

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Environmental Effects and Spacecraft Protection (6)

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THE STUDY OF IRRADIATION EFFECT OF HIGH ENERGY PROTON AND ELECTRON ON
TRIPLE-JUNCTION INGaP₂/GaAs/Ge CELL**Abstract**

The space radiation environment is mainly composed of proton and electron. These energetic particles in space degrade the electrical performance of the devices. Therefore, understanding the radiation response of the device is extremely important for accurate predictions of the expected mission lifetime. A lot of study had shown that the main environmental factors affecting normal working of solar cell are high energy proton and electron in space, so this paper studies the effect of high energy proton and electron irradiation on triple-junction InGaP₂/GaAs/Ge cell. The solar cell was irradiated with 5.0, 10.0, and 15.0 MeV protons and 0.8, 1.0, 1.5, and 2.0 MeV electrons. The radiation damage in solar cell caused by high energy particles will decrease diffusion length of photo-induced carrier and decrease the photoelectron conversion efficiency of solar cell. The damage can result in the degradation of the electrical characteristics of the solar cell, even malfunction, which will have a direct effect on reliability and service life of the spacecraft on orbit. The study provides reference data for the design of solar array to ensure the normal work of solar cell, thereby ensuring security and reliability of the spacecraft on orbit.