORN[1]
[1]King Mongkut's Institute of Technology Ladkrabang, [2]Udon Thani Rajabhat University, [3]Synchrotron Light Research Institute

H4-13-O09 15:15–15:30

Dielectric Anomalies Suppression of Co-doped $BaZrO_3$ with Ultrahigh *Q*-factor

Phieraya PULPHOL[1], Rangson MUANGHLUA[1], Naratip VITTAYAKORN[1], Taras KOLODIAZHNYI[2], Wanwilai VITTAYAKORN[1]
[1]King Mongkut's Institute of Technology Ladkrabang, [2]National Institute for Material Science

December 12, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

H4-12-P01

Quenting Effects for Depolarization Temperature on $(Bi_{0.5}Na_{0.5})TiO_3$-ZnO Ceramics by Controlling the Firing Conditions

Yuto ITAKURA, Yuka TAKAGI, Hajime NAGATA, Tadashi TAKENAKA
Tokyo University of Science

H4-12-P02

Preparation and Characterization of Graphene/$Bi(Fe,Mn)O_3$ Structure on $SrRuO_3$-buffered $SrTiO_3$ Substrate

Seiji NAKASHIMA, Sho YAMAGATA, Yakumo FUCHIWAKI, Satoru SUZUKI, Hironori FUJISAWA
University of Hyogo

H4-12-P03

Fabrication of 111-Oriented $BaTiO_3$ Ceramics by a High-Magnetic-Field-Assisted Electrophoretic Deposition Method with Co-Existing Hexagonal-Tetragonal Phases of $BaTiO_3$ Powders

Hari Shankar MALLIK, Sangwook KIM, Ichiro FUJII, Shintaro UENO, Satoshi WADA
University of Yamanashi

H4-12-P04

High-Power Piezoelectric Properties of Mn-doped $(Bi_{0.5}Na_{0.5})TiO_3$-$(Bi_{0.5}K_{0.5})TiO_3$-$BaTiO_3$ based ceramics at MPB composition

Tomoya UENO, Yuka TAKAGI, Hajime NAGATA, Tadashi TAKENAKA
Tokyo University of Science

H4-12-P05

High-Power Piezoelectric Characteristics of $MnCO_3$ and CuO Co-Doped $Ba(Zr,Ti)O_3$-$(Ba,Ca)TiO_3$ Ceramics

Takuo TOMINAGA, Yuka TAKAGI, Hajime NAGATA, Tadashi TAKENAKA
Tokyo University of Science

H4-12-P06

The quenching effects for depolarization temperature of $(Bi_{0.5}Na_{0.5})TiO_3$ ceramics with various dopants

Koutaro EGUCHI, Yuka TAKAGI, Hajime NAGATA, Tadashi TAKENAKA
Tokyo University of Science

H4-12-P07

Investigation of Mn-Nb Co-doped Barium Titanate Ceramics for DC-bias free Dielectrics

Piyush SAPKOTA, Ichiro FUJII, Shintaro UENO, Satoshi WADA
University of Yamanashi

H4-12-P08

Structural and Piezoelectric Properties of Lead-free Piezoelectric Ceramics in the $BaTiO_3$–$BiFeO_3$

Hyunwook NAM, Ichiro FUJII, Sangwook KIM, Shintaro UENO, Satoshi WADA
University of Yamanashi

H4-12-P09

Structure analysis of $(Ca,Ba)Nb_2O_5$ ceramic powder from high-energy X-ray diffraction

Yasuhiro YONEDA
Japan Atomic Energy Agency

H4-12-P10

The $BaTiO_3$/PDMS Composite Film Modified with $Ti_{0.8}O_2$ Nanosheets and Silver Nanopowders for Flexible Nanogenerators

Naratip VITTAYAKORN, Saichon SRIPHAN, Thitirat CHAROONSUK, Tosapol MALUANGNONT
King Mongkut's Institute of Technology Ladkrabang

December 11–13, 2019

Symposium H-5

Intelligent Material Processes with Low Environmental Load and Energy Consumption

[Organizers]

Nobuhiro MATSUSHITA (Tokyo Institute of Technology)
Tomoaki WATANABE (Meiji University)
Hajime WAGATA (Meiji University)
Yung-Jung HSU (National Chiao Tung University)
Ferry ISKANDAR (Institute of Technology Bandung)

[Sponsors]

HOKUTO DENKO CORPORATION

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December 11, 2019

Oral Session 3

Time 16:30–18:35 Room Mont-5

Chairpersons Ken-ichi KATSUMATA, Tomoaki WATANABE

Opening
Nobu Matsushita (Tokyo Tech)
16:30–16:35

H5-11-K01 ▸Keynote 16:35–17:15

Semiconductor Nanoheterostructures for Photoconversion Applications

Yung-Jung HSU
National Chiao Tung University

H5-11-I02 ▸Invited 17:15–17:40

Behavior of Photogenerated Charge Carriers on Powder Photocatalysts

Akira YAMAKATA
Toyota Technological Institute

Break
17:40–17:50

H5-11-O03 17:50–18:05

Hydrothermal Synthesis of Rutile-type Titania Crystals with Pseudocubic Shapes

Makoto KOBAYASHI[1], Hideki KATO[2], Minoru OSADA[1], Masato KAKIHANA[2]

[1]Institute of Materials and Systems for Sustainability, Nagoya University, [2]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University

H5-11-O04 18:05–18:20

One-pot synthesis of (B/A)-TiO_2 nanosheet/Carbon dot heterostructure for enhanced visible-light-photocatalysis

Sovann KHAN[1], Norihiro SUZUKI[1], Kazuya NAKATA[2], Chiaki TERASHIMA[1], Akira FUJISHIMA[1], Ken-ichi KATSUMATA[1]

[1]Tokyo University of Science, [2]Tokyo University of Agriculture and Technology

H5-11-O05 18:20–18:35

TiO_2 Nanowire-Supported Sulfide Hybrid Photocatalysts for Durable Solar Hydrogen Production

Ping-Yen HSIEH
Department of Materials Science and Engineering, National Chiao Tung University

