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Size dependence of the exciton g-factor in self-assembled CdTe/ZnTe quantum dots THANG B. HOANG, SEBASTIAN MACKOWSKI, HOWARD E. JACKSON, LEIGH M. SMITH, University of Cincinnati, PIOTR WOJNAR, GRZEGORZ KARCZEWSKI, JACEK KOSSUT, Institute of Physics PAS, Warsaw, Poland — We study exciton spin splitting of single quantum dots in a highly inhomogeneous self-assembled CdTe/ZnTe quantum dot sample. By spatial imaging of individual dots in applied magnetic field (using a solid immersion lens) and by analyzing the circular polarization of the PL emissions, we measure both the spin splitting and the diamagnetic shift of zero-dimensional excitons. We determine that the absolute value of exciton g-factor decreases from 4 to about 2 as the emission energy decreases from 2.35 eV to 1.85 eV. At the same time, we observe an increase of the diamagnetic shift up to 100 μeV. Such small values indicate strong spatial confinement of the excitons, as the diamagnetic shift corresponding to the bulk Bohr radius ($\sim$10nm) which equal 600 μeV. From the diamagnetic shift we estimate that the diameter of CdTe quantum dots ranges from 1nm to 6nm. These results imply that the g-factor and thus the spin splitting of a quantum dot exciton is strongly enhanced for quantum dots with smaller size of the confining potentials. The work was supported by NSF grants nr 9975655 and 0071797 and PBZ-KBN-044/P03/2001.

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