The Effect of Zinc Concentration Upon Optical Properties of Cd$_{1-x}$Zn$_x$Se

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Theoretical investigations of the optical properties of Cd$_{1-x}$Zn$_x$Se with zinc-blende crystal structure are reported. The calculations are mainly based on the pseudopotential framework within the virtual crystal approximation in which the effect of compositional disorder is involved. A meaningful agreement with known data is only obtained when the disorder effect is included in the calculation. The zinc concentration dependence of the selected features of Cd$_{1-x}$Zn$_x$Se, such as energy band gaps, and refractive index, has been examined. All studied quantities are found to vary monotonically with zinc concentration $x$. The refractive index has been scaled with the zinc concentration. Such scaling showed that the variation of the refractive index versus Zinc concentration exhibits a non-linear behavior.