December 12, 2019

Oral Session 4

Time 9:00–11:30 Room Trade-2

Chairpersons Hajime WAGATA, Sayaka YANAGIDA

H5-12-O01 9:00–9:15

Design of Full-Spectrum-Drive Photoelectrodes for Water Splitting

Yu Ting WANG
Material Science and Engineering of Chiao Tung University

H5-12-O02 9:15–9:30

Tin Sulfide Colloidal Nanocrystals: Synthesis and Characterization

Retno MIRANTI[1], Satria Zulkarnaen BISRI[2,1], Yoshihiro IWASA[2,3], Nobuhiro MATSUSHITA[1]

[1]Tokyo Institute of Technology, [2]RIKEN Center for Emergent Matter Science (CEMS), [3]The University of Tokyo

H5-12-O03 9:30–9:45

Facet Effect of Au@CdS Yolk@Shell Nanocrystals on Photocatalytic Hydrogen Production

Yi-An CHEN, Yung-Jung HSU
Department of Materials Science and Engineering, National Chiao Tung University

H5-12-O04 9:45–10:00

Significant Performance of Ammonia Borane Dehydrogenation Using Au@Cu_2O Core@Shell Nanocrystals

Mei Jing FANG
National Chiao Tung University

H5-12-O05 10:00–10:15

Preparation of Au@Cu_2O Core-shell Particles on Rutile Rods using Step-by-step Photocatalytic Deposition and Investigation of their Photocatalytic Cr(IV) Reduction Ability

Sayaka YANAGIDA, Takumi YAJIMA, Takahiro TAKEI, Nobuhiro KUMADA
University of Yamanashi

Break
10:15–10:25

H5-12-I06 ▸Invited 10:25–10:50

Microwave-assisted Synthesis of Carbon Nanostructured Materials and Its Physical Properties

Ferry ISKANDAR[1,2], Fitri A. PERMATASARI[1]
[1]Institut Teknologi Bandung, [2]Research Center for Nanosciences and Nanotechnology

H5-12-I07 ▸Invited 10:50–11:05

Solution Plasma and Hetero-Graphene

SANGWOO CHAE[1,3], PHUWADEJ PORNAROONTHAM[1,3], NAGAHIRO SAITO[1,2,3,4]
[1]Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [2]Conjoint Research Laboratory in Nagoya University, Shinshu University, [3]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [4]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H5-12-O08 11:05–11:30

Preparation of Nanosheets by Using Ionic Liquids

Ken-ichi KATSUMATA[1], Tetsuya YAMADA[2], Yuta KUBOTA[3], Yuki MAKINOSE[4], Norihiro SUZUKI[1], Kazuya NAKATA[5], Chiaki TERASHIMA[1], Nobuhiro MATSUSHITA[3], Akira FUJISHIMA[1]
[1]Tokyo University of Science, [2]Kanagawa Institute of Industrial Science and Technology, [3]Tokyo Institute of Technology, [4]Shimane University, [5]Tokyo University of Agriculture and Technology

December 12, 2019

Oral Session 5

Time 14:00–16:00 Room Trade-2

Chairpersons Ferry ISKANDAR, Yoshitake MASUDA

H5-12-I09 ▸Invited 14:00–14:25

Intelligent Material Processes with Low Environmental Load and Energy Consumption for Nanostructuring of Metal Oxides -Gas/Chemical Sensors with SnO_2, TiO_2, ZnO-

Yoshitake MASUDA
National Institute of Advanced Industrial Science and Technology (AIST)

H5-12-O10 14:25–14:40

Liquid-phase Synthesis of Pt-loaded $Y_2WO_6:Eu^{3+}$ Phosphor Particles for Hydrogen Gas Sensing

Hong YE, Manabu HAGIWARA, Shinobu FUJIHARA
Keio University

H5-12-O11 14:40–14:55

Preparation and Gas Sensor Characteristics of Ni-Zn Ferrite Thin Film Deposited on Porous Silicon

Hiroki ISHIGAMI
Department of Electronics Science, Shizuoka University

Break
14:55–15:00

H5-12-O12 15:00–15:15

Low environmental loading process: Spin spray for thin film deposition of functional metal oxides

Hwai En LIN, Yuta KUBOTA, Nobuhiro MATSUSHITA
Tokyo Institute of Technology

H5-12-O13 15:15–15:30

Preparation of transparent conductive ZnO film by Non-Seed CBD method

Naoya SHIOIRI, Hajime WAGATA
Meiji University

H5-12-O14 15:30–15:45

Resistive Switching Properties of Liquid Phase Deposited Cerium Oxide Films

Yuta KUBOTA, Tetsuya FURUKAWA, Nobuhiro MATSUSHITA
Tokyo Institute of Technology

H5-12-O15 15:45–16:00

Liquid-phase Synthesis and Morphology Control of Ferroelectric $BiFeO_3$ Particles for Stress Sensing Applications

Kohei YOSHIYAMA, Manabu HAGIWARA, Shinobu FUJIHARA
Keio University

December 12, 2019

Oral Session 6

Time 16:30–18:25 Room Trade-2

Chairpersons Masamoto TAFU, Hiroyuki MUTO

H5-12-K16 ▸Keynote 16:30–17:10

Intelligent Material Processes with Ceramic Nanocrystals

Minoru OSADA
Nagoya University

H5-12-I17 ▸Invited 17:10–17:35

Advanced Composite Particles Integration Process via Electrostatic Assembly Method

Hiroyuki MUTO, Atsushi YOKOI, Wai Kian TAN, Go KAWAMURA, Atsunori MATSUDA
Toyohashi University of Technology

Break
17:35–17:45

H5-12-I18 ▸Invited 17:45–18:10

Development of Functional Coatings Showing Paradoxical Surface Wetting/Dewetting Properties

ATSUSHI HOZUMI
AIST

H5-12-O19 18:10–18:25

Development of novel sol-gel based surface initiator layers for surface-initiated ATRP (SI-ATRP)

Tomoya SATO[1], Gary J. DUNDERDALE[1,2], Chihiro URATA[1], Atsushi HOZUMI[1]
[1]National Institute of Advanced Industrial Science and Technology (AIST), [2]Department of Chemistry, University of Sheffield

December 13, 2019

Oral Session 7

Time 9:00–11:30 Room Mont-5

Chairpersons Yuta KUBOTA, Naonori SAKAMOTO

H5-13-I01 ▸Invited 9:00–9:25

Bioaccumulation and biomineralization on a radural teeth of chiton, *Achanthopreura japonica*.

