

Enhancing photoluminescence intensity of quantum dots via increasing dispersion and using unique optical property of hollow silica nanoparticles

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Photoluminescence intensity of quantum dots is highly affected by the state of dispersion. In order to achieve high levels of photoluminescence, optimal dispersion of quantum dots are needed. In this study, high level dispersion of quantum dots in both liquid phase (organic solvent) and film phase (polymer matrix) are achieved using silica and hollow silica nanoparticles. A novel method of conjugating quantum dots dispersed in organic solvent onto silica and hollow silica nanoparticles in one phase is used. Furthermore, by using the unique optical property of hollow silica nanoparticles further enhancement of photoluminescence is achieved. The mechanism behind the effect of hollow silica nanoparticle's photoluminescence increment is studied.