



Contribution ID: 849 Contribution code: THU-PO3-617-04

Type: Poster

Mechanical and thermal properties of glass fiber-filled thermos-plastic materials for magnet and cryogenic applications

Thursday, 18 November 2021 10:00 (20 minutes)

Consumable pulsed magnets at the Pulsed Field Facility usually use a considerable amount of G10 fillers to create smooth and strong winding transitions from one layer to another. These fillers typically have complicated shapes to fill all the gaps at the transitions. They are expensive and time-consuming to fabricate. Even machining G10 is hazardous and unfavorable. G10 material was chosen because of its excellent mechanical and dielectric strengths in liquid nitrogen which is used to cool magnets down. In this paper, we investigate the possibility of replacing G10 material by a few glass fiber-filled thermos-plastic materials which can be used to fabricate fillers by the 3D printing technique. This replacement will significantly reduce the material cost for our consumable pulsed magnets. Nylon and Polyether Ether Ketone (PEEK) materials filled with chopped E-glass fibers will be used to 3D print the samples. The mechanical and thermal properties of the samples will be measured at temperatures between 77 K and 300K, and for directions parallel and perpendicular to the printing direction of the samples. The outcome of this study will also help to evaluate the possibility of using these 3D printing materials for other cryogenic applications such as experimental probes or parts for superconducting magnets.

Primary author: TOPLOSKY, Vince (NHMFL)

Co-authors: BETTS, Scott (NHMFL); GODDARD, Robert (NHMFL); HAN, Ke; TORRES, Joseph; NGUYEN, Doan (NHMFL)

Presenter: TOPLOSKY, Vince (NHMFL)

Session Classification: THU-PO3-617 Other Components for Magnets