



## Advanced Metal Foam Structures for Outer Space

A document discusses a proposal to use advanced materials — especially bulk metallic glass (BMG) foams — in structural components of spacecraft, lunar habitats, and the like. BMG foams, which are already used on Earth in some consumer products, are superior to conventional metal foams: BMG foams have exceptionally low mass densities and high strength-to-weight ratios and are more readily processable into strong, lightweight objects of various sizes and shapes. These and other attractive properties of BMG foams would be exploited, according to the proposal, to enable *in situ* processing of BMG foams for erect-

ing and repairing panels, shells, containers, and other objects. The *in situ* processing could include (1) generation of BMG foams inside prefabricated deployable skins that would define the sizes and shapes of the objects thus formed and (2) thermoplastic deformation of BMG foams. Typically, the generation of BMG foams would involve mixtures of precursor chemicals that would be subjected to suitable pressure and temperature schedules. In addition to serving as structural components, objects containing or consisting of BMG foams could perform such functions as thermal management, shielding against radiation, and shielding against hypervelocity impacts of micrometeors and small debris particles.

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*In accordance with Public Law 96-517, the contractor has elected to retain title to this invention. Inquiries concerning rights for its commercial use should be addressed to:*

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