

Effects of step-potential on confinement strength of strain-induced type-I core-shell quantum dots

ABSTRACT

In this paper, the transition energy between lowest unoccupied molecular orbital (LUMO) of conduction band and highest occupied molecular orbital (HOMO) of valence band for band structures of type-I core-shell quantum dots (CSQDs) within a strong and weak confinements of charge carriers are estimated using the effective mass approximation together with single-band model. The effect of potential step at the conduction and valence bands on the confinement strength is then properly discussed. Our numerical results show that for a same size of CSQDs, the one with bigger potential steps will have stronger carriers' confinement with more localized excitons.

Keyword: Quantum dots; Colloidal quantum dots; Transition energy; Bessel spherical functions