Developing Metallothionein Capped CdSe Nanoparticles

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Abstract:

Semiconductor nanoparticles are exciting materials because of potential applications in medicine, engineering and biology. Size tunable emission, through the quantum confinement effect of semiconductor nanoparticles make them useful as chromophores for biological fluorescence marker, light emitting diodes, and laser materials. These nanoparticles are stabilized by molecules bound to the surface, called capping molecules. Thiol containing molecules are the best characterized and most prevalent capping molecules to date. Although hydrophilic monothiols render the nanoparticles water soluble, they are prone to photobleaching. The aggregation of monothiol capped nanoparticles occurs by desorption of the thiol ligands from the nanoparticle surfaces. We hypothesize that peptides based on metallothioneins present a solution to these problems. Here we demonstrate the production of water soluble metallothionein capped CdSe nanoparticles with increased fluorescence emission intensity.