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## Investigation of high resistivity p-type FZ silicon diodes after $^{60}\text{Co}$ - gamma irradiation

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In this work, the macroscopic (I-V, C-V) and microscopic (Thermally Stimulated Current(TSC) and Capacitance(TS-Cap)) measurements were used to investigate the properties of high resistivity p-type diodes irradiated with  $^{60}\text{Co}$  gamma-rays with dose values of 10, 20, 100 and 200 Mrad. Two types of diodes are manufactured using p-stop and p-spray to isolate pad and guard ring, and both are FZ p-type materials. For macroscopic measurements, frequency-dependent C-V only appeared on p-stop diodes and presented strongly dose-dependence; The development of leakage current density (jd) with dose value was investigated. Compared to standard FZ n-type diodes, the exponential increase of jd with dose didn't appear. In the microscopic measurements, the development of irradiation-induced defects concentration (BiOi, CiOi, VO, I) with dose is observed. And one unexpected larger peak appeared at the temperature range 80~130 K for 200 Mrad irradiated diodes. The above results were compared with data from TSC and Deep-Level Transient (DLTS) spectroscopy measurements achieved by the team of the CERN-RD50 "Acceptor removal project".

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