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PREDICTING METHODS OF HIGH TEMPERATURE PERFORMANCE FOR REUSABLE LAUNCH  
VEHICLE THERMAL PROTECTION MATERIALS

**Abstract**

With the rapid development of Reusable Launch Vehicle (RLV), the design of thermal protection structure and selection of heatshield materials become more and more important. This paper focuses on the predicting method of high temperature performance under aero-heating environments for different type materials, i. e. oxidation-resistant carbon/carbon composite, carbon/silicon carbide composite, ultra-high temperature ceramics (ZrC, ZrB<sub>2</sub>), etc. The prediction models as high temperature oxidation, high temperature mechanical properties, high temperature radiation and wall catalysis characteristics are introduced. After comparing the merits and demerits of their combined performance, the candidates for different components in RLV are recommended. Finally, the perspective of predicting and evaluating methods for reusable thermal protection materials is preliminarily surveyed.

Keywords: Reusable Launch Vehicle, thermal protection system, thermal performance