

Incorporation of Quantum Dots in Silicone Polymer with Uniform Dispersion For White Light Emitting Diodes Applications

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High photoluminescence efficiency of quantum dot (QD)/polymer composite film is necessary to QD LED. However, aggregation of QDs in polymer matrix is critical problem, reducing luminescence and stability of QD/polymer composite. High refractive index silicone encapsulant polymer is widely used instead of organic polymers because of its light extraction efficiency and stability to environment. So, we investigated the change in various properties of QD in phenyl hybrid silicone resin with controlling dispersion. We synthesized Cd-free CIS/ZnS QDs and incorporated QDs within thiol functionalized resin. 3-mercaptopropyl trimethoxysilane was chosen because it has methoxy group which can react sol-gel condensation in resin synthesis reaction and has higher enthalpic attractive force with metallic nanoparticle such as QDs. After we fabricated cured-QD/silicone nanocomposites. Properties of nanocomposite such as dispersion state, QY and stability were measured. QDs in thiol functionalized-silicone composite exhibited higher QY, transmittance UV stability and thermal stability.