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Effect of Atmospheric Conditions on Type and Depth of Polymer Damage Due to Ultra Violet Radiation MACKENZIE SINDEN-REDDING, FIROUZEH SABRI, J. COLE, University of Memphis, N. LEVENTIS, Missouri Science and Technology — The Earth's atmosphere scatters, absorbs, and reflects the sun's total incoming radiation reducing it by nearly 55%, thus also reducing UV which causes material damage at the Earth's surface. Visually noticeable material changes often associated with UV exposure is a color shift, typically towards a yellow tint. In this work, we have explored the relationship between free radical generation and the color shift of two types of material: RTV 655 and Silica aerogels. The impact of atmosphere on the amount and nature of free radicals generated, as well as the color shift, is the prime focus of this work. Both materials are of particular interest in space-related applications such as calibration targets for Mars landers. Investigative tools implemented are ESR technique, UV-Vis spectral analysis and X-ray diffraction studies. Both material types demonstrate a significant and similar spectral shift regardless of the presence or absence of atmospheric oxygen. However, not both exposure circumstances lead to a detectable ESR signal.

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