

Magneto-optical properties of various excitonic complexes in CdTe and CdSe self-assembled quantum dots

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In this work we present systematic comparison of two systems of self-organized quantum dots (QDs): CdTe/ZnTe and CdSe/ZnSe.

To reduce the influence of the effects related to the specific growth technique and sample, we examined 7 structures fabricated in 3 molecular beam epitaxy laboratories. In order to determine statistically significant data and determine typical QDs properties we have investigated over 160 individual dots (Fig 1.). Based on such systematic, statistical approach we obtained various parameters describing magneto-optical properties of the excitonic complexes in CdTe/ZnTe and CdSe/ZnSe QDs.

In particular, we focused on difference between transition energy of neutral exciton (X) and biexciton (XX), fine-structure splitting, g-factor and diamagnetic shift. Studied quantities have been already measured for single QDs, but here we analyze experimental results in terms of average values taking into account variation across the large QD population (Fig. 1).

As a result we found statistically important correlations between key parameters describing internal structure of excitonic complexes.

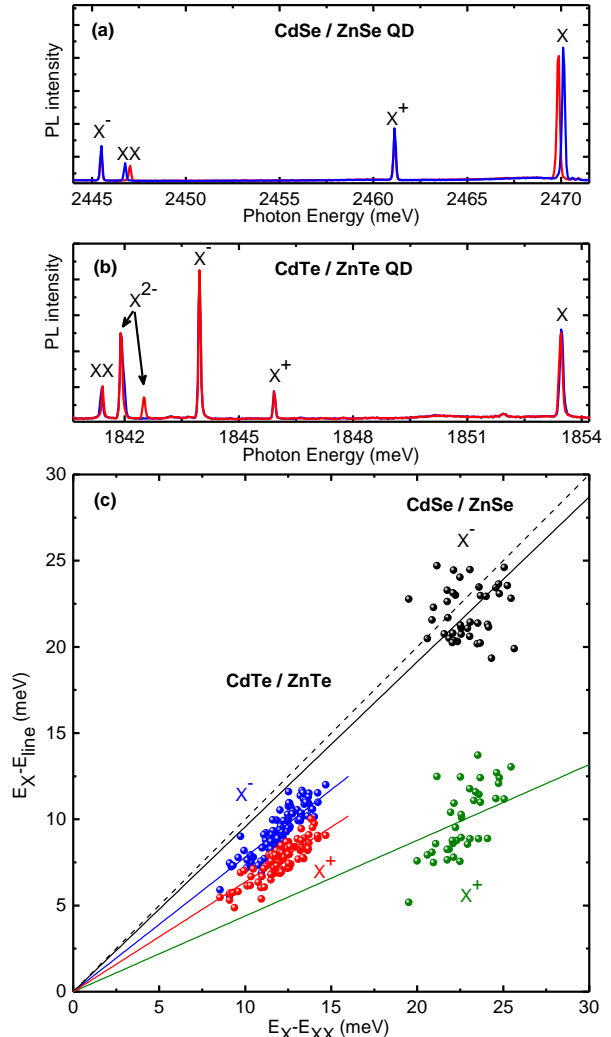


Fig. 1. Typical spectra of individual CdSe (a) and CdTe (b) QD contain several emission lines that form a characteristic pattern. Energy difference between the neutral exciton line and the charged exciton lines plotted versus the energy difference between the neutral exciton line and the biexciton line for CdTe/ZnTe (red and blue symbols) and CdSe/ZnSe (black and green symbols) QDs (c).