Contribution ID: **110** Type: **Invited Talk**

Development of p-n junction CdTe detector by backside irradiate doping

Friday, 25 November 2022 09:15 (30 minutes)

Compared to scintillator detectors, semiconductor detectors have higher spatial resolution because of the direct generation of electric charge when X-rays are incident inside the semiconductor. Among semiconductor detectors, CdTe semiconductor detectors are used as radiation detectors at room temperature. Since the thickness of the CdTe device used as a radiation detector is as thick as approximately 1 mm, a high voltage is applied to increase the charge collection efficiency. Accordingly, it is required to suppress the dark current flowing in the CdTe when high voltage is applied. Therefore, a diode junction is suitable for the junction between CdTe and electrode. Among diode junctions, we chose the pn junction because the hole mobility of CdTe decreases when the bulk is heated, making thermal diffusion and ion implantation annealing methods difficult. Therefore, we developed a pn junction CdTe radiation detector by direct laser irradiation of the interface between CdTe and electrode as a method for doping the n-layer. By controlling the doping layer and doping concentration by changing the irradiation intensity and frequency, an appropriate pn junction is formed inside the CdTe to suppress dark current. The fabricated pn-junction CdTe radiation detectors were subjected to current-voltage characteristic evaluation, gamma-ray spectral evaluation, SIMS evaluation.

Topics

Contact Email address

Primary author: Dr NISHIZAWA, Junichi (Shizuoka University)

Co-authors: KASE, Hiroki (Shizuoka University); TAKAGI, Katsuyuki (Shizuoka University); TABATA, Kento (Shizuoka University); AOKI, Toru (Shizuoka University)

Presenter: Dr NISHIZAWA, Junichi (Shizuoka University)

Session Classification: Material Science and Diagnostics