

Thermal Tuning and Inversion of Excitonic Zeeman Splittings in Colloidal Doped CdSe Quantum Dots

Alina M. Schimpf and Daniel R. Gamelin*

Department of Chemistry, University of Washington, Seattle, WA 98195-1700, USA

*Electronic address: Gamelin@chem.washington.edu

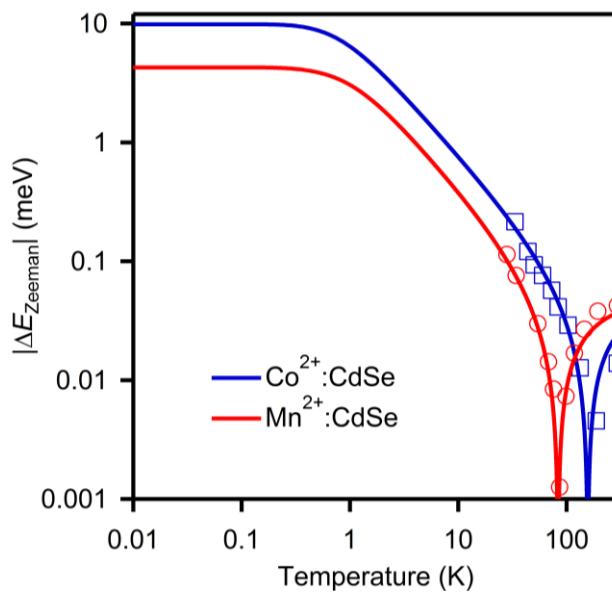


Figure S1. Temperature dependence of the Zeeman splitting energies in colloidal $\text{Cd}_{0.995}\text{Mn}_{0.005}\text{Se}$ (circles) and $\text{Cd}_{0.995}\text{Co}_{0.005}\text{Se}$ (squares) QDs. The solid lines show fits to the data. At temperatures close to 100 K, the curves deviate from Curie behavior and the contribution from the intrinsic Zeeman splitting is clearly observed.

Table S1. Literature values for mean-field exchange energies in bulk Cd_{1-x}Mn_xSe and Cd_{1-x}Co_xSe.

Sample	$N_0\alpha$ (eV)	Ref.	$N_0\beta$ (eV)	Ref.	$N_0(\alpha - \beta)$ (eV)	Ref.
Cd _{1-x} Mn _x Se	0.26	1	-1.27	4		
	0.26	2	-1.24	1		
	0.28	3				
	0.23	4				
Cd _{1-x} Co _x Se	0.28	5	-1.87	5	2.52	8
	0.32	6	-2.12	7		

- (1) Arciszewska, M.; Nawrocki, M. Determination of the Band-Structure Parameters of Cd_{0.95}Mn_{0.05}Se from Magnetoabsorption Measurements. *J Phys. Chem. Solids* **1986**, *47*, 309-314.
- (2) Shapira, Y.; Heiman, D.; Foner, S. Magnetization and Spin-Flip Energy in Cd_{0.9}Mn_{0.1}Se. *Solid State Comm.* **1982**, *44*, 1243-1245.
- (3) Nawrocki, M.; Planell, R.; Fishman, G.; Galazka, R. Exchange-Induced Spin-Flip Raman Scattering in a Semimagnetic Semiconductor. *Phys. Rev. Lett.* **1981**, *46*, 735-738.
- (4) Arciszewska, M.; Nawrocki, M. Excitonic Magnetoabsorption of Cadmium Manganese Selenide. In *Proc. of the XI Conf. of Physics of Semiconducting Compounds, Jaszowiec*; Pol. Acad. Sci.: Warsaw, Poland, **1982**, p 225-229.
- (5) Nawrocki, M.; Hamdani, F.; Lascaray, J. P.; Golacki, Z.; Deportes, J. Ion-Carrier Electron Exchange Constants for CdCoSe Semimagnetic Semiconductor. *Solid State Comm.* **1991**, *77*, 111-114.
- (6) Bartholomew, D. U.; Suh, E. K.; Ramdas, A. K.; Rodriguez, S.; Debska, U.; Furdyna, J. K. Electronic Raman-Scattering in Cd_{1-x}Co_xSe. *Phys. Rev. B* **1989**, *39*, 5865-5871.
- (7) Gennser, U.; Liu, X. C.; Vu, T. Q.; Heiman, D.; Fries, T.; Shapira, Y.; Demianiuk, M.; Twardowski, A. Exchange Energies, Bound Magnetic Polarons, and Magnetization in CdSe:Co and CdS:Co. *Phys. Rev. B* **1995**, *51*, 9606-9611.
- (8) Inoue, M.; Adachi, N.; Mogi, I.; Kido, G.; Nakagawa, Y.; Oka, Y. An Optical Study of Cd_{0.989}Co_{0.011}Se in High Magnetic Fields. *Physica B* **1993**, *184*, 441-444.