

Fabrication of highly luminescent quantum dot/poly(methyl methacrylate) nanocomposite by matrix-free method

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Herein, we have fabricated highly luminescent and stable QD/poly(methyl methacrylate) (PMMA) nanocomposite at high QD concentration by using a matrix-free method. CdSe/ZnS QDs were functionalized by PMMA polymeric ligands to prepare nanocomposites. We investigated optical properties of QD/PMMA nanocomposites using polymeric ligands with different end groups (thiol, amine, and carboxylic acid) and molecular weights. We could fabricate QD/PMMA nanocomposites with high quantum yield at QD concentration as high as 30% (w/w), which exhibited high transparency without change in emission wavelength. Finally, QD/PMMA composite was coated onto polyethylene terephthalate (PET) film and then applied to WLEDs. We confirm that WLED based on the matrix-free QD/PMMA nanocomposites exhibited superior LED efficiency to conventional WLEDs.