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INVESTIGATION OF ABLATIVE PROPERTIES OF LIGHTWEIGHT CARBON/PHENOLIC
COMPOSITES**Abstract**

Lightweight carbon/phenolic composites, consisting of rigid carbon fibrous substrate and phenolic resin matrix, have been fabricated with different densities for investigation of the relationship between density as well as composition and ablative properties. The microstructure was characterized by SEM. The results showed that the micromorphology of phenolic matrix changes with varying content of phenolic resin in composite. The thermal conductivity at room temperature slightly increased with increasing density of composite. The ablation and thermal performance of composites in hypersonic flow environment were determined by arc jet test carried on heat flux of 600 W/cm². Resession rate is reducing with increased density. The discrepancy in in-depth temperature responses and ablative end-state of composites is mostly dependent on the content of phenolic in composites. The composite with lower density has higher effective heat of ablation as well as higher thermal penetration on test conditions.