Fabrication from the Hybrid Quantum Dots of CdTe/ZnO/G.O Quasi-core–shell–shell for the White Light Emitting Diodes

Hong Hee Kim$^{1,5}$, YeonJu Lee$^5$, Keun yong Lim$^2$, CheolMin Park$^1$, Do Kyung Hwang$^{3,4,*}$, and Won Kook Choi$^{3,5,*}$

$^1$Department of Materials Science and Engineering, Yonsei University, Seoul 120-749, $^2$Department of Display Materials Engineering Kyung Hee University, Gyeonggi-do 446-701, Korea, $^3$Department of Nanomaterials and Nano Science, Korea University of Science and Technology (KUST), Daejun 34113, $^4$Center for Opto-Electronic Materials and Devices, Post-Silicon Semiconductor Institute, Korea Institute of Science and Technology (KIST), Seoul 02792, $^5$Materials and Life Science Research Division, Korea Institute of Science and Technology (KIST), Seoul 027921, Korea

Recently, many researchers have shown an increased interest in colloidal quantum dots (QDs) due to their unique physical and optical properties of size control for energy band gap, narrow emission with small full width at half maxima (FWHM), broad spectral photo response from ultraviolet to infrared, and flexible solution processing. QDs can be widely used in the field of optoelectronic and biological applications and, in particular, colloidal QDs based light emitting diodes (QDLEDs) have attracted considerable attention as an emerging technology for next generation displays and solid state lighting. A few methods have been proposed to fabricate white color QDLEDs. However, the fabrication of white color QDLEDs using single QD is very challenging. Recently, hybrid nanocomposites consisting of CdTe/ZnO heterostructures were reported by Zhimin Yuan et al.[1]. Here, we demonstrate a novel but facile technique for the synthesis of CdTe/ZnO/G.O(graphene oxide) quasi-core-shell-shell quantum dots that are applied in the white color LED devices. Our best device achieves a maximum luminance of 484.2 cd/m$^2$ and CIE coordinates (0.35, 0.28).

**Keywords:** QDLEDs, CdTe, ZnO, G.O, White Color LEDs