Contribution ID: **364** Type: **Poster Presentation**

Thermal and mechanical properties of selected 3D printed thermoplastics in the cryogenic temperature regime

Wednesday, 1 July 2015 09:00 (2 hours)

Insulating materials for use in cryogenic boundary conditions are still limited to a proved selection as Polyamid, Glasfiber reinforced resins, PEEK, Vespel etc. These materials are usually formed to parts by mechanical machining or sometimes by cast methods. Shaping complex geometries in one piece is limited. Innovative 3D printing is now an upcoming revolutionary technology to construct functional parts from a couple of thermoplastic materials as ABS, Nylon and others which possess quite good mechanical stability and allow realizing very complex shapes with very subtle details. Even a wide range of material mixtures are an option and thermal treatments can be used to finish the material structure for higher performance. The use of such materials in cryogenic environment is very attractive but so far poor experience exists. In this paper first investigations of the thermal conductivity, expansion and mechanical strength are presented for a few selected commercial 3D material samples to evaluate their application prospects in the cryogenic temperature regime.

Primary author: Dr WEISS, Klaus-Peter (KIT, Institute for Technical Physics)

Co-authors: BAGRETS, Nadezda (Karlsruhe Institute of Technology –KIT); Dr GOLDACKER, Wilfried (KIT, Institute for Technical Physics)

Presenter: Dr WEISS, Klaus-Peter (KIT, Institute for Technical Physics)

Session Classification: M3PoB - Cryogenic Materials VI: Insulation

Track Classification: ICMC-12 - Insulation and Impregnation Materials