

Bright light-emitting diodes by photoinduced layered nanoplatelets film with controlled assembly

조현진, 이도창[†]

KAIST

(dclee@kaist.edu[†])

The light-emitting diodes (LEDs) using isotropic particles such as quantum dots (QDs) causes loss of light when the light goes out from LEDs, which limits the light out-coupling efficiency and the external quantum efficiency (EQE). However, the light out-coupling efficiency and the EQE can be improved through controlling transition dipole orientation when anisotropic particles such as nanoplatelets (NPLs) are well arranged. Here, we investigated the effect of thickness, morphology and assembly of NPLs film to the performance of the LEDs. Therefore, this study has developed a strategy to stack CdSe/CdZnS NPLs monolayers that induced face down assembly one by one, bridging them with photoinduced crosslinker. The highest EQE was achieved when NPLs were stacked in the 3 monolayers with controlled assembly. Therefore, our work paves the way to optimize thickness and assembly of NPLs film in LEDs.