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Properties of Spacecraft Materials Exposed to Ionizing Radiation ALEXANDER SOUVALL, GERGORY WILSON, Utah State University, HEATHER TIPPETS, Brigham Young University - Idaho, BEN RUSSON, KATIE GAMAUNT, JOHN DENNISON, Utah State University — The effects of ionizing radiation damage on the various properties of spacecraft materials resulting from exposure in the Space Survivability Testing chamber (SST) are being studied with both *ex situ* and *in situ* tests. The SST is a ground based test facility designed to mimic low earth orbit (LEO), and geosynchronous orbit to test potential environmental-induced modifications to small satellites , and materials. Tests described here expose spacecraft materials to a Sr^{90} ionizing beta radiation source at room temperature and in high vacuum. *Ex situ* optical transmission/reflectivity measurements glass samples will monitor optical darkening. Properties of polymeric samples will be measured before and after SST exposure as well as a comparative study of SST ground-based tests to space flown samples. These include materials from the MISSE and PrintSat missions. The MISSE mission studied the effects of prolonged exposure to the LEO space environment properties of common spacecraft materials. PrintSat is a 3D printed CubeSat built by students at Montana State University constructed of WindForm, a nano-carbon-impregnated plastic; it will use on-board sensors to observe mechanical and electrical space-induced changes of WindForm. By comparison of ground-based tests in the SST to the results of these in-flight tests, the ability of the chamber to mimic the space environment and predict potential radiation damage effects will be quantified.

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