

Controlling the refractive index of silica/quantum dot hybrid particles to reduce the light-scattering in nanocomposites for display application

전형준, 엄기주, 조준희, 양갑필, 이강택[†]
연세대학교
(ktlee@yonsei.ac.kr[†])

Advances in the synthesis of quantum dots (QDs) materials have brought the quantum efficiency of QDs closer to 1, but the luminescence efficiency of nanocomposite films by mixing with resin and thermal curing for white light-emitting diodes (LEDs) is seriously lowered because of aggregation and oxidation of QDs and poor adhesion of QDs to the resin. To overcome these problems, hybrid particles have been synthesized by attaching onto template particles made of polymer or metal oxide. However, due to the difference in refractive index between the template particles and the resin, light-scattering at the interface may interfere with the luminescence of the QDs in the hybrid particles, resulting in a decrease in the quantum efficiency of the nanocomposite films. Therefore, we control the light scattering at the interface in nanocomposite films by using silica particles as template particles and surface modification.

This work was supported by grants from the National Research Foundation of Korea (2017R1A2B4007534) and the Ministry of Trade, Industry & Energy (MOTIE, Korea) under Industrial Technology Innovation Program (No.10079347).