

SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations (IP)

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FEASIBILITY OF FDM ABLATIVE CERAMIC MATERIALS FOR LOW-COST PROPULSIVE
SYSTEMS**Abstract**

Rocket engines regularly employ ablative materials as a liner in various sections such as in the chamber, throat, and nozzle for controlled cooling. Common ablative materials include graphite, fiber-reinforced organics, and ceramics. This paper examines the feasibility of additively manufacturing ceramic ablative materials, specifically Fused Deposition Modeling silicon carbide suspended in a thermoplastic polymer matrix. The manufacturing process is described in detail in this paper but generally follows the pyrolysis method used in Ceramic Matrix Composite manufacturing. Additive manufacturing ceramic ablative materials will enable shorter production times compared to conventional manufacturing methods and more freedom in geometry design. Feasibility will be determined by examination of the burn through times of prepared samples, ease of manufacturing, strength of the material, and effects of ceramic volume fraction.