

Exciton-phonon spectra of $\text{CuGa}_{1-x}\text{In}_x\text{Se}_2$ crystals

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Abstract

In the present paper the excitonic reflectivity and the wavelength derivative reflection (WDR) study of $\text{CuGa}_{1-x}\text{In}_x\text{Se}_2$ solid solutions are presented. The states $n=1$, $n=2$ and $n=3$ of A, B, C exciton series are determined. The exciton binding energies and more exact values of the band gaps of all three intervals (Γ_7^{V1} , Γ_6^{C1} , Γ_6^{V2} , Γ_6^{C1} , Γ_7^{V3} , Γ_6^{C1}) are calculated hereby. The magnitudes of the splitting due to crystal-field and spin-orbit interaction are determined as well.