

SPACE DEBRIS SYMPOSIUM (A6)
Hypervelocity Impacts and Protection (3)

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THE HYPERVELOCITY IMPACT TEST INVESTIGATION AND ANALYSIS ON THERMAL
CONTROL INSTRUMENT IN THE SATELLITES

Abstract

The thermal control instrument in the satellite may not operate properly while it is collided by the Meteoroid/Orbital debris, which may lead to thermal subsystem catastrophic failure or even satellites functional failure. The thermal control instrument is used in the satellites to keep the temperature within the specified periods, which is very important for the normal operation of critical instruments such as the thrusters, the batteries etc. Therefore, it is very meaningful to explore the failure mechanism of the thermal control instrument while it is collided by the Meteoroid/Orbital debris for the purpose of the satellites application. In this paper, the thermal control instrument hypervelocity impact tests are presented with Two Stage Light Gas Gun, which simulate the configuration in the satellites. The velocity of spherical projectile with the aluminum alloy is kept 5.0km/s constantly. In addition, the operating principle of the thermal control instrument will be related. Furthermore, the ballistic limits diameters are figured out by adjusting the various projectile diameters. Moreover, the test results applied in satellites are also analyzed in the paper.