Improving dispersity of quantum dots in polymer resin by modifying steric properties of ligands

이승준, 이강택†
연세대학교
(ktlee@yonsei.ac.kr†)

Quantum dots (QDs) have shown great potential for display material in light-emitting devices such as color conversion layer (CCL) and inkjet printing because of their narrow band emission, high photoluminescence quantum yield (PLQY) and solution processability. To fabricate CCL via inkjet printing, patterned QDs must be uniformly dispersed in micrometer-thickness for high color conversion. Issues with solvent based QDs ink depicts coffee ring patterns during solvent evaporation causing aggregation of QDs at the periphery and degradation of optical properties. In addition, thickness of the film must be sufficient for effective color conversion. On the other hand, polymer based QDs ink with polymer resin such as methyl methacrylate (MMA) and photoresists can be used to fabricate thicker films to enhance color conversion. When it comes to fabricating polymer based QDs ink, QDs with typical organic ligands, such as oleic acid and tri-octylphosphine are unsuitable for QDs dispersion in polymer resins which leading to serious aggregation of QDs. To solve this problem, we modified steric properties of ligands to control ligand-monomer or ligand-ligand interaction to stabilize QDs.