Deep level transient spectroscopy (DLTS) study of defects introduced in antimony doped Ge by 2 MeV proton irradiation

C. Nyamhere , A.G.M. Das, F.D. Auret, A. Chawanda, C.A. Pineda-Vargas, A. Venter

Abstract

Deep level transient spectroscopy (DLTS) and Laplace-DLTS have been used to investigate the defects created in Sb doped Ge after irradiation with 2 MeV protons having a fluence of 1×10^{13} protons/cm^2. The results show that proton irradiation resulted in primary hole traps at E_V +0.15 and E_V +0.30 eV and electron traps at E_C −0.38, E_C−0.32, E_C −0.31, E_C −0.22, E_C −0.20, E_C −0.17, E_C −0.15 and E_C −0.04 eV. Defects observed in this study are compared with those introduced in similar samples after MeV electron irradiation reported earlier. E_C −0.31, E_C −0.17 and E_C −0.04, and E_V +0.15 eV were not observed previously in similar samples after high energy irradiation. Results from this study suggest that although similar defects are introduced by electron and proton irradiation, traps introduced by the latter are dose dependent.