

Evaluation of Two Ionic Liquid-Based Epoxies from the MISSE-8 (Materials International Space Station Experiment-8) Sample Carrier

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Two sets of epoxy mixtures, both containing the same ionic liquid (IL) based resin but utilizing two different curing agents, were evaluated after spending more than two years of continual space exposure outside of the International Space Station on the MISSE-8 sample rack. During this period the samples, positioned on nadir side, also experienced some 12,500 thermal cycles between $\sim -40^{\circ}\text{C}$ and $+40^{\circ}\text{C}$. Initial examination showed some color change, a miniscule weight variance, and no cracks or debonding from the sample substrate. Microscopic examination of the surface revealed some slight deformities and pitting. These observations, and others, are discussed in view of the ground-based control samples. Finally, the impetus of this study in terms of space applications is presented.