

MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Space Environmental Effects and Spacecraft Protection (6)

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EXPERIMENTAL STUDY ON ACOUSTIC EMISSION SIGNAL CHARACTERISTICS OF SPACE  
DEBRIS HYPERVELOCITY IMPACT ON MANNED SPACECRAFT WITH PARTITION FRAMES

**Abstract**

Partition frames are widely used in manned spacecraft structure, which can alter the characteristics of AE(acoustic emission) signal resulted from space debris impact due to signal reflection and mode conversion. In order to study the transmission characteristics of AE signal caused by debris impact on manned spacecraft with partition frames, the effects of partition frames on AE signals are studied experimental in simulated structure. The AE signals are created by lead break and projectiles launched on spacecraft structure with partition frames and the signals are collected by sensor array. The effects of the partition frames on AE signals are studied in wave mode and frequency domain using wavelet method by comparison between spacecraft structure with partition frames and structures without frames. The results illustrate that the energy of S0 mode will decrease after transmitting in the structure with partition frames, which have low-pass filtering effect on AE signals. This paper provides a favorable reference to the study on transmission characteristics of AE signal resulted from space debris impact on spacecraft.