



2008, Volume 41, Number 5, pag. 055403

Exciton spectra and energy band structure of CuGaSe₂ single crystals

S. Levchenko, N. N. Syrbu, V. E. Tezlevan, E. Arushanov, J. M. Merino, and M León

<https://doi.org/10.1088/0022-3727/41/5/055403>

Abstract

Photoreflectivity, wavelength modulation spectroscopy and photoluminescence measurements of CuGaSe₂ are used to determine the exciton and band parameters as well as the energy band structure of CuGaSe₂ at photon energies higher than the fundamental band gap. The spectral dependences of the real ϵ_1 and imaginary ϵ_2 components of the complex dielectric function $\epsilon(E) = \epsilon_1(E) + i\epsilon_2(E)$ are calculated using the Kramers–Kronig relations. As a result, the energy band structure of CuGaSe₂ at photon energies higher than the fundamental band gap is derived from the analysis of the structures observed both in the $\epsilon(\omega)$ and in the wavelength modulated reflectivity spectra.