

Formation of TlBr thin film for semiconductor radiation detector

Saturday, 18 November 2023 10:45 (15 minutes)

TlBr (thallium bromide) is one of the materials used in semiconductor detectors. Due to its characteristics, it is generally being researched as a semiconductor detector for high-energy X-rays that can operate at room temperature, but it suffers from low carrier mobility and a reduction in energy resolution due to signal rise time. Therefore, we will consider fabricating a semiconductor detector using thin film TlBr. By making the film thin, it is possible to compensate for the low carrier mobility. Making it a thin film allows high-energy X-rays to easily pass through it, but TlBr has a characteristic of having a high mass attenuation coefficient in the low energy band, so we are considering creating a semiconductor detector for low energy use.

This time, in order to investigate the relationship between changes in substrate temperature and crystallinity when depositing a thin film of TlBr, we prepared two samples, one without heating the substrate and one with heating the substrate to 150°C, and each X-ray diffraction measurements were performed. As a result, it was confirmed that crystal orientation improved when the substrate temperature was increased.

Topics

Session A. Physics of condensed matter and spectroscopy

Primary author: HAYAKAWA, Shoma (Shizuoka University)

Co-authors: TABATA, kento; Mr TOYODA, Kohei; KASE, Hiroki; NISIZAWA, Junichi; TAKAGI, Katsuyuki; Prof. AOKI, Toru

Presenter: HAYAKAWA, Shoma (Shizuoka University)

Session Classification: Session at Shizuoka University