

Fabrication of highly luminescent Cd free QD/silicone film with uniform QD dispersion and its application to WLED

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High photoluminescence efficiency of quantum dot (QD)/polymer composite film is necessary to QD LED. However, conventional Cd-based QD has toxic problem which has limitation in application in industry. And aggregation of QDs in polymer matrix is another problem, reducing QY of QD/polymer composite. So, we investigated the change in quantum yield(QY) of QD in phenyl hybrid silicone resin with controlling dispersion. We synthesized Cd-free CIS/ZnS QDs and incorporated CIS/ZnS QD within thiol functionalized silicone resin which can have high enthalpic attractive force with metallic nanoparticle such as QDs. QDs in thiol functionalized -silicone resin had higher QY and transmittance compared to QDs in non-modified silicone resin because of higher dispersion state of QDs in modified silicone resin. Properties of QD/silicone composite such as dispersion state, QY and stability were measured by confocal microscopy, TEM, UV, PL and integrating sphere.