Contribution ID: **149** Type: **Invited Talk**

# Long-term stability of diode-type CdTe X-/gamma-ray detector with high current density

*Saturday, 18 November 2023 08:30 (30 minutes)*

Polarization poses a significant challenge in cadmium telluride (CdTe) detectors, preventing the simultaneous achievement of high energy resolution and long-term stability at room temperature. The mechanism driving bias-induced polarization is presumed to involve an increase in the number of ionized acceptors resulting from hole detrapping. Simultaneously, the accumulation of negative charges is suppressed as the hole density in the bulk increases. Consequently, polarization effects occur in diode-type detectors with low current densities but not in ohmic-type detectors with high current densities. In this study, we fabricated a diode-type detector with a high current density, which is between the ohmic and diode types, and evaluated its long-term stability. The detector had dimensions of 3×3×0.75 mm3, comprising a central electrode of 0.5×0.5 mm2 surrounded by a guard-ring electrode. By finely patterning the anode, we increased the current density, achieving a current density comparable to that of the ohmic type while enabling the application of a higher bias voltage.

## Topics

Session A. Physics of condensed matter and spectroscopy

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**Session Classification:** Session at Shizuoka University