Chiya NUMAKO
Chiba University

H5-13-I02 ▸Invited 9:25–9:50

Effect of hybridization on reactivity of dicalcium phosphate dihydrate (DCPD) by apatites nano-particles for solidification of fluoride ions

Masamoto TAFU, Natsuki OKAJIMA, Takeshi TOSHIMA, Saori TAKAMATSU
National Institute of Technology, Toyama College

H5-13-O03 9:50–10:05

Effective Tellurium Recovery from Bi-Sb-Te Intermetallic Solid Materials by Wet Mechanochemical Technique

Ryo SASAI[1], Takuya FUJIMURA[1], Kazushi URABE[1], Takuya SANO[2]
[1]Shimane University, [2]ARBIZ Corporation

Break
10:05–10:20

H5-13-I04 ▸Invited 10:20–10:45

New Type Solid-State Reaction, Water-Assisted Solid-State Reaction

Kenji TODA
Niigata University

H5-13-O05 10:45–11:00

Cement sludge recycling system using sodium gluconate

Daiki ATARASHI[1], Hiroshi FURUI[1], Eiji SUNADA[3], Eiichi KATSUBE[4], Yuichi TSUKADA[5]
[1]Shimane University, [2]Hiroshima Area Concrete Cooperative Association, [3]Maruse, [4]Kitagawa Corporation, [5]DKK-TOA Corporation

H5-13-O06 11:00–11:15

Controlled Fabrication of Textured and Porous $Ca_3Co_4O_9$ Ceramics and Their Thermoelectric Property

Rina SHIMONISHI, Manabu HAGIWARA, Shinobu FUJIHARA
Keio University

H5-13-O07 11:15–11:30

Growth and characterization of $Li_xLa_{(1-x)/3}NbO_3$ single crystals by TSFZ method

MD SHAHAJAN ALI
CCST, University of Yamanashi

December 13, 2019

Oral Session 8

Time 14:00–16:00 Room Work-5

Chairpersons Chiya NUMAKO, Akifumi MATSUDA

H5-13-I08 ▸Invited 14:00–14:25

Preparation of Ultrathin Nanosheet pn-Junction and Photocatalytic Activity

Shintaro IDA, Keisuke AWAYA
Kumamoto University

H5-13-O09 14:25–14:40

Solution-Phase Ligand-Exchange of Lead Sulfide Colloidal Quantum Dot for Facile Thick Film Fabrication

Ricky Dwi SEPTIANTO[1,2], Satria Zulkarnaen BISRI[1,2], Nobuhiro MATSUSHITA[2], Yoshihiro IWASA[1,3]
[1]RIKEN CEMS, [2]Tokyo Institute of Technology, [3]The University of Tokyo

H5-13-O10 14:40–14:55

Room-temperature epitaxy and optoelectronic properties of heavily doped $Ni_{1-x}Fe_xO$ thin films

Akifumi MATSUDA[1], Seo OKKYUN[2], Osami SAKATA[2,1], Mamoru YOSHIMOTO[1]
[1]Tokyo Institute of Technology, [2]National Institute for Materials Science

Break
14:55–15:05

H5-13-I11 ▸Invited 15:05–15:30

Growth Mechanism of mist CVD

Toshiyuki KAWAHARAMURA[1,2,3], Li LIU[1,2,3], Phimolphan RUTTHONGJAN[2], Shota SATO[2], Mariko UEDA[2], Tatsuya YASUOKA[2], Yuki TAGASHIRA[2], Tamako OZAKI[2], Yuna ISHIKAWA[1], Miyabi FUKUE[1], Giang T. DANG[1,2,3]
[1]School of Sys. Eng., Kochi University of Technology, [2]Eng. Course, Graduate School of Engineering, Kochi University of Technology, [3]Center for Nanotechnology, Res. Inst., Kochi University of Technology

H5-13-O12 15:30–15:45

Development of Electrostatic LSMCD , and Preparation and Characterization of Alumina Thin Film

Takuma SUZUKI, Takahiko KAWAGUCHI, Naonori SAKAMOTO, Hisao SUZUKI, Naoki WAKIYA
Department of Electrics and Materials Science, Shizuoka University

H5-13-O13 15:45–16:00

Analysis of ferroelectric thin films by cross sectional AFM

Naonori SAKAMOTO, Satoshi MIYAZAKI, Kohei KASAMI, Takahiko KAWAGUCHI, Naoki WAKIYA, Hisao SUZUKI
Shizuoka University

December 13, 2019

Oral Session 9

Time 16:30–18:25 Room Work-5

Chairpersons Shitaro IDA, Shintaro YASUI

H5-13-I14 ▸Invited 16:30–16:55

Development of high power blue diode laser for additive manufacturing of pure copper

Masahiro TSUKAMOTO
Joining and Welding Research Institute, Osaka University

H5-13-O15 16:55–17:10

Ultra-high Rate Performance of $LiCoO_2$ Cathode Thin Film Battery

Shintaro YASUI[1], Sou YASUHARA[1], Takashi TERANISHI[2], Yumi YOSHIKAWA[2], Tomoyasu TANIYAMA[3], Mitsuru ITOH[1]
[1]Tokyo Institute of Technology, [2]Okayama University, [3]Nagoya University

H5-13-O16 17:10–17:25

Preparation of YSZ Thin Film on Through-Hole-Type Porous Silicon

Hiroki NAKANE
Department of Electronics Science, Shizuoka University

Break
17:25–17:40

H5-13-O17 17:40–17:55

Development of Novel Dynamic Aurora PLD which Enables *in-situ* Observation of Epitaxial Growth of Ceramic Thin Films

