Detection and Spectrometric Properties of the 4H-SiC Schottky Detectors Based on Thick Epitaxial Layers

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Abstract. Silicon carbide (SiC) is a promising semiconductor material for radiation detectors. The spectrometric properties of prepared Schottky barrier detectors were investigated. The 4H-SiC detectors have been fabricated from high quality epitaxial layers supplied by two different manufacturers. The epitaxial layers have different thicknesses of 80 μm and 100 μm and different doping concentrations of about 7×10^{13} cm^{-3} and 2×10^{14} cm^{-3} respectively. Schottky contacts based on Ni/Au double layers with two diameters of 2 and 3 mm were fabricated on the top side (epitaxial layer). On the back side the full area Ti/Pt/Au ohmic contact were fabricated. Detectors were placed in the vacuum chamber and connected to the spectrometric chain. As a source of radiation, the triplet alpha particle radioisotope $^{239}Pu^{238}Pu^{244}Cm$ was used. The used radiation source produces alpha particles with energies between 5.16 MeV and 5.8 MeV. The 4H-SiC detectors were tested at different biases up to 150 V. The obtained best energy resolution was about 19.6 keV for 5.5 MeV alpha particles.

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