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IN-SPACE MANUFACTURING OF FUNCTIONAL SENSORS

Abstract

Human exploration beyond Earth's atmosphere is rapidly increasing and with it the need for supporting research and technology in the field. Commercialization of space has led to vast opportunities for discovery in low gravity basic research. Among these, in-space manufacturing of functional materials poses a significant but valuable challenge. This work leverages light-matter interactions to design novel sensing materials, towards the creation and tailoring of materials in low-gravity to enable functional sensing using both earth-based and in-situ resources. With a focus on ceramic, lunar and planetary regolith composites, the research investigates changes in intrinsic emission properties of with mechanical inputs, to configure the sensing properties. Ground reference samples will assess variations in bonding and dispersion that affect sensor performance. This will be optimized and durability will be validated under harsh environments. The outcomes will offer new functional materials to meet space and earth-based needs.