Mayu YOSHIDA
Department of Electronics Science, Shizuoka University

H5-13-O18 17:55–18:10

Preparation of $Ca_3Co_4O_9$ Thin Film by Dynamic Aurora PLD

Tetsunari TANADA, Takahiko KAWAGUCHI, Naonori SAKAMOTO, Hisao SUZUKI, Naoki WAKIYA
Department of Electronics and Materials Science, Shizuoka University

H5-13-O19 18:10–18:25

Perpendicular Magnetic Anisotropy in Nickel Ferrite Thin Films

Keisuke TAKASHIMA[1], Nipa DEBNATH[1], Takahiko KAWAGUCHI[1], Naonori SAKAMOTO[1], Kazuo SHINOZAKI[2], Hisao SUZUKI[1], Naoki WAKIYA[1]
[1]Shizuoka University, [2]Tokyo Tech

Closing
Nobuhiro Matsushita (Tokyo Tech)
18:25~

December 13, 2019

Poster Session

Time 19:00–20:30 Room Trade-0

H5-13-P01

Synthesis of Xonotlite in Cement-Silica-Portlandite system

Yuta MORIMOTO[1], Daiki ATARASHI[1], Kouichi IMASAWA[2]
[1]Shimane University, [2]Sumitomo Metal Mining Siporex

H5-13-P02

Effect of calcium nitrite on hydration of blast furnace slag

Shuya OSAKI[1], Daiki ATARASHI[1], Hyeonjin SONG[1], Yuhji SUDOH[2]
[1]Shimane University, [2]Nissan Chemical Co., Ltd

H5-13-P03

Effect of Alkanolamine on reaction of $4CaO{\cdot}Al_2O_3{\cdot}Fe_2O_3$

Hyeonjin SONG[1], Daiki ATARASHI[2], Yoshifumi HOSOKAWA[3], Miho MIYAKAWA[4]
[1]Shimane University, [2]Shimane University, [3]TAIHEIYO CEMENT CORPORATION, [4]GCP Chemicals CO.,LTD

H5-13-P04

Highly Cationic Nitrogen-doped Graphene to Enhance Electric Properties via Solution Plasma

SANGWOO CHAE[1,4], GASIDIT PANOMSUWAN[2], NAGAHIRO SAITO[1,3,4,5]
[1]Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [2]Department of Materials Engineering, Faculty of Engineering, Kasetsart University, [3]Conjoint Research Laboratory in Nagoya University, Shinshu University, [4]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [5]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H5-13-P05

Synergistic Effect of Electrical Properties of Cationic Nitrogen-Doped Carbon and Carbon Nanotubes Composites Synthesized via Plasma Solution.

Sangwoo CHAE[1,3], Takumi YANA[1], Nagahiro SAITO[1,2,3,4]
[1]Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [2]Conjoint Research Laboratory in Nagoya University, Shinshu University, [3]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [4]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H5-13-P06

Investigation of N-doped Carbon Dots Synthesized by Solution Plasma for Detection of Nitro Aromatic Molecules

Kyusung KIM[1,3], Junmo MOON[1], Nagahiro SAITO[1,2,3,4]
[1]Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [2]Conjoint Research Laboratory in Nagoya University, Shinshu University, [3]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [4]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H5-13-P07

Analyzing properties of nitrogen, boron and nitrogen-boron doped few-layer graphene coated copper nanoparticles synthesized by solution plasma for oxygen reduction reaction catalyst

Phu Quoc PHAN[1], Kyusung KIM[1,3], Yukihiro MUTA[1,3], Mongkol TIPPLOOK[1,3], Sangwoo CHAE[1,3], Nagahiro SAITO[1,2,3,4]
[1]Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [2]Conjoint Research Laboratory in Nagoya University, Shinshu University, [3]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [4]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H5-13-P08

Synthesis of nitrogen-oxygen-codoped nanocarbons via solution plasma process and nitridation for CO_2 adsorption

PHUWADEJ PORNAROONTHAM[1,4], GASIDIT PANOMSUWAN[2], NAGAHIRO SAITO[1,3,4,5]
[1]Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University, [2]Department of Materials Engineering, Faculty of Engineering, Kasetsart University, [3]Conjoint Research Laboratory in Nagoya University, Shinshu University, [4]Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research Institute and Academia (OPERA), [5]Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program (SICORP)

H5-13-P09

Development of fabrication process for $BaTaO_2N$ photoanodes using roll press method and calcination

Mizuki ITO, Tomoaki WATANABE
Meiji University

H5-13-P10

Development of fabrication method for layered photoanodes by using roll press method

Mai IIJIMA, Tomoaki WATANABE
Meiji University

H5-13-P11

Synthesis and Evaluation of Sphere-like CuO Films on Conductive Substrates by Direct Annealing Method

Ryo NISHIDA, Tomoaki WATANABE
Meiji University

H5-13-P12

$Cu_{2-x}O$-Fe_2O_3 Composite Films Prepared By Low Temperature Solution Process

Kazuya SHIMADA, Hwai-En LIN, Yuta KUBOTA, Nobuhiro MATSUSHITA
Tokyo Institute of Technology

H5-13-P13

Growth and characterization of $LiCoO_2$ single crystals by Traveling Solvent Floating Zone(TSFZ) technique using tilted-mirror type furnace.

