Contribution ID: **42** Type: **poster**

Current-voltage characteristics of Iron-implanted silicon based Schottky diodes.

Current-voltage (I-V) measurements were carried out on undoped and Iron (Fe) doped n- silicon to establish and study a change in electrical properties of the material-based diodes with Fe doping concentration. Fe doping was achieved by implantation at the energy of 160 keV to fluences of 10^15, 10^16 and 10^17 ion/cm^2. The obtained results indicated that the Au/n-Si/Al and Au/Fe-n-Si/Al diodes were well fabricated and Fe doping resulted to diode behaviour changing from normal exponential to ohmic I-V behaviour. This ohmic behaviour was explained in terms of Fe-induced defect levels that were positioned at the centre of the energy gap. An I-V ohmic region increase with fluence indicating that the density of defect levels increases with Fe implantation fluence. The obtained (I-V) properties of Fe doped silicon-based diodes were similar to those of the diodes that were fabricated on radiation-hard materials indicating that Fe, too, is a promising dopant in a quest to improve radiation-hardness of Si to be used in high energy physics experiments.

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Track Classification: Detectors for High Radiation and Extreme Environments