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RESEARCH ON HYPERVELOCITY IMPACT EFFECT FOR WHIPPLE SHIELD AT CRYOGENIC TEMPERATURES

Abstract

The hypervelocity impact effects have been studied on typical Whipple shield at cryogenic temperatures. The cryogenic setup, which was installed in the target chamber of two-stage light-gas gun, has been firstly developed to cool targets down to -150"C with liquid nitrogen to permit the testing of shield structure at cryogenic temperatures. Then some hypervelocity impact tests have been done at cryogenic temperatures and impact results have been compared with ones at room temperatures, including the bumper penetration characteristics, debris colud characteristics and rear wall damage characteristics. Finally, the ballistic limit curves of Whipple shield are obtained at cryogenic temperatures.