Temperature dependence of Optoelectronical properties of CuInSe2 Crystals

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Photoluminescence (PL) is a widely used method to study the defect structure in semiconductor materials. PL spectra of CIS crystals and thin films are very sensitive to the deviation from the ideal stoichiometry. Many researchers have measured PL of CIS as a function of the Cu/In ratio. These studies have shown that the emission spectra for Cu- and In-rich samples are dominated by different types of recombination. In this study, PL properties of stoichiometric CuInSe2 crystals are grown by the low temperature solution method. Several lines from two different types of gas lasers, emitting at 325 nm(He-Cd laser), 488 nm, 514 nm (Argon-ion laser) were used. And we present a detailed analysis of the temperature and the excitation dependence of the band in CIS and propose improvement for this PL measurement data analysis.
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