Radiative properties of *GaSe* and *GaSe*: *Eu* nanolamellar structures intercalated with *Cd*

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In this work the crystalline structure, surface morphology, photoluminescence (PL) and absorption spectra of *CdSe-GaSe* and *CdSe-GaSe<Eu>* composites are studied in the fundamental absorption band edge region. The studied composite contain *CdSe* and *GaSe* micro crystallites, and Eu^{3+} centers. The *GaSe*:*Eu* plates treatment in *Cd* vapor for ~40 min leads to a *CdSe* layer formation (with hexagonal/cubic lattice) on (0 0 0 1) surface of the *GaSe* lamella. At 730K a *CdSe-GaSe* heterostructure is obtained with hexagonal *CdSe* layer, while at T ≈ 850K analog structures are obtained with cubic *CdSe*. The PL specter of *GaSe:Eu* lamellae intercalated with *Cd* is composed from Eu^{3+} ion emission bands in *GaSe* (transitions $^5D_0 \rightarrow {}^7F_{0,1,2}$), emission band of indirect excitons in *GaSe* crystallites and emission band of *CdSe* crystallites from compound. At 80K temperature the PL bands of Eu^{3+} ion intersect with PL bands of direct and indirect excitons. The exciton – Eu^{3+} energy transfer were established from the PL bands intensity dependence on excitation energy.

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