

**Dr. Dmitri V. Talapin***Assistant Scientist*

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Research Summary:

Dmitri's research interests revolve around colloidal inorganic nanomaterials, spanning from synthetic methodology to device fabrication. By combining expertise in the colloidal synthesis, self-assembly and characterization of nanomaterials properties, his group creates novel materials for electronic, photovoltaic, thermoelectric and catalytic applications.

Selected Recent Publications:

M. V. Kovalenko, M. Scheele, **D. V. Talapin**. Colloidal Nanocrystals with Molecular Metal Chalcogenide Surface Ligands. *Science* **324**, 1417 (2009).

D. V. Talapin, E. V. Shevchenko, M. I. Bodnarchuk, X. Ye, J. Chen, C. B. Murray. Quasicrystalline order in self-assembled binary nanoparticle superlattices. *Nature* **461**, 964 (2009).

N. J. Borys, M. J. Walter, J. Huang, **D. V. Talapin**, J. M. Lupton. The role of particle morphology in interfacial energy transfer in CdSe/CdS heterostructure nanocrystals. *Science* **330**, 1371 (2010).

E.V. Shevchenko, **D.V. Talapin**, N.A. Kotov, S. O'Brien, C.B. Murray, Structural Diversity in Binary Nanoparticle Superlattices. *Nature*, **439**, 55, (2006).

D.V. Talapin, C.B. Murray. PbSe Nanocrystal Solids for n- and p-Channel Thin Film Field-Effect Transistors *Science*, **310**, 86, (2005).

M. I. Bodnarchuk, M. V. Kovalenko, W. Heiss, **D. V. Talapin**. Energetic and Entropic Contributions to Self-assembly of Binary Nanocrystal Superlattices: Temperature as the Structure-directing Factor. *J. Am. Chem. Soc.*, **132**, 11967 (2010).

M. V. Kovalenko, M. I. Bodnarchuk, **D. V. Talapin**. Nanocrystal superlattices with thermally degradable hybrid inorganic-organic capping ligands. *J. Am. Chem. Soc.*, **132**, 15124 (2010).

M. V. Kovalenko, M. I. Bodnarchuk, J. Zaumseil, J.- S. Lee, **D. V. Talapin**. Expanding the chemical versatility of colloidal nanocrystals capped with molecular metal chalcogenide ligands. *J. Am. Chem. Soc.*, **132**, 10085 (2010).

J.-S. Lee, M. I. Bodnarchuk, E. V. Shevchenko, **D. V. Talapin**. Magnet-in-the-Semiconductor FePt-PbS and FePt-PbSe Nanostructures: magnetic properties, charge transport and magnetoresistance. *J. Am. Chem. Soc.* **132**, 6382 (2010).

D. V. Talapin, J.-S. Lee, M. V. Kovalenko, E. V. Shevchenko. Prospects of Nanocrystal Solids as Electronic and Optoelectronic Materials. *Chem. Rev. (invited)* **110**, 389 (2010).