Contribution ID: 156 Type: Oral

Annealing Effect of Thallim Bromide Thin Film

Saturday, 18 November 2023 10:00 (15 minutes)

Thallium Bromide (TlBr) is a compound semiconductor with a wide band gap(2.68 eV). TlBr can be formed into thin films by vacuum evaporation, and large areas can be produced without a tiling process. TlBr is potentially suitable for FPD applications.

TIBr thin films deposited by vacuum evaporation was evaluated. In direct conversion semiconductor detectors, the quality of the semiconductor crystals is important. Polycrystals are less efficient at collecting the charge generated by photons due to grain boundaries, so larger grain sizes are preferred. Ideally, single crystals are best. Therefore, we conducted experiments to improve the crystal orientation by post-processing. Crystal orientation was evaluated by X-ray diffraction. The results showed that post-deposition heat treatment improved the crystal orientation. The results also showed that the crystallization deteriorated when the cooling rate after heating was too fast. It was suggested that the recrystallization process during the transition from the liquid phase to the solid phase is affected by the cooling rate. It was found that the cooling rate must be controlled for post-deposition heat treatment to improve the crystal orientation. The results of this study will accelerate the application of thin film TIBr to detectors.

Topics

Session A. Physics of condensed matter and spectroscopy

Primary author: TOYODA, Kohei (Shizuoka University)

Co-authors: TABATA, Kento; HAYAKAWA, Shoma (Shizuoka University); Dr NISHIZAWA, Junichi (Shizuoka

Univ.); TAKAGI, Katsuyuki (Shizuoka University); AOKI, Toru (Shizuoka University)

Presenter: TOYODA, Kohei (Shizuoka University)

Session Classification: Session at Shizuoka University