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Investigation of radiation hardness of alumina layer for slim edge devices

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We have been investigating Scribe-Cleave-Passivate (SCP) method of making slim edges on silicon sensors. For n-type devices commonly used dielectrics, such as silicon oxide and nitride, work well and they are radiation resistant. For p-type devices we used alumina (Al2O3) for this purpose. Our earlier radiation tests revealed its potential weakness for low ionizing doses. In this work we have made dedicated MOS structures with alumina and irradiated them with gammas and protons. The structures allow a direct evaluation of interface charge on the border of alumina and silicon, which is important for the SCP slim edge performance. We obtained first results indicating development of the interface charge with irradiation dose and possible effect of different processing methods.

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