

## PAPER

# The composition effect on the thermal and optical properties across CdZnTe crystals

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## Abstract

$\text{Cd}_{1-x}\text{Zn}_x\text{Te}$  mixed crystals investigated in this work were grown from the melt using the vertical Bridgman–Stockbarger method in the whole range of composition  $0 < x < 1$  that is from one binary crystal (CdTe) to another (ZnTe). The real composition of grown crystals was measured with the SEM/EDS method along the growth axis. The segregation coefficient of Zn in a CdTe matrix has been evaluated as being close to unity. The energy gap as a function of the composition was determined from transmission spectroscopy. Thanks to that, the bowing parameter of this ternary alloy was found to be 0.458. In this work the systematical study of thermal properties of  $\text{Cd}_{1-x}\text{Zn}_x\text{Te}$  alloys from one binary crystal (CdTe) to another (ZnTe) grown by the vertical Bridgman technique were undertaken for the first time. The thermal diffusivity and effusivity of the investigated

crystals were derived from the experimental data and allowed the thermal conductivity to be calculated. Diagrams of the thermal conductivity versus composition were analyzed applying the model for mixed semiconducting crystals given by Sadao Adachi. Thanks to that, the contribution of the thermal resistivity arising from the lattice disorder to the total resistivity of the crystal has been determined.

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