

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Advanced Materials and Structures for High Temperature Applications (4)

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INVESTIGATION ON THE ABLATION PERFORMANCE OF EPDM INSULATION MATERIAL
UNDER DENSE PARTICLE STREAM

Abstract

Abstract: the ablation experiment for the EPDM insulation material is conducted 17 times based on the ground test solid rocket motor(SRM) for dense particle flow simulation in the SRM combustion chamber. The effect of particle flow on the material ablation rate is researched, the carbide morphology of the material is investigated by scanning electron microscopy, and the relation between the particle flow parameters and the microstructure of the carbide material is obtained. The results indicate that :(1) there is a critical value for the particle velocity ,When the particle velocity below the critical value, the particle velocity have a little effect on the ablation rate, when the particle velocity above the critical value, the ablation rate increases rapidly with the particle velocity.(2)based on the relation between particle flow parameters and the material ablation rate, a engineering prediction model is proposed for the EPDM ablation rate through mathematical regression analysis;(3) the carbide morphology differs a lot under various particle flow parameters;(4) the effect of fiber layer in the EPDM on the ablation rate is analysed, and it is found that the ablation rates are almost the same for different fiber layer mode, Under harsh conditions, the fiber vertical layer mode is better than fiber parallel layer mode