

Stoichiometry variable semiconductor nanocrystal (NCs)-biomolecule entanglement and time-resolved emission process

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In recent years, there has been growing interest in the development of nanocrystal (NCs)-protein bioconjugates for they are considered as potential candidates for bioactive fluorescent probes in sensing, imaging, immunoassay, and other diagnostics applications [1-4]. The size selective, surfactant based and thiol stabilized nanocrystals of $Cd_x Zn_{1-x} S$ ($0 < x < 1$) have been grown by reverse micellar route. They were successfully entangled with denatured bovine-serum-albumin (BSA, a kind of plasma protein extracted from buffalo and commercially available from Aldrich & Co.) to form $Cd_x Zn_{1-x} S - BSA$ ($0 < x < 1$) conjugate systems. Nanocrystals size down to ~ 1 nm is confirmed by transmission electron microscopy. Steady state luminescence and time-resolved luminescence patterns describe effective modifications while undergoing transition from fluorescent CdS to phosphorescent ZnS material, and resulting effect of BSA conjugation to such systems. A possible mechanism is also encountered in this work.

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