Microstructure-Property correlation studies in semiconducting materials

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Single crystals of Group II -VI semiconductor compounds like CdZnTe (CZT) and ZnTe are an important class of material for infrared-, gamma ray- detection and as well for terahertz generation and detection applications. However, the growth of high-quality single crystals of CZT and ZT is a challenging task due to their inherent poor thermophysical properties. Hence the effectiveness in the growth process is still plagued by several issues such as formation of secondary phases, point defects, segregation etc., which needs to be addressed.

Aiming this, a detailed study will be attempted on :

1. Development of suitable theoretical model to predict the microstructure and to validate with experimental results.
2. Microstructure modification (tellurium precipitate characteristics, Zn segregation, non-stoichiometry compositions etc.,) in CZT and ZnTe.
3. Establishing the optimum microstructure – property (optical properties, mechanical) correlation in the CZT and ZnTe.