

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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AEROHEATING AND STRUCTURE COUPLED ANALYSIS IN THERMAL PROTECTION SYSTEM
FOR REUSABLE LAUNCH VEHICLE**Abstract**

The thermal protection system (TPS) design for reusable launch vehicle (RLV) associated with entry trajectory, aeroheating environment, structure temperature and response is complex and significant. To improve the calculation accuracy of TPS performance and shorten the design period, this paper demonstrates a new tool for predicting the aeroheating and thermal response for the non-ablative rigid external TPS used in RLV, and the finite element method decoupling was also employed. The research indicated that, during the RLV returned throughout the reentry flight, the hot wall heat flux actual action on the TPS is less than the initial calculation value obtained by the engineering algorithm or CFD method. And the problem of aeroheating and structure coupling must be considered for TPS design. At last, the C/SiC shingle structure response for RLV TPS is discussed.