Suppressed Photoluminescence Blinking Dynamics of Cdse Based Core/Gradient Alloy Shell/Shell Quantum Dots:Single Particle Spectroscopy

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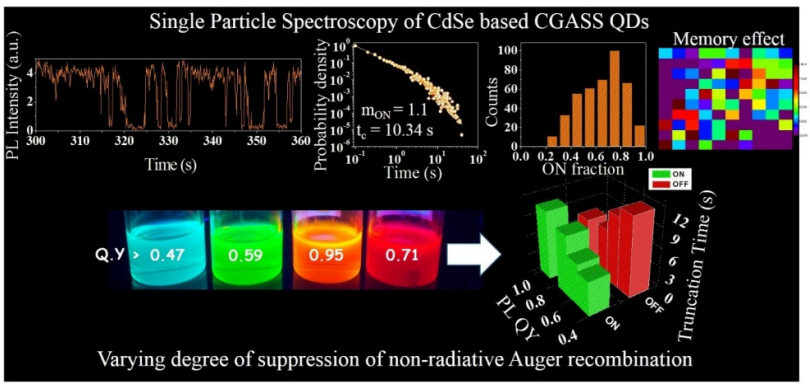
CdSe based core/gradient alloy shell/shell (CGASS) quantum dots (QD) with very high photoluminescence quantum yield (PLQY, 95%) have been synthesized in 'one pot' using the reactivity difference between Cd and Zn precursors and Se and S precursors. Single Particle Spectroscopic optical behaviour of these CGASS QDs has been probed employing our home build confocal/TIRF microscopy setup.At the single particle level these CGASS QDs are quite photostable without showing any blueing and bleaching for one hour even under air atmosphere.Under continuous photo-irradiation, emission from a single particle is interrupted by non-emissive dark periods randomly i.e. single QD blinks.The dynamicsof blinking has been noted to be quite broadly distributed (over five decades of magnitude in probability density and three decades of magnitude in time).The probability density distribution for both the ON- and OFF-events follow a truncated power law with an additional exponential decay behavior.PLQY could be correlated with the truncation time.Significant memory effect in blinking dynamics has been observed. Auger recombination process has been significantly suppressed, however with a varying degree of suppression for different CGASS QDs. Superior optical behavior of these CGASS QDs over core/shell QDs could be established.

All these results will be elaborated.



Reference:

Roy, D.; Routh, T.; Asaithambi, A. V.; Mandal, S.; Mandal, P. K. *J. Phys. Chem. C* **2016**, *120*, 3483.