

# ZrO<sub>2</sub> RADIATION SENSOR

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## Abstract

The effects of  $\gamma$  – irradiation on the physical and electrical properties of ZrO<sub>2</sub> high-k MOS radiation sensors were studied. The doses of  $\gamma$  –irradiation applied have been up to 80 Gray. The C-V characteristics seeing as the flat-band shift when exposed to  $\gamma$  – irradiation showed high sensitivity.

Raman scattering spectra measurements of the undoped ZrO<sub>2</sub> thin films grown by RF magnetron sputtering on silicon substrate have been investigated. The impact of  $\gamma$  – irradiation doses on the ZrO<sub>2</sub> thin films on Raman spectra was analyzed. The intensity of the Raman signal originating from monoclinic ZrO<sub>2</sub> is found to decrease with increasing gamma radiation. We also observed peak shift with the gamma radiation dose.

The fabricated ZrO<sub>2</sub>/SiO<sub>2</sub>/Si nanostructures response to gamma radiation studied by Raman spectroscopy and C-V flat band shift measurements shown the possible application as the low dose radiation sensors.

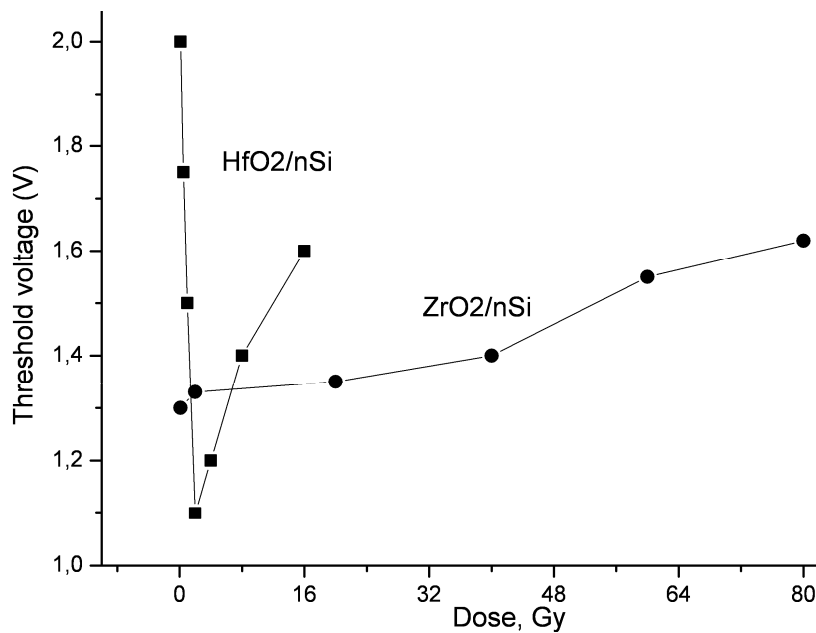


Fig. 1. Radiation dependence of the threshold voltage for ZrO<sub>2</sub>/nSi and HfO<sub>2</sub>/nSi  $\gamma$  –rays sensors.