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Radiation damage investigation of epitaxial p-type silicon using Schottky and pn-junction diodes

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This project, which is part of RD50, focuses on the investigation of trap energy levels introduced by radiation damage in epitaxial p-type silicon. Using 6-inch wafers of various boron doping concentrations ($1e13$, $1e14$, $1e15$, $1e16$, and $1e17 \text{ cm}^{-3}$) with a $50 \mu\text{m}$ epitaxial layer, multiple iterations of test structures consisting of Schottky and pn-junction diodes of different sizes and flavours are being fabricated at RAL and Carleton University.

In this talk, details on the diode fabrication and electrical measurements of the structures will be given. IV and CV scans of fabricated test structures have been performed and cross-checked between institutes, the results of which will be presented. Furthermore, another focus of this talk will be in the characterisation of trap parameters obtained from Deep-Level Transient Spectroscopy (DLTS) and supplemented by Thermal Admittance Spectroscopy (TAS). Spectra for unirradiated and irradiated diode samples will be shown and their details collected from Arrhenius analyses will be listed.

Finally, the on-going activities for the next round of wafer processing and proposed plans for measurements and irradiation in the coming months, will be reviewed.

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