Contribution ID: **152** Type: **Oral**

Thermal Diffusion Doping for CdTe Semiconductor Radiation Detectors

Saturday, 18 November 2023 11:15 (15 minutes)

CdTe used as a semiconductor detector has the advantages of high sensitivity to high energy and the ability to operate at room temperature. However, its charge collection efficiency is lower than that of Si and Ge. To ensure sufficient charge collection efficiency, it is desirable to use a structure that allows the application of high voltages. Therefore, when used as a CdTe detector, it is desirable to diode the detector at the p-n junction, which has the features of leakage current suppression by rectifying action, damage resistance, and heat resistance.
In this study, we aim to fabricate a p-n junction CdTe detector by thermal diffusion doping using an electron beam to develop a radiation image detector with high spatial resolution. To this end, we first verified whether a n+ layer can be formed inside the p- type CdTe. Thermal diffusion doping with an electron beam was performed using an EBAS (Electron Beam Assist Source) system. After depositing In onto CdTe, thermal diffusion doping was performed using the EBAS system. The carrier density of the doped layer was measured to confirm the formation of a n+ layer inside CdTe. The value of carrier density was determined using the Van der Pauw method of Hall effect measurement. The results show that the carrier density is sufficient for the n+ layer inside CdTe.

Topics

Session A. Physics of condensed matter and spectroscopy

Primary author: NAKAMURA, Ibuki (Shizuoka university)

Co-authors: Dr NISHIZAWA, Junichi (Shizuoka Univ.); TAKAGI, Katsuyuki (Shizuoka University); KASE, Hiroki; AOKI, Toru (Shizuoka University)

Presenter: NAKAMURA, Ibuki (Shizuoka university)

Session Classification: Session at Shizuoka University