Abstract Submitted
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Tuning the synergistic functionality of semiconducting and magnetic nanoparticle co-assemblies[1] MARK BARTOLO, Univ of California - Merced, RANDY ESPINOZA, California State University - Fresno, JUSSI AMARAL, SAYANTANI GHOSH, Univ of California - Merced — A much sought after goal of nano-synthesis is the ability to create artificial materials from self-assembled nano-constituents that would exhibit multifunctionality and *in situ* responsiveness to external stimuli. We are investigating the ensemble behavior of Fe_3O_4 magnetic nanoparticles (MNPs) and CdeSe/ZnS quantum dots (QDs) when dispersed in electro-optically active liquid crystalline (LC) matrix. Prior research has demonstrated an enhancement in the QD emission with a small, applied magnetic field, a result of synergistic interactions between the nanoparticles. Here, we have expanded the phase space by varying the sizes and relative proportions of QDs and MNPs in the assemblies. Our goal is to identify the limits of sensitivity of the enhanced brightening effect as a function of concentration of MNPs.. Using scanning confocal photoluminescence microscopy, we observe that 20 nm MNPs co-assembled with 6 nm QDs exhibit the brightening effect at very dilute limit of 1:100 for MNP:QD, while decreasing MNP sizes require higher proportion of the latter. This could be a potential platform for developing high sensitivity, small footprint, and low power magnetic field detectors.

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