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MLI; 2.2 Environmental Exposure; 3 Experimental Procedures; 4 Results and Discussion; 4.1 Exposure Regions; 4.2 Tensile Properties; 4.3 Optical and Thermal Properties; 4.4 X-Ray Photoelectron Spectroscopy (XPS); 4.5 Atomic Oxygen Erosion Yield (Ey); 5 Summary and Conclusions; References; Effect of Solar Exposure on the Atomic Oxygen Erosion of Hubble Space Telescope Aluminized-Teflon Thermal Shields; 1 Introduction; 2 Materials and Experimental Procedures; 2.1 Materials; 2.2 Space Environmental Exposure 3 Experimental Procedures 3.1 Samples; 3.2 Mass Measurements; 3.3 Ground-Laboratory RF Plasma Asher Exposure; 3.4 Flux Tests; 3.5 Exposure Area Measurements; 3.6 Erosion Yield Calculation; 3.7 Photo-Documentation; 4 Results and Discussion; 4.1 Material Degradation; 4.2 Fluence and Erosion Yield Values; 5 Summary; References; Post-flight Analysis of Materials Exposed on the Spectrometer Sub-unit of MEDET (18 Months On-Board ISS); 1 Introduction; 2 Experimental Procedure; 2.1 Spectrometer; 2.2 Flight Samples; 2.3 Mission Environment and Parameters; 3 Post-Flight Analysis of Samples 3.1 Measurements and characterization techniques 3.2 Polymeric films; 3.3 Thermal Coatings (Silicon Based); 3.4 Multilayer Polymeric Films; 3.5 Summary of Thermo-Optical Properties Results; 4 Correlation with Flight Measurements; 5 Conclusions; References; Polymer Strain Experiment on MISSE 6; 1 Introduction; 2 Polymer Strain Experiment; 3 Materials International Space Station Experiment 6; 4 Calculations for Strain Testing; 5 Experimental Procedure; 5.1 Dehydration Shrinkage Studies; 5.2 Thermal Vacuum Strain Testing; 5.3 Scanning Electron Microscopy; 5.4 Mandrel Bend Testing 6 Results and Discussion 6.1 Dehydration Shrinkage Data; 6.2 Thermal Vacuum Testing; 6.3 Scanning Electron Microscopy; 6.4 Mandrel Bend Testing; 7 Conclusions; References; Passive Space Environment Effect Measurement on JEM/MPAC and SEED; 1 Introduction; 2 Space Environment Monitoring Samples; 2.1 UV Fluence Monitoring; 2.2 Space-Radiation Effect: Total Ionizing Dose (TID); 3 AO Monitoring; 3.1 Maximum Temperature; 4 Results and Discussion; 4.1 Retrieved UV and AO Monitoring Samples; 4.2 Deriving the Space Environment Factor Values from Monitoring Samples; 5 Conclusions; References Attenuation of Scattered Thermal Energy Atomic Oxygen

Sommario/riassunto

The goals of the 10th International Space Conference on "Protection of Materials and Structures from Space Environment" ICPMSE-10J, since its inception in 1992, have been to facilitate exchanges between members of the various engineering and science disciplines involved in the development of space materials, including aspects of LEO, GEO and Deep Space environments, ground-based qualification, and in-flight experiments and lessons learned from operational vehicles that are closely interrelated to disciplines of the atmospheric sciences, solar-terrestrial interactions and space life sciences. The knowledge of environmental conditions on and around the Moon, Mars, Venus and the low Earth orbit as well as other possible candidates for landing such as asteroids have become an important issue, and protecting both hardware and human life from the effects of space environments has taken on a new meaning in light of the increased interest in space travel and colonization of other planets. And while many material experiments have been carried out on the ground and in open space in the last 50 years (LDEF, MEEP, SARE, MISSE, AOP, DSPSE, ESEM, EURECA, HST, MDIM, MIS, MPID, MPAC and SEED), many questions regarding the environmental impact of space on materials remain either poorly understood or unanswered. The coming generations of scientists will have to continue this work and tackle new challenges, continuing to build the level of confidence humans will need to continue the

colonization of space. It is hoped that the proceedings of the ICPMSE-10J presented in this book will constitute a small contribution to doing so.
