

SPACE DEBRIS SYMPOSIUM (A6)
Interactive Presentations (IP)

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EXPERIMENT AND CALCULATION OF THE PERFORMANCE OF DEBRIS SHIELD STUFFED
WITH GLASS EPOXY PLATE

Abstract

As an effort to find a lighter mass, better performance and lower cost shield, the debris shield stuffed with glass epoxy plate was investigated. Hypervelocity impact tests were carried out to compare shielding capabilities of the glass epoxy plate stuffed shield and aluminum triple-wall shield with the same areal densities. The aluminum projectile diameter is 5.5mm and the impact velocity ranges from 4.0 to 5.0km/s in the tests. The SPH (smoothed particle hydrodynamic) simulation on the two kinds of shields was carried out to obtain the ballistic limits of the shields. Efforts were made on the mechanism exploration to explain why the shielding capability of the glass epoxy plate stuffed shield is better than that of the aluminum triple-wall shield. Results show that the attenuation momentum of debris impacting on the glass epoxy plate is obviously higher than that of impacting on aluminum plate with the same areal density. Thus, the damage to the rear plate produced by the debris which penetrated the glass epoxy plate stuffed in the shield is reduced, and the performance of the epoxy plate stuffed shield is improved.