Ruma PARVIN
University of Yamanashi

H5-13-P14

Synthesis of Nano $LiCoO_2$ by Water-Assited Solid-State Reaction Method

Tsukasa HOSHI
Graduate School of Niigata University

H5-13-P15

Electrochemical properties of $Cu_{2-x}O$-αFe_2O_3 composite film for supercapacitor

Michihiko UEMURA
Tokyo Institute of Technology

H5-13-P16

Optimization of doping amount of upconversion phosphor by parallel synthesis using complex gelation method

Kohei KASUYA[1], Sayaka TAMURA[2], Yasushi SATO[3], Makoto KOBAYASHI[4], Hideki KATO[5], Masato KAKIHANA[5], Koji TOMITA[1]
[1]Tokai University, [2]Kanagawa University, [3]Okayama University of Science, [4]Nagoya University, [5]Tohoku University

H5-13-P17

A New Low-Temperature Synthesis of K_2NbO_3F with NH_4F as a Fluorinating Agent

Masaru WATANABE
Graduate School of Science and Technology, Niigata University

H5-13-P18

Ca - Al - O: (Eu, Nd) phosphors synthesized on mortar hardened body

Keiji KOMATSU[1], Tetsuro KIMURA[1], Atsushi NAKAMURA[2], Hidetoshi SAITOH[1]
[1]Nagaoka University of Technology, [2]Chubu Chelest

H5-13-P19

Pure Copper Film Welding with Near Infrared and Blue Diode Lasers

Kento MORIMOTO[1], Masahiro TSUKAMOTO[2], Shin-ichiro MASUNO[2], Yuji SATO[3], Kazuyuki AZUMI[4], Yoshihiko HAYASHI[4]
[1]Graduate School of Engineering, Osaka University, [2]Joining and welding research institute, Osaka University, [3]Japan Atomic Energy Agency, [4]Osaka Fuji Corporation

H5-13-P20

Formation of aligned peptide films by blade coating and their structural analysis

Kazunori MOTAI
Tokyo Institute of Technology

H5-13-P21

Fabrication of Bioactive and Antibacterial Nanostructured Surface on Ti-based BMG Surface by Hydrothermal-Electrochemical Process

Nobuhiro MATSUSHITA
Tokyo Institute of Technology

H5-13-P22

Effect of crystallinity of FAp (fluorapatite) on adsorption of ammonia gas

Aoi IWAORI
National Institute of Technology, Toyama College

H5-13-P23

Analytical Research on Preservation and Restoration Method of Excavated Ancient Coins

Yuko NISHIMOTO[1], Yuki AOYANAGI[1], Shinya NAGASAKO[2]
[1]Kanagawa Univ., [2]Tokyo metropolitan Archaeological Center

H5-13-P24

Simultaneous Formation Process of Ti_3SiC_2/TiC Composite Films from Their Elemental Materials

Tsutomu SONODA, Akira WATAZU, Setsuo NAKAO
National Institute of Advanced Industrial Science and Technology

H5-13-P25

Improvement Of Packing Structure Of Green Body Via Electrostatic Nano-Assembly Technique

Ryota OGASAWARA
Toyohashi University of Technology

H5-13-P26

Orientation controlled room-temperature growth of ZnO (0001) thin films on atomic-step patterned flexible polymer substrates

Tomoaki OGA[1], Hiroyuki MORITA[1], Satoru KANEKO[2,1], Akifumi MATSUDA[1], Mamoru YOSHIMOTO[1]
[1]Tokyo Institute of Technology, [2]Kanagawa Institute of Industrial Science and Technology

H5-13-P27

Preparation of Zinc Oxynitride Thin Films by a Solution Process and Subsequent Nitridation

Shota EBARA, Hajime WAGATA
Meiji University

H5-13-P28

Growth of ZnO Mesocrystals Using Mixed Solvents of Choline Chloride – Urea Deep Eutectic Solvent and Ethylene Glycol

Hajime WAGATA[1], Eriko NAKASHIMA[1], Motoki ASAGA[1], Masaru TADA[2], Kunio YUBUTA[3]
[1]Meiji University, [2]Tokyo Institute of Technology, [3]Tohoku University

Cluster I

Biopolymers

Symposium

I-1 Bio-based Polymers

I-2 Environmentally Degradable Polymers

I-3 Biodegradable Polymers for Biomedical Applications

December 13, 2019

Symposium I-1

Bio-based Polymers

[Organizer]

Hideki ABE (RIKEN CSRS)

December 13, 2019

Oral Session 7

Time 9:00–11:20 Room Mont-1

Chairpersons Hideki ABE, Takeharu TSUGE

I1I2-13-O01 9:00–9:15

Development of Heat-resistant Polymeric Materials from Bio-based Chemicals

Hideki ABE

RIKEN Center for Sustainable Resource Science

I1I2-13-K02 ▸Keynote 9:15–9:45

Controlled/Living Polymerization of Functional Styrenes from Natural Resources

Kotaro SATOH

Tokyo Institute of Technology

I1I2-13-O03 9:45–10:00

Fabrication of Multiple Parallel Gel Filaments by Applying Shear to Polymer Assembly

Yuriko TAKAYAMA, Norihiro KATO

Utsunomiya University

I1I2-13-I04 ▸Invited 10:00–10:20

Protease-catalyzed Polymerization for Synthesis of Polypeptides with Specific Sequence Motifs

Kousuke TSUCHIYA[1,2], Keiji NUMATA[1,2]

[1]RIKEN, [2]JST-ERATO

I1I2-13-I05 ▸Invited 10:20–10:40

Microsphere with Dimple Morphology Prepared from Ferulic Acid

Hironori ATARASHI

Okayama University

I1I2-13-I06 ▸Invited 10:40–11:00

Thermally Conductive Hierarchical Molecular Assemblies Based on Filamentous Viruses

Toshiki SAWADA[1,2]

[1]Tokyo Institute of Technology, [2]PRESTO-JST

I1I2-13-I07 ▸Invited 11:00–11:20

New Polyhydroxyalkanoate Biosynthesis Utilizing Metabolic Pathways for Amino Acid and Fatty Acid

Takeharu TSUGE

Tokyo Institute of Technology

December 13, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

I1-13-P01

Characterization of Porous Ti6Al4V/Bio-based Polymer Composites for Improved Biocompatibility

Mari MIYATA[1], Naritoshi AOYAGI[1], Kasumi FURUYA[1], Shota FUNAMI[1], Chuen Kum LEE[2]

[1]National Institute of Technology, Nagaoka College, [2]Nanyang Polytechnic, School of Engineering

I1-13-P02

Fabrication of Insulin-like Growth Factor-1 Conjugated IPN gel and Controlling Length of the Conjugation Linker for Enhancement of the Embedded Chondrocytes Function

