

Acceptor removal project in the framework of RD50 collaboration and last TSC results on p-type Si pad diodes

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In present work a new common acceptor removal project in the framework of RD50 collaboration, role of each participant, type of measurement and samples distribution will be outlined.

The proton- and neutron-fluence dependent radiation damage effects, including change in leakage current, effective doping concentration, N_{eff} , space charge sign inversion, but also introduction and annealing evolution of point- and cluster-defects have been studied in Si pad diodes fabricated from p-type EPI material of different resistivities (10-1000 Ω -cm). Standard electrical characterisation and TSC (Thermally Stimulated Current) techniques were used.

Results of performed I-V, C-V and TSC measurements are discussed. A promising correlation between effective doping concentration N_{eff} obtained from C-V measurements and defect concentration N_c extracted from TSC measurements for both neutron and proton irradiation is observed.

In TSC measurements a detailed analysis of the dominant peaks - E(30K), BiOi and three main deep acceptor levels H(116K), H(140K) and H(152K) - tentatively responsible for the change in the effective space charge is performed. The origin, field-enhanced and annealing behaviour of E(30) and H(40) and cluster-related defects are discussed as well.

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