Investigating the Dust Mitigation Abilities of Dissociative Degradation

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Particulate contamination requires dust mitigation techniques to provide low-scatter surfaces on sensitive instrumentation in space. We have previously shown that poly(olefin sulfone)s photodegrade in spacelike conditions: in vacuum and with UV light exposure. We now demonstrate that photodegradable polymers can reduce dust accumulation on optical surfaces for space applications. Our research shows that dissociative degradation of poly(olefin sulfone)s significantly decreased the number of dust particles on a dust-coated surface.
Our findings show a viable way to mitigate the collection of extraterrestrial dust on optical surfaces in space, enabling passive removal of particulate contamination without any direct human intervention.

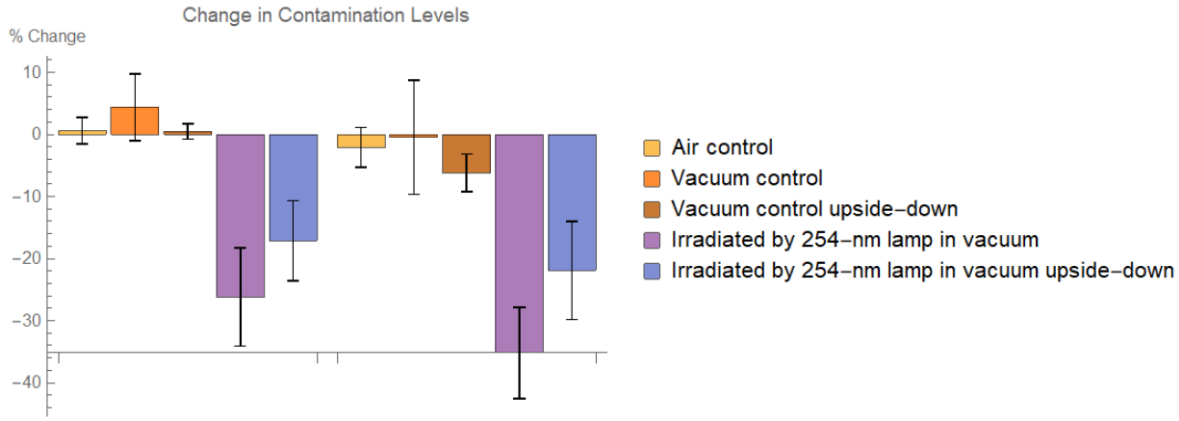

Figure 1. Relative change in number of particles or percent area coverage (PAC) on PMPS thin film samples and controls. Each color represents a different experimental group. Each bar represents the average of all the samples in an experimental group, and the error bars represent the corresponding standard error. The data on the left is calculated based on the change in particle count. The data on the right represents the percent change in percent area coverage (PAC).

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