Hiro YAMAGUCHI[1], Shohei ISHIKAWA[1], Shigehito OSAWA[1,2], Michihiro IJIMA[3], Hidenori OTSUKA[1,2]

[1]Graduate School of Science, Tokyo University of Science, [2]Department of Applied Chemistry, Faculty of Science, Tokyo University of Science, [3]Department of Materials Chemistry and Bioengineering, National Institute of Technology, Oyama College

December 12–13, 2019

Symposium I-2

Environmentally Degradable Polymers

[Organizers]

Jun KIKUCHI (RIKEN CSRS)
Sijun Dong (Institute of Urban Environment, Chinese Academy of Sciences)

December 12, 2019

Oral Session 5

Time 14:00–16:00 Room Mont-4

Chairperson Jun KIKUCHI

Opening Talk
Jun Kikuchi
14:00–14:00

I2-12-K01 ▸Keynote 14:00–14:30

Recent advances in marine plastic pollution research in Japan

Atsuhiko ISOBE
Kyushu University

I2-12-I02 ▸Invited 14:30–14:50

Study on the biological toxic effects of microplastics on *Oryzias melastigma*

Sijun DONG, Xu ZHANG, Dongxiao DING, Yi LIN
Institute of Urban Environment, Chinese Academy of Sciences

I2-12-O03 14:50–15:05

Measurement Informatics for Evaluation of Materials and Environment

Jun KIKUCHI
RIKEN CSRS

I2-12-I04 ▸Invited 15:05–15:25

Molecular, Material, Product and Process Design and Process Control Based on Materials Informatics, Chemoinformatics and Process Informatics

Hiromasa KANEKO
Meiji University

I2-12-I05 ▸Invited 15:25–15:45

Toward optimization of total environment: forward prediction and parameter optimization in MI

Kei TERAYAMA[1]
[1]RIKEN Center for Advanced Intelligence Project, [2]Medical Sciences Innovation Hub Program, RIKEN Cluster for Science, Technology and Innovation Hub, [3]Department of Biomedical Data Intelligence, Graduate School of Medicine, Kyoto University

I2-12-I06 ▸Invited 15:45–16:00

Quantum chemistry towards Fugaku

Takahito NAKAJIMA
RIKEN

December 12, 2019

Oral Session 6

Time 16:30–18:30 Room Mont-4

Chairperson Yoshifumi AMAMOTO

I2-12-I07 ▸Invited 16:30–16:50

Silk-based materials as eco-friendly material

Keiji NUMATA
RIKEN

I2-12-I08 ▸Invited 16:50–17:10

Biomass Plastics and Biodegradable Plastics - Solution of Circular Economy? -

Hiroshi SANO
Mitsubishi Chemical Corporation

I2-12-I09 ▸Invited 17:10–17:30

Biodegradability of biodegradable plastics in marine environments

Ken-ichi KASUYA
Gunma University

I2-12-I10 ▸Invited 17:30–17:50

Fermentative Production of PHBH and metabolic engineering for regulation of its material properties

Shunsuke SATO, Hisashi ARIKAWA, Yoshihiro MOURI, Sho FURUTATE
KANEKA CORPORATION

I2-12-I11 ▸Invited 17:50–18:10

L_1regularization and its application to polymer

Kei HIROSE[1], Keisuke TERAMOTO[1]
[1]Kyushu University, [2]RIKEN Center for Advanced Intelligence Project

I2-12-I12 ▸Invited 18:10–18:30

Simulation and Informatics for Research of Polymer Materials

Ryuichi SAKASHITA
TOSOH

December 13, 2019

Oral Session 7

Time 9:00–11:20 Room Mont-1

Chairperson Hideki ABE, Takeharu TSUGE

I1I2-13-O01 9:00–9:15

Development of Heat-resistant Polymeric Materials from Bio-based Chemicals

Hideki ABE

RIKEN Center for Sustainable Resource Science

I1I2-13-K02 ▸Keynote 9:15–9:45

Controlled/Living Polymerization of Functional Styrenes from Natural Resources

Kotaro SATOH

Tokyo Institute of Technology

I1I2-13-O03 9:45–10:00

Fabrication of Multiple Parallel Gel Filaments by Applying Shear to Polymer Assembly

Yuriko TAKAYAMA, Norihiro KATO

Utsunomiya University

I1I2-13-I04 ▸Invited 10:00–10:20

Protease-catalyzed Polymerization for Synthesis of Polypeptides with Specific Sequence Motifs

Kousuke TSUCHIYA[1,2], Keiji NUMATA[1,2]

[1]RIKEN, [2]JST-ERATO

I1I2-13-I05 ▸Invited 10:20–10:40

Microsphere with Dimple Morphology Prepared from Ferulic Acid

Hironori ATARASHI

Okayama University

I1I2-13-I06 ▸Invited 10:40–11:00

Thermally Conductive Hierarchical Molecular Assemblies Based on Filamentous Viruses

Toshiki SAWADA[1,2]

[1]Tokyo Institute of Technology, [2]PRESTO-JST

I1I2-13-I07 ▸Invited 11:00–11:20

New Polyhydroxyalkanoate Biosynthesis Utilizing Metabolic Pathways for Amino Acid and Fatty Acid

Takeharu TSUGE

Tokyo Institute of Technology

December 13, 2019

Poster Session

Time 14:00–15:30 Room Trade-0

I2-13-P01

Characterization of Scratch Damage of Commercial Polymers

Tomoko KAJIWARA[1], Yoshifumi AMAMOTO[1,2], Ken KOJIO[1,2], Atsushi TAKAHARA[1,2]

[1]Institute for Materials Chemistry and Engineering, Kyushu University, [2]International Institute for Carbon-Neutral Energy Research, Kyushu University

I2-13-P02

Preparation and Characterization of Sacran/Imogolite Nanotubes Hybrid Film Prepared by Layer-by-Layer Assembly

Linlin LI[1], Wei MA[2], Akihiko TAKADA[3], Yuji HIGAKI[4], Maiko OKAJIMA[5], Tatsuo KANEKO[5], Atsushi TAKAHARA[1,2,3]

