

A study on the plasmonic fluorescence of quantum dots and metal hybrid supraparticles

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Over the past decade, hybridization of exciton-plasmon has caught the attention because their interaction can suppress Auger-recombination, blinking effect and enhance fluorescence emission of quantum dot (QD). Surface plasmon resonance (SPR) results in strong local electromagnetic field enhancement, which can affect exciton dynamics of QD. However, plasmonic materials such as gold can be used not only optical enhancer but also optical quencher. In this study, we fabricated metal and QD hybrid supraparticles. Because metal affects fluorescence of QD by enhancer or quencher depending on the distance between QD and metal, we encapsulated silica shells with different thicknesses on the metal nanoparticle cores. Moreover, we also studied quantum yield (QY) change of QD with various composition of two materials. It is expected that these results will provide possibilities in biological and light-emitting device applications.