

1348, Bq-42

Spectroscopic ellipsometric studies of the dielectric function of $\text{Cd}_{1-x-y}\text{Mn}_x\text{Fe}_y\text{Te}$ single crystals

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$\text{Cd}_{1-x-y}\text{Mn}_x\text{Fe}_y\text{Te}$ single crystals grown by the vertical Bridgman method have been studied by measuring the complex dielectric function using spectroscopic ellipsometry in the 1.5 ~ 5.5 eV photon energy range at room temperature. The CP energy parameters of the E_0 , E_1 , $E_1 + \Delta_1$, and E_2 structures were determined by fitting the second-derivative spectra $d^2\varepsilon/d\omega^2$ with a theoretical model, i.e., the standard critical point (SCP) line shapes. The E_1 , $E_1 + \Delta_1$, and E_2 energies decreased with increasing Fe composition y , which is due to the hybridization effect of the valence and conduction bands in $\text{Cd}_{1-x}\text{Mn}_x\text{Te}$ with Fe 3d levels.