

Fabrication of Quantum Dot/Photoresist Nanocomposites by Dispersing Wrinkled Silica-Quantum Dot Hybrid Particles and Their Application to Display Device

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Quantum dot(QD) based display devices have received attention because of optical properties of QD. QDs have size-dependent narrow emission and broad absorption, high efficiencies and stabilities, which lead to high device efficiency. There are many ways to apply QDs to display devices. Among them, it is commercialized to use QDs as a color converter where QDs exist on the backlit in the form of green and red QD mixed film. However, there still remain challenges such as low optical efficiency and color gamut. To overcome the problems, red and green QDs film should be patterned, separately. Photolithography method is the best way because it has been developed for decades. However, QDs cannot be dispersed in commercial PR resin. To overcome this limitation, we disperse QDs to PR resin in the form of QD-wrinkled silica hybrid particles(WSQs). We characterized the film and the WSN/PR nanocomposites were also analyzed to confirm the scattering effect. To prove their potential as a display, the WSQ/PR nanocomposite were attached onto mLED. We believe this study suggests a new way to disperse QDs to photoresist film and use QDs for micro LEDs.