



Optica Applicata 2006(Vol.36), No.2-3, pp. 245-256

Capacitance-transient spectroscopy on irradiation-induced defects in Ge

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Keywords

Ge-defect, deep level transient spectroscopy (DLTS), Laplace DLTS

Abstract

Recent studies of room-temperature irradiation-induced defects in Ge using space-charge capacitance-transient spectroscopy are reviewed. From these measurements only two defect complexes have been unambiguously identified until now: the *E*-center (the group-V impurity-vacancy pair) and the *A*-center (the interstitial oxygen-vacancy pair). However, contrary to silicon where each of these centers introduces only one energy level, in germanium the *E*-center has three energy levels corresponding to four charge states ($=, -, 0, +$), and the *A*-center has two levels corresponding to three charge states ($=, -, 0$). Another feature specific to each material is the anneal temperature. Both centers disappear below 150°C in germanium, whereas in silicon the *E*-center anneals out at ~150°C, depending on the charge state, and the *A*-center is stable up to 350°C.



725.9 kB

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