

# Behavior of layered demisable spacecraft materials in harsh environment

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This study aims at describing the physio-chemical alterations in standard layered materials, analogous to those utilized in spacecraft construction, under the influence of reactive atomic oxygen (ATOX). ATOX conditions similar to those found in Low Earth Orbit (LEO) were simulated to assess, quantitatively and qualitatively, the impact of ATOX exposure [1] in mass loss, structural and chemical transformations.

Pristine samples were also compared as reference in order to understand the effect of ATOX. Additionally, post-exposure changes in thermo-optical properties, including the materials' solar absorption and reflectivity, were examined.

The research findings illuminated the primary degradation patterns of the layered materials. The study provided crucial insights into the potential particle sizes that could be released during atmospheric re-entry. Moreover, the observations established a correlation between the mechanical degradation of the materials and changes in their thermo-optical properties.

[1] The experiments were conducted at ESTEC TEQ-QEE LEOX facility, European Space Agency