S5-1.3

Cathodoluminescence and X-Ray Luminescence of ZnIn2S4 and CdGa2S4 Single Crystals

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Zinc thioindate and gallium thiogallate single crystals were grown by a chemical vapor transport method. The cathodoluminescence and X-ray luminescence spectra of $ZnIn_2S_4$ and $CdGa_2S_4$ single crystals were studied. From cathodoluminescence spectra of $ZnIn_2S_4$ at low temperatures the forbidden gap width of (2.96 ± 0.02) eV at 80 K and optical depth of the deep acceptor level $E_A = (E_V + 0.30)$ eV were determined. In the X-ray luminescence spectra of $CdGa_2S_4$ a single emission band is observed with an energy maximum at 2.14 eV and a slope within the high-energy range at approximately 2.34 eV identified as optical transitions of donor-acceptor type.