[1]Graduate School of Engineering, Kyushu University, [2]International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, [3]Institute for Materials Chemistry and Engineering (IMCE), Kyushu University, [4]Department of Integrated Science and Technology, Faculty of Science and Technology, Oita University, [5]School of Materials Science, Japan Advanced Institute of Science and Technology (JAIST)

I2-13-P03

Refining Messy NMR Data Important for Measurement Informatics

Shunji YAMADA[1,2], Atsushi KUROTANI[2], Eisuke CHIKAYAMA[2,3], Jun KIKUCHI[1,2,4]

[1]Nagoya University, [2]RIKEN, [3]Niigata University of International and Information Studies, [4]Yokohama City University

I2-13-P04

Methods for Important Factor Extraction toward Membrane Interface Evaluation

Sosei SUZUKI

Graduate School of Medical Life Science, Yokohama City University

I2-13-P05

Analysis of Lignin Degradation by Fungi Isolated from West Coast, Sabah, Malaysia

Clarence M. ONGKUDON, Adznila EBERAHIM, Jun KIKUCHI, Abygail Lorna ERIC, Mailin MISSON, Minami MATSUI, Tomoko MATSUMOTO, Daiki YOKOYAMA

Universiti Malaysia Sabah

I2-13-P06

Synthesis of Oligopeptide Containing Natural and Unnatural Amino Acids Toward Environmentally Degradable Polymers

Chie KOGANEMARU[1], Yoshifumi AMAMOTO[1,2,3], Atsushi TAKAHARA[1,2,3]

[1]Graduate School of Engineering, Kyushu University, [2]Institute for Materials Chemistry and Engineering, Kyushu University, [3]International Institute for Carbon-Neutral Energy Research, Kyushu University

I2-13-P07

Integrated Analysis of Biodegradable Plastics for Revealing the Relationship among Physical Properties and Chemical Structures

Ryo YAMAWAKI[1], Yuuri TSUBOI[2], Akiyo TEI[2], Kengo ITO[1,2], Jun KIKUCHI[1,2,3]

[1]Grad. Sch. Med. Life Sci. , Yokohama City Univ., [2]RIKEN CSRS, [3]Grad. Sch. Bioagri. Sci., Nagoya Univ.

I2-13-P08

Prediction of 2D J-resolved NMR parameters by combination of machine-learning and quantum chemical computations for molecular complexity

Xiangru XU[1], Kengo ITO[2,3], Jun KIKUCHI[2,3,4]

[1]Institut des Sciences et Ingénierie Chimiques, Ecole Polytechnique Fédérale de Lausanne, [2]RIKEN Center for Sustainable Resource Science, [3]Graduate School of Medical Life Science, Yokohama City University, [4]Graduate School of Bioagricultural Sciences, Nagoya University

December 12–14, 2019

Symposium I-3

Biodegradable Polymers for Biomedical Applications

[Organizer]

Masaya YAMAMOTO (Tohoku University)

December 12, 2019

Oral Session 6

Time 16:30–18:25 Room Mont-2

Chairpersons Yasuhiko IWASAKI, Tsuyoshi KIMURA

I3-12-I01 ▸Invited 16:30–16:53

Development of cationic poly(amino acid)s for nucleic acids delivery

Kanjiro MIYATA

The University of Tokyo

I3-12-I02 ▸Invited 16:53–17:16

Design of Soft-biomaterials Based on Intermediate Water Contents

Masaru TANAKA

Kyushu University

I3-12-I03 ▸Invited 17:16–17:39

Temperature-Responsive Biodegradable Injectable Polymer Systems Exhibiting Irreversible Gelation for Medical Application

Yuichi OHYA

Kansai University

I3-12-I04 ▸Invited 17:39–18:02

Relationship of Structures and Biomedical Functions for Resorbable Poly(ε-caprolactone)-block-Poly(ethylene glycol) Copolymers

Ming-Fa HSIEH

Chung Yuan Christian University

I3-12-I05 ▸Invited 18:02–18:25

Self-Assembling Elastin-Like Polypeptides as a Platform for Cell Studies

Ayae SUGAWARA-NARUTAKI

Nagoya University

December 13, 2019

Oral Session 7

Time 9:00–11:25 Room Mont-2

Chairpersons Shang-Hsiu HU, Nobuyuki MORIMOTO

I3-13-I01 ▸Invited 9:00–9:23

Network formation of endothelial cells on decellularized ECM hydrogels

Tsuyoshi KIMURA[1], Janpei KADOTA[1], Naoko NAKAMURA[2], Yoshihide HASHIMOTO[1], Akio KISHIDA[1]

[1]Tokyo Medical and Dental University, [2]Shibaura Institute of Technology

I3-13-I02 ▸Invited 9:23–9:46

Increased Chemoresistance of Tumor Cells on Staged Tumorigenesis- Mimicking Matrices

Takashi HOSHIBA

Tokyo Metropolitan Industrial Technology Research Institute

I3-13-O03 9:46–9:56

Preparation of stepwise osteogenesis-mimicking ECM-deposited PLGA-collagen hybrid meshes for tissue engineering

Yazhou CHEN[1,2], Naoki KAWAZOE[1], Guoping CHEN[1,2]

[1]Research Center for Functional Materials, National Institute for Materials Science, Tsukuba, 305-0044, Japan, [2]Department of Materials Science and Engineering, Graduate School of Pure and Applied Sciences, University of Tsukuba, Tsukuba, 305-8577, Japan

I3-13-I04 ▸Invited 9:56–10:19

Phosphorus-containing polymers for bone treatment

Yasuhiko IWASAKI

Kansai University

I3-13-I05 ▸Invited 10:19–10:42

An Apoptotic Cell-inspired Polymer for Anti-inflammatory Therapy

Mitsuhiro EBARA

National Institute for Materials Science

I3-13-I06 ▸Invited 10:42–11:05

A Fish Gelatin-based Soft Tissue Adhesive for Biomedical Applications

Tetsushi TAGUCHI

National Institute for Materials Science

I3-13-O07 11:05–11:15

Deformation and formation of Lo phase domains on cell-sized Liposome with membrane-adhesive plasmonic nanomaterials

