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Temperature-Dependent Photoconductivity Responce and Band Gap Variation of $Tl_2In_2S_3Se$ Layered Single Crystals IPEK GLER, ankaya University, NIZAMI GASANLY, Middle East Technical University, MARIANNA AMBRICO, CNR-Istituto di Metodologie Inorganiche e dei Plasmi-UOS di Bari,, TERESA LIGONZO, Bari University — Temperature variation of indirect band gap of $Tl_2In_2S_3Se$ layered single crystals were obtained by means of absorption and photoconductivity measurements. The temperature coefficient of $-7.1\ \ 10^{-4}$ eV/K from absorption measurements in the temperature range of 10–300 K in the wavelength range of 520–1100 nm and $-5.0\ \ 10^{-4}$ eV/K from PC measurements in the temperature range of 132–291 K in the wavelength range of 443–620 nm upon supplying voltage $V = 80$ V were obtained. From the analysis of dark conductivity measurements in the temperature range of 150–300 K, conductivity activation energy was obtained as 0.51 eV above 242 K. The degree of the disorder, the density of localized states near Fermi level, the average hopping distance and average hopping energy of $Tl_2In_2S_3Se$ crystals were found as, $1.9\ \ 10^5$ K, $N_f = 4\ \ 10^{20}$ cm^{-3}eV^{-1}, 29.1 Å and 24.2 meV in the temperature range of 171–237 K, respectively. Activation energy of hopping conductivity at $T = 171$ K was obtained as 41.3 meV and the concentration of trapping states was found as $1.6\ \ 10^{19}$ cm^{-3}.

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