

THE CANADIAN MINERALOGIST

CONTENTS, VOLUME 21

The pyrosmalite group of minerals. I. Structure refinement of manganpyrosmalite	T. KATO & Y. TAKÉUCHI	1
The pyrosmalite group of minerals. II. The layer structure of mcGillite and friedelite	T. OZAWA, Y. TAKÉUCHI, T. TAKAHATA, G. DONNAY & J.D.H. DONNAY	7
The pyrosmalite group of minerals. III. Derivation of polytypes	Y. TAKÉUCHI, T. OZAWA & T. TAKAHATA	19
Wadsleyite, natural β -(Mg,Fe) ₂ SiO ₄ from the Peace River meteorite	G.D. PRICE, A. PUTNIS, S.O. AGRELL & D.G.W. SMITH	29
Loudounite, a new zirconium silicate from Virginia	P.J. DUNN & D. NEWBURY	37
Spinel zonation in the De Beers kimberlite, South Africa: possible role of phlogopite	J.D. PASTERIS	41
Priderite-bearing xenoliths from the Prairie Creek mica peridotite, Arkansas	R.H. MITCHELL & R.D. LEWIS	59
The Baie-des-Moutons syenitic complex, La Tabatière, Quebec. I. Petrography and feldspar mineralogy	A.E. LALONDE & R.F. MARTIN	65
The Baie-des-Moutons syenitic complex, La Tabatière, Quebec. II. The ferromagnesian minerals	A.E. LALONDE & R.F. MARTIN	81
Gladstone-Dale constants: a new approach	F.D. BLOSS, M. GUNTER, SHU-CHUN SU & H.E. WOLFE	93
Beaverite-plumbojarosite solid solutions	J.L. JAMBOR & J.E. DUTRIZAC	101
Bastnaesite in fractures of the Eye-Dashwa lakes pluton, Atikokan, northwestern Ontario	D.C. KAMINENI & M. BONARDI	115
Forms of iron, phosphorus and trace-metal ions in a layered sediment core from Lake Ontario	P.G. MANNING, K.R. LUM & T. BIRCHALL	121
A cobalt-bearing sulfide-arsenide assemblage from the Nord mine (Finnshytteberg), Sweden: a new occurrence of clinosafflorite	E.A.J. BURKE & M.A. ZAKRZEWSKI	129
Telluride minerals from the Ashley deposit, Bannockburn Township, Ontario	D.C. HARRIS, W.D. SINCLAIR & R.I. THORPE	137
Mineral species from Canadian type localities, an annotated list	R.I. GAIT	145
A second occurrence of stibivanite: Buca della Vena mine (Apuan Alps), Italy	S. MERLINO & P. ORLANDI	159
Book reviews		161
Crystalloraphy. An Introduction for Earth Science (and other Solid State) Students	R.B. FERGUSON	
Clay Minerals	H. KODAMA	
Platinum Group Elements: Mineralogy, Geology, Recovery	J.M. DUKE	
Erratum		164
Commission on Ore Microscopy: Minutes of Varna meeting		167

THE CRYSTAL CHEMISTRY OF THE AMPHIBOLES

F.C. HAWTHORNE

Introduction	174
Classification and Nomenclature	175
Formula-Unit Calculation	177
Amphibole Crystal Structures	184
The Tetrahedral Double-Chain	213
The Octahedral Strip	227
The M(4), A and O(3) Sites	242
Crystal-Structure Refinement of Amphiboles	262
Mössbauer Spectroscopy	264
Infrared Absorption Spectroscopy in the OH Region	276
Electronic Absorption Spectroscopy	288
Miscellaneous Spectroscopic Methods	296
Cation Distributions in Amphiboles	302
Factors Affecting Cation Ordering	312
Oxidation – Dehydroxylation	317
High-Temperature Crystallography	321
Electrical, Magnetic and Elastic Properties	325
Deformation Behavior	331
References	337
Appendices: A, B, C, D, E, F, G	353
Cabriite Pd ₂ SnCu, a new species in the mineral group of palladium, tin and copper compounds	T.L. EVSTIGNEEVA & A.D. GENKIN 481
Vashegyite, a sheet aluminum phosphate: new data	Z. JOHAN, E. SLANSKY & P. POVONDRA 489
Viitaniemiite from the Francon quarry, Montreal, Quebec	R.A. RAMIK, B.D. STURMAN, A.C. ROBERTS & P.J. DUNN 499
Weddellite from Biggs, Oregon, U.S.A.	J.A. MANDARINO & N.V. WITT 503
Weddellite from Lutterworth Township, Haliburton County, Ontario	J.A. MANDARINO 509

