**Radiation effects and modifications in materials: characteristics study of VO2 based nano-coatings**

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Materials used in space missions can be subjected to various types of radiation including neutrons, gamma, beta, and alpha. The damage sustained can be quite complex and simultaneously degrade the characteristic properties of materials. Recently, there has been a growing interest in the development of small satellites with more up-to-date technologies comparable to large conventional satellites in interplanetary space missions. Future development of these small satellites requires the application and use of passive thermochromic layers to achieve good thermal control for longer mission life and cost-effective launches. Vanadium dioxide (VO2) thin films are being considered as an imminent prospect as a passive smart radiator coating (SRCs) for heat regulation in nano and microsatellites. Thermochromic response of VO2 based SRCs is channeled by low emissivity at lower temperatures to preserve the heat, and high emissivity at high temperatures to fritter away the additional unnecessary heat. Since radiation damage induces property modifications in different ways, its radiation tolerance should be investigated. In this contribution, we discuss a broad overview of radiation interaction with materials. As well as the defects modification characteristics of VO2 thin films subjected to radiation species with energy and projectile doses similar to those accosted in a space environment.

**References**

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