

14TH IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Hypervelocity Impacts and Protection (3)

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INFLUENCE ON SHIELDING PERFORMANCE OF AEROGEL/FIBERGLASS COMPOSITE
STUFFED IN SHIELD

Abstract

Aerogel/Fiberglass Composite (AFC) with excellent thermal protective property stuffed in the debris shield could be possible to improve both the thermal insulation and debris shielding performance of a spacecraft. To explore the shielding performance of the AFC stuffed shield, Hypervelocity impact tests were carried out at hypervelocity impact range A of CARDC. The projectiles are aluminum spheres with 3.0mm to 6.0mm diameter, while the impact velocity ranges from 3.0km/s to 7.0km/s. The targets were AFC stuffed shields and aluminum triple-wall shield with the same areal density. AFC were stuffed in different positions of the shield: the first position was close to the rear place of bumper, the second position was the center of between the bumper and rear wall, the third position was close to the face place of rear wall. The shielding performance of between AFC stuffed shield and aluminum triple-wall shield were compared. The difference on shielding performances of the debris shields stuffed with AFC in different position was investigated. It is found that the shielding performance of the AFC stuffed shield is better than that of the aluminum triple-wall shield obviously, and the shielding performance of the debris shields stuffed with AFC in different position is different.