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P2.58: Study of bulk damage of high dose gamma irradiated p-type silicon diodes with different resistivities

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The irradiation study of silicon diodes was carried out in order to evaluate the effects of gamma-irradiation on p-type silicon. Three types of n-in-p diodes from different manufacturers were studied. The diodes had comparable active area and thickness but different initial resistivities and oxygen concentration. Thanks to that we were able to determine how different initial parameters influence radiation-induced changes in measured electrical characteristics. The diodes were irradiated by a Cobalt-60 gamma source to total ionizing doses ranging from 0.50 up to 8.28 MGy, and annealed for 80 minutes at 60℃. The main goal of the study was to characterize the evolution of the full depletion voltage with total ionizing dose, by measuring capacitance-voltage characteristics, and the gamma-radiation induced displacement damage by measuring current-voltage characteristics.

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