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Deep level defects in alpha-particle irradiated epitaxially grown silicon

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Abstract content (Max 300 words)
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In this work, we investigated the defects introduced when epitaxially grown silicon was irradiated by making use of a 5.4MeV americium 241 foil radioactive source with a fluence rate of $7 \times 10^{-6} \text{ cm}^{-2} \text{ s}^{-1}$ at room temperature. Deep level transient spectroscopy (DLTS) and Laplace-DLTS measurements were used to investigate the electronic properties of the defects introduced. After exposure to alpha-particles with a fluence of $1.3 \times 10^{10} \text{ cm}^{-2}$, the energy levels of the hole traps measured were: EV+0.16eV, EV +0.33eV and EV +0.52eV. EV +0.33eV was identified as the interstitial carbon (Ci) related defect. It was a result of induced damage and could only be explained by the presence of donor-like traps. EV +0.52eV was an electron beam deposition (EBD) process induced defect because of its presence in the as deposited sample. According to literature, this defect is boron impurity related. The identity of EV +0.16eV was not clear.

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MSc

Main supervisor (name and email) and his / her institution

Dr Mmantsae Diale

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