

Band Gap Engineering of $\text{Cu}_2\text{ZnGeS}_4\text{xSe}_4(1-\text{x})$ Solid Solutions

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Abstract: $\text{Cu}_2\text{ZnGeS}_4\text{xSe}_4(1-\text{x})$ (CZGSSe) single crystals were grown by chemical vapor transport (CVT) from synthesized polycrystals using iodine as a transport agent. The elemental analysis showed good agreement with stoichiometry. The values of the band gap of solid solutions are determined from the transmission spectra in the region of the absorption edge, and its concentration dependence, which has a nonlinear quadratic dependence on the composition, is established. These findings highlight the potential of CZGSSe single crystals for optoelectronic applications, emphasizing the tunability of their band gap through composition variation.

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