Theoretical studies on energy gap variation in ZnS$_x$Se$_{1-x}$. (0\textdegree\X)

Abstract:

In this work, the energy bandgap $E_G = E_{g1} + E_{g2}$ of semiconductor alloys ZnS$_x$Se$_{1-x}$ is evaluated. Here, $E_{g1}$ is the unperturbed bandgap, and $E_{g2}$ is the shift caused by the grain-size effect. The kp perturbation theory is used to derive the momentum matrix elements and energy eigenvalues of the conduction bands of the alloy with different compositions. A plot of energy gap for various compositions used in this study is shown.