Tomohiro NOBEYAMA[1], Shigyo KAZUKI[2], Hirotaka NAKATSUJI[3], Hiroshi SUGIYAMA[4], Tsutomu HAMADA[5], Tatsuya MURAKAMI[1,6]
[1]Graduate School of Engineering, Toyama Prefectural University, [2]Bio-AFM Frontier Research Center, Kanazawa University, [3]Graduate School of Engineering, Osaka University, [4]Graduate School of Science, Kyoto University, [5]School of Materials Science, Japan Advanced Institute Science and Technology, [6]Institute for Integrated Cell-Material Sciences, Kyoto University

I3-13-O08 11:15–11:25

Tunable non-enzymatic degradability of *N*-substituted polyaspartamide main chain for enhanced mRNA transfection efficiency

Mitsuru NAITO[1], Yuta OTSU[1], Rimpei KAMEGAWA[1], Kotaro HAYASHI[2], Satoshi UCHIDA[1,2], Hyun Jin KIM[1], Kanjiro MIYATA[1]
[1]The University of Tokyo, [2]Innovation Center of NanoMedicine

December 13, 2019

Oral Session 8

Time 14:00–15:52 Room Mont-2

Chairpersons Ming-Fa HSIEH, Mitsuhiro EBARA

I3-13-I09 ▸Invited 14:00–14:23

Polysaccharides-based Docking Hydrogels Bearing Biodegradable and Robust Functions

Tooru OOYA
Kobe University

I3-13-I10 ▸Invited 14:23–14:46

Adaptable Microporous Hydrogels for Neuron Regeneration

Shang-Hsiu HU
National Tsing Hua University

I3-13-I11 ▸Invited 14:46–15:09

Ultra-Flexible Nanofilms for Bio-Integrated Device & System

Toshinori FUJIE
Tokyo Institute of Technology

I3-13-I12 ▸Invited 15:09–15:32

Bioresorbable Inorganic/Organic Composite for Bone Repair

Masanori KIKUCHI
National Institute for Materials Science

I3-13-O13 15:32–15:42

Cell Separation Column using Temperature-Responsive-Cationic Copolymer Modified Beads

Kenichi NAGASE[1], Daimu INANAGA[1], Goro EDATSUNE[1], Yuki NAGATA[1], Aya MIZUTANI AKIMOTO[2], Hideko KANAZAWA[1]
[1]Keio University, [2]The University of Tokyo

I3-13-O14 15:42–15:52

Development of biomedical be-ta Ti alloys with low Young's modulus by selected laser melting from mixture powder

Mitsuharu TODAI
Department of Environmental Materials Engineering, National Institute of Technology, Niihama College

December 14, 2019

Oral Session 10

Time 9:00–11:29 Room Work-3

Chairpersons Masaya YAMAMOTO, Jun-ichiro JO

I3-14-I01 ▸Invited 9:00–9:23

Biodegradable characteristics of octacalcium phosphate-based bone substitute materials involving osteoclastic cellular activity

Osamu SUZUKI, Yukari SHIWAKU, Ryo HAMAI
Division of Craniofacial Function Engineering, Tohoku University Graduate School of Dentistry

I3-14-I02 ▸Invited 9:23–9:46

Development of Intracellular Controlled Release Technologies Based on Biodegradable Polymer Nanoparticles to Modify Cellular Biological Activities

Jun-ichiro JO, Yasuhiko TABATA
Kyoto University

I3-14-I03 ▸Invited 9:46–10:09

Surface Modification of Silica Nanoparticles Using 4-Aryloxy Boron Dipyrromethene (BODIPY) Enhances Skin Permeation

Masaru KATO
Showa University

I3-14-O04 10:09–10:19

Reversible Stabilization of Messenger RNA-loaded Polyion Complex by Degradable Silica Shell

Rimpei KAMEGAWA[1], Mitsuru NAITO[2], Satoshi UCHIDA[1], Hyun Jin KIM[2], Kanjiro MIYATA[1]
[1]Graduate School of Engineering, The University of Tokyo, [2]Graduate School of Medicine, The University of Tokyo

I3-14-O05 10:19–10:29

Design of sulfobetaine polymers for mitochondrial delivery

Nobuyuki MORIMOTO, Yoshifumi OISHI, Masaya YAMAMOTO
Tohoku University

I3-14-006 10:29–10:39

Bifunctional scaffolds for photothermal breast cancer therapy and adipose tissue regeneration

Xiuhui WANG[1], Naoki KAWAZOE[1], Guoping CHEN[1,2]
[1]Research Center for Functional Materials, National Institute for Materials Science, [2]Department of Materials Science and Engineering, Graduate School of Pure and Applied Sciences, University of Tsukuba

I3-14-007 10:39–10:49

Stimulation of Endogenous VEGF Secretion by Dodecyl group-modified Injectable Hydrogel

Yosuke MIZUNO[1], Tetsushi TAGUCHI[1,2]
[1]University of Tsukuba, [2]National Institute for Materials Science

I3-14-008 10:49–10:59

New Cell Separation System using Mixed Temperature-responsive and Cationic Polymer Brushes

Haruno WAKAYAMA, Kenichi NAGASE, Hideko KANAZAWA
Keio University

I3-14-009 10:59–11:09

Regulation of Mesenchymal Stem Cells Transfection through Micropatterned Surfaces

Yongtao WANG[1], Yingjun YANG[1,2], Naoki KAWAZOE[1], Guoping CHEN[1,2]
[1]National Institute of Materials for Science, [2]University of Tsukuba

I3-14-010 11:09–11:19

Design of Cell Membrane Anchoring molecules for cell labeling

George MOGAMI
Tohoku University

I3-14-011 11:19–11:29

Magnetic Force-Assisted Sandwich Culture to Create 3D Microenvironment for Epithelial Cells

Masaya YAMAMOTO, Mayumi TOKUDA, Taiga SUTO
Tohoku University