

Fabrication of environmentally friendly QD-polymer nanocomposites with improved optical properties using amphiphilic polymer ligands

양갑필, 윤철상, 김정욱¹, 이강택[†]

연세대학교; ¹서강대학교

(ktleee@yonsei.ac.kr[†])

Quantum dots (QDs) have attracted attentions to be the next-generation material in light-emitting devices (LEDs). To apply QD to LEDs, polymers such as polydimethylsiloxane (PDMS) or polymethylmethacrylate (PMMA) are chosen as a QD matrix. In the QD-polymer nanocomposite, however, optical properties of QD decrease because of aggregation and FRET. Besides, most of high performing QDs are composed with environmentally harmful component such as Cd, Pb. To solve these problems, we present the environmentally friendly QD-polymer nanocomposite showing enhanced optical properties compared to conventional QD/PDMS nanocomposites. We fabricated nanocomposite by encapsulating QD with polystyrene-co-maleic anhydride(PSMA) followed by crosslinking QD-PSMA with PDMS to produce nanocomposite. Nanocomposite was fabricated by ring opening reaction between anhydride in PSMA and diamines of aminopropyl-terminated PDMS. By analyzing optical and thermal properties, we observed great potential of environmentally friendly QD polymer nanocomposites in application to LEDs.