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# Borosilicate cermet structures via photopolymerization-based 3D printing using metal-exuding glasses

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## Abstract

Cermets are composite materials that combine the characteristics of ceramics or glasses with metallic phases. This enables property combinations in such a way that the resulting composite material exhibits the high rigidity of a glass, but also has a significantly higher ductility, thermal conductivity, and glass-to-metal bonding ability. Primary constraints of conventional cermet manufacture are with geometrical complexity and size, complex processing requirements such as die casting, time and cost consuming post-processing, and challenging machining procedures. Additive manufacturing (AM) can largely avoid the drawbacks of traditional production techniques.

Here, a new technique is proposed using borosilicate glass powders in a photopolymerizable slurry to fabricate 3D-printed structures which, by post-processing, can be transferred into cermets. We will report on this process, achievable properties and the mechanism underlying cermet formation.

**Keywords:** Borosilicate glass, Cermet, 3D printing, Photopolymerization

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