

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
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ADDITIVE MANUFACTURING WITH AMORPHOUS SUBSTRATES

**Abstract**

Over the past decade there has been a renaissance in the advancement of additive manufacturing. The research presented utilizes techniques developed for terrestrial applications to process extra-terrestrial material simulants and characterizes material properties of 3D printed components. More specifically, this research leverages developments in the 3D printing of amorphous substrates (glass) developed on earth, and applies them to basalt type materials readily available on the Martian surface. This paper documents the critical material properties of both 3D printed Earth derived basalt, as well as Martian Regolith Simulants to inform potential applications on the Martian surface. In addition, it provides data to develop fabrication constraints for computer modeled and 3D printed designs in extra-terrestrial environments.