Derbylite from Buca della Vena mine, Apuan Alps, Italy M. MELLINI, P. ORLANDI & N. PERCHIAZZI	513
Grunerite from the Shinyama ore deposit, Kamaishi mine, Japan E. UCHIDA	517
The formation of subcalcic garnet in scheelite-bearing skarns R.J. NEWBERRY	529
The polytypes of pennantite P. BAYLISS	545
The structure of hackmanite, a variety of sodalite, from Mont St-Hilaire, Quebec R.C. PETERSON	549
The crystal structure of jarlite F.C. HAWTHORNE	553
The crystal structure of pachnolite F.C. HAWTHORNE & R.B. FERGUSON	561
Chlorapatite de synthèse: substitution et inclusions de Mn, Ce, U et Th en traces A. BAUMER, R. CARUBA, H. BIZOUARD & A. PECKETT	567
Origin of the hawaiiites from the Itcha Mountain Range, British Columbia M. Z. STOUT & J. NICHOLLS	575
The Ellison Lake pluton: a cordierite-bearing monzogranitic intrusive body in southwestern Nova Scotia P.L. ALLEN & S.M. BARR	583
Metastable feldspars of Archean age in the Meggisi Lake granite, Wabigoon belt, Ontario S.F. SABAG & R.F. MARTIN	591
Book reviews	
Uranium 81 (P.R. Simpson, J.E. Plant & G.C. Brown, eds.) S.M. BARR	603
Fluid Inclusion Research (E. Roedder & A. Kozlowski, eds.) J. GUHA	604
Inorganic ⁺ Geochemistry (P. Henderson) M.D. HIGGINS	604
Preface T.T. VANDERGRAAF	605
Immobilization of U-Th-Ra in mine wastes by phosphate mineralization F.H. MURRAY, J.R. BROWN, W.S. FYFE & B.I. KRONBERG	607
Leaching studies of natural and synthetic titanite, a potential host for wastes from the reprocessing of Canadian nuclear fuel P.J. HAYWARD, F.E. DOERN, E.V. CECCHETTO & S.L. MITCHELL	611
Characteristics of radionuclide sorption on fracture-filling minerals in the Eye-Dashwa Lakes pluton, Atikokan, Ontario D.C. KAMINENI, T.T. VANDERGRAAF & K.V. TICKNOR	625
Effect of alteration on pore structure of crystalline rocks: core samples from Atikokan, Ontario T.J. KATSUBE & D.C. KAMINENI	637
Uranium in overthrust Archean basement, Bahia, Brazil L.M. LOBATO, J.M.A. FORMAN, K. FUZIKAWA, W.S. FYFE & R. KERRICH	647
<hr/>	
Ir in Keweenawan basalts of the Mamainse Point Formation, Ontario N.W.D. MASSEY, J.H. CROCKET & A. KABIR	655
Chloritoid amphibolites from the Pamur area, Andhra Pradesh, southern India D.S. REDDY & M.S. MURTY	661
Metamorphism in the Aleutian arc: the Finger Bay pluton, Adak, Alaska S.M. KAY	665
Compositional range of Mn-garnet in zoned granitic pegmatites J.R. BALDWIN & O. VON KNORRING	683

Study of the vibrational spectra of natural natrolite	F. PECHAR & D. RYKL	689
The occurrence of wurtzite polytypes in eastern Ohio	D.W. HOLLENBAUGH & E.H. CARLSON	697
Sturmanite, a ferric iron, boron analogue of ettringite	D.R. PEACOR, P.J. DUNN & M. DUGGAN	705
Proceedings of the twenty-eighth annual meeting of the Mineralogical Association of Canada		711
Index	J.D. SCOTT	719