

## Fabrication of quantum dot-polymer nanocomposites using amphiphilic polymer ligands and its application to LED devices

양갑필, 윤철상, 김정욱<sup>1</sup>, 이강택<sup>†</sup>

연세대학교; <sup>1</sup>서강대학교

(ktleee69@yonsei.ac.kr<sup>†</sup>)

Quantum dots (QDs) have been attracting great attentions to be the next-generation material in light-emitting devices (LEDs) for their superior optical properties such as high color purity, quantum yield and photochemical resistance. In recent researches, polymers such as polydimethylsiloxane (PDMS) or polymethylmethacrylate (PMMA) are chosen as a QD matrix to apply QDs to LEDs. However, when it comes to apply QDs into polymer matrix, optical properties of QD decrease because of QDs agglomeration and FRET effect. To solve this problem, we introduced amphiphilic polymer to the system and eventually fabricated QD-polymer nanocomposite showing better optical properties compared to conventional QD/PDMS. We fabricated nanocomposites by encapsulating QD with polystyrene-co-maleic anhydride (PSMA) followed by crosslinking QD-PSMA with PDMS to produce QD-PSMA/PDMS nanocomposite. Nanocomposite was prepared by ring opening reaction between maleic anhydrides in PSMA and amines of aminopropyl-terminated PDMS at RT. We also fabricated White LED with QD-PSMA/PDMS and observed great potential in LED application.