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The objective of this experiment is to evaluate the oxidation performance and heat resistance of the Ultra-high Temperature Ceramics (UHTCs) ZrB2 and HfB2 under high temperature, high heat flux, ablative, and oxidative environments. The investigation of UHTCs such as ZrB2 and HfB2 could potentially lead to new, easily reusable thermal protection systems (TPS) for space craft. The UHTC samples will be oxidized using an oxy-acetylene torch and a high temperature air furnace. The torch will expose the samples to rapid heating, high velocity combustion gasses, and sample temperatures in excess of 3000°C. The furnace will expose the samples to temperatures up to 1600°C in static air. Once tested, the samples will be analyzed to determine weight change, ablation rate, oxide layer thickness, and oxidation reaction products. It is expected that the torch test will produce a more aggressive environment than the air furnace resulting in greater oxidation of the UHTC specimens.

Keywords

Oxyacetylene, Torch, Furnace, UHTC, Hafnium Diboride, Zirconium Diboride, Ablation, Oxidation, Thermal Protection System, Heat Flux

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