

Correlation between Radiation Damage and Electrical Characteristics of the Proton-irradiated Silicon PN Diode

Sunday, 10 December 2017 20:42 (1 minute)

The present study describes the correlation between radiation damages and electrical properties of the PN diode after irradiation the energy proton. The PN diodes were irradiated at difference irradiation energies of 5.26, 7.2, and 8.67 MeV with the proton doses of 1×10^{10} , 1×10^{11} , and 1×10^{12} cm⁻². The final 3D distribution of the ions and all kinetic phenomena associated with the ion energy loss, such vacancies, sputtering, ionization, and phonon production can be estimated by using the calculation packages (SDTrimSP and IM3D). From the findings, it is observed that the penetration of protons into the PN diode leads to the production of lattice defects in the form of vacancies, defect clusters and dislocations. As to the ionization effects in the PN diode, the total ionizing dose and single event effects were also calculated. In practical terms, the capacitance–voltage and current–voltage characteristics of the PN diode after irradiation has been measured to deduce the correlation between the damage creations and the electrical properties.

Keywords: Radiation damage, SDTrimSP, Proton, Semiconductor device.

Primary author: Dr HOANG, Sy Minh Tuan (Duy Tan University)

Presenter: Dr HOANG, Sy Minh Tuan (Duy Tan University)

Session Classification: POSTER

Track Classification: Radiation damage and radiation tolerant materials