

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Luminescence of nanoparticles in solvent environment near its phase transitions** ANDREY ANTIPOV, MATTHEW BELL, MESUT YASAR, VLADIMIR MITIN, ALEKSANDR VEREVKIN, University at Buffalo — We demonstrate phenomenon of colloidal CdSe and CdSe/ZnS nanoparticles (NPs) photoluminescence (PL) sensitivity to the phase state of solvent environment. New dramatic PL features in close vicinity of the solvent phase transitions are observed, such as pronounced singularities in PL peak energy, PL line width, and PL lifetime vs. temperature. For instance, a singularity in the PL peak energy with amplitude of up to 25 meV is observed at around the freezing point of water 273 K for water-solved CdSe/ZnS NPs. We observe similar singularities in the vicinity of the freezing point for core and core/shell NPs solved in both water and toluene. We also observe a singularity in the vicinity of the glass/solid state transition for NPs solved toluene. Such features are not observed in dry samples. We associate an origin of such singularities with non-monotonic behavior of Kapitza resistance between NPs and their environment during temperature-induced phase transitions in solvent: the escape rate of acoustical phonons from NPs is dramatically modified by the changes in acoustical mismatching.

Andrey Antipov  
University at Buffalo

Date submitted: 20 Nov 2008

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