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Compatibility Testing of Printed Polymers Exposed to Water and Insulating Oil Environments

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To enable employment of 3D printed polymeric components in high voltage pulsers and related support systems, compatibility with materials commonly used for insulation and cooling in these systems must be known. Polymeric test samples, printed with four common 3D printing techniques (fused deposition modeling, stereolithography, polymer jetting, and selective laser sintering) were exposed to water or insulating oil environments for extended durations. Preliminary results of compatibility testing of 3D printed parts will include comparisons of material absorption, embrittlement, and changes in dielectric strength between exposed samples and a control group of unexposed samples. Water absorption tests were performed after a 24 hour exposure period. Mechanical and dielectric strength testing was performed on test samples exposed to insulating oil environments for a nine month period.

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