Abstract Submitted
for the 4CF12 Meeting of
The American Physical Society

Space Impact Ejecta Model of Micrometeoroid Collision on MISSE-6[1] KELBY PETERSON, J.R. DENNISON, USU Materials Physics Group — The Utah State University SUSpECS project allowed for pre- and post-flight analysis of various materials used in space-component design. Approximately 180 samples were flown on MISSE-6 and spent 18 months suspended off the side of the International Space Station. This presentation focuses on a thin film of polyethylene terephthalate (PET) MylarTM coated with Vapor Deposited Aluminum (VDA). Samples that were part of the Materials International Space Station Experiment (MISSE) experienced diverse effects whilst exposed to the space environment. This sample displayed evidence of atomic oxygen erosion of the VDA, UV-induced discoloration of the polymer, and a crater created by a micrometeoroid impact. There is a lack of data pertaining to the effects of micrometeoroids on space components; in order to further understand these effects, a simulation of the UV radiation was tested on similar polymers at varying intensities. Vaporization energy calculations were used to estimate the pre-impact velocity and mass of the micrometeoroid, the trajectory of the impact ejecta and its effects on surrounding material. It is of particular interest to note that VDA-coated MylarTM is a major component in the construction of astronaut suits, which could be penetrated by such impacts.

[1]This work was supported through funding from NASA and Johns Hopkins.

Kelby Peterson
USU Materials Physics Group

Date submitted: 20 Sep 2012 Electronic form version 1.4