

## Analysis of $I-V$ characteristics of Si diodes irradiated with short-range ions

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Received November 17, 2022

Revised November 22, 2022

Accepted for publication November 22, 2022

Radiation degradation of Si ion detectors becomes critical for the experiments at new facilities giving the beam intensity increase up to  $10^5$  times. The study is focused on the impact of heavily damaged Bragg peak region (BPR) at the ion range end on the bulk current of Si sensors irradiated with 53.4 MeV  $^{40}\text{Ar}$  ions in the fluence range  $(1-4) \cdot 10^9$  ion/cm<sup>2</sup>. It is shown that taking into account only the generation current component is insufficient to explain the experimental  $I-V$  curves. Simulating  $I-V$  characteristics and the electric field profiles demonstrated arising of a built-in junction in the BPR, which controls hole diffusion at voltages below full depletion voltage. Contribution of this component to the total diode current enabled the agreement between experimental and simulated  $I-V$  curves.

**Keywords:** silicon sensors, radiation degradation, current-voltage characteristic, carrier diffusion.

Full text of the paper will appear in journal SEMICONDUCTORS.