Manufacturing With Moon Dust

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Moon colonization would benefit from manufacturing using local materials such as moon dust, a basaltic volcanic ash (BVA). We investigate the feasibility of additive 3D printing (FDM) with a BVA-loaded polymer and how the materials withstand the wide range of lunar temperatures. Thermal cycling shows that FDM printed materials PLA+, PLA with carbon fiber and BVA loaded "moon dust" filaments all deform under stress at lunar day temperatures >95C, near the filament transition. We sintered the green BVA print under argon flow to simulate the oxygen-free lunar environment. The binder was not fully burned away, causing the material to become crumbly and graphite-like. We compare FDM printing to other methods of manufacturing with moon dust and contrast the respective advantages and challenges.

Awards Won: