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The Recent Research Progresses in Space Debris Hypervelocity Impact Test in CAST ZIZHENG GONG, FU DAI, JIYUN YANG, MINGQIANG HOU, JIANDONG ZHENG, JINGYU TONG, Beijing Institute of Spacecrafts Environment Engineering, HEWEI PANG, China Academy of Space Technology —
A more perfect projectile/sabot aerodynamic separating technique in hypervelocity impact experiment was developed. By using this technique, the Al sphere with diameters from 10 mm to 1 mm were separated with sabot 100% successfully in the velocity ranges of 3$\sim$ 7km/s, on the two-stage-light-gas gun with 18 mm caliber. The technique of flier-plate with graded wave impedance in hypervelocity launcher was developed, and a titanium plate with 4mm in diameter and 2 mm in thickness was launched to 10km/s. The ballistic limit curve of typical aluminum alloy whipple shield was investigated by both experiment and numerical simulation, the results were compared with Christiansen equation, and a jump phenomena were found at velocity between 8.5km/s and 11km/s in simulation results. The hypervelocity impact damage characteristic and damage model of fused silica glass outer windshield was obtained by using the two-stage-light-gas gun up to 6.5 km/s impacting velocity. The hypervelocity impacts on the outer surfaces functional material, such as the thermal control material, window glass, and OSR etc., by using The Laser-driven Flyer system are also reviewed.

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