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Collective effects and optical characteristics of $CdSe_xTe_{1-x}$

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Abstract

Collective effects and some response characteristics such as piezoelectric stress and strain constants, Fröhlich coupling parameter, optical electronegativity and exciton properties of $CdSe_xTe_{1-x}$ common-cation ternary alloys have been investigated. The calculations are carried out using a pseudopotential approach under a modified virtual crystal approximation that takes into account the alloy disorder effect, combined with the Adachi model. Generally, a good accord is obtained between our results and those available in the literature. The composition dependence of the features of interest shows that the Fröhlich coupling parameter remains almost constant, the piezoelectric properties vary almost linearly and the optical properties exhibit a non-linear behavior.

Previous Next

Keywords

Optical properties; Piezoelectric properties; Exciton properties; Ionicity; Fröhlich coupling parameter; $CdSe_xTe_{1-x}$ alloys