RENORMALIZATION OF THE LOW-ENERGY PART OF THE ELECTRON SPECTRUM DUE TO CONFINED AND INTERFACE PHONONS IN SPHERICAL NANOHETEROSYSTEM β-HgS/CdS

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S u m m a r y

Renormalization of the low-energy part of the electron spectrum due to confined (L) and interface (I) phonons in spherical QD embedded into the external semiconductor medium is investigated totally taking into account the configurational interaction by the example of β-HgS/CdS nanogeterosystem. It is shown that a shift of the ground electron level due to the interaction between the electron and L- and I-phonons within all states of discrete and continuous spectra almost does not depend on the QD size. Its magnitude is close to a ground level shift in the massive crystal creating QD. Exited electron levels with energy $E_{nl}\,(l>0)$ are splitted into $l+1$ components, whose energy is characterized by its own magnitude of the total energy shift Δ^{nlm} depending on $|m|$. Δ^{nlm} values monotonously increase at the bigger nanogeterosystem radius and saturate for big QD sizes. Electron levels with quantum numbers $n, l>0$ do not interact with the ground level and electron levels with n_i, l_i for which $l_i < l$.