

Optical resistance of polymer materials when exposed to shortwave ultraviolet radiation

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Polymer materials are widely used in aerospace engineering due to their low density, flexibility, and durability. The influence of external factors of outer space, can cause changes in their operational properties: chemical composition, mechanical strength, optical properties. Work on the mechanisms of polymer degradation [1] shows that the main influence on optical properties is exerted by radiation in the range of 200-280 nm (UV-C range). To assess the durability of new promising and already used materials used in the rocket and space products, a cycle of ground tests using solar radiation simulators is necessary [2], [3]. The paper presents the results of testing polymer materials at an accelerated optical stability testing facility. An pulsed xenon lamp is used as a radiation source in the installation. An accelerated optical stability test of polymer materials, PET and siloxane rubber, has been performed. The material samples were irradiated with doses of UV-C radiation corresponding to a stay in orbit from 1 week to 1 year (according to ASTM E-490 AM0 Standard Spectra 2000). The analysis of changes in the optical properties of the samples under the influence of radiation is carried out. The presented data were obtained using a TUV9DCS spectrophotometer (SILab, China).

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