

Highly concentrated quantum dot/polyimide nanocomposite for flexible color-conversion layer

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Quantum dot (QD) is attracting attention as a display material such as a color conversion layer (CCL) due to its wide absorption and narrow emission band. When using QD as a display material by incorporating into polymer nanocomposites, QD is susceptible to external conditions such as oxygen, water, heat, and UV. The polymer nanocomposite must be manufactured to ensure stability of QDs. However, conventional polymers such as polymethyl methacrylate and photoresist have been utilized in a narrow range of applications in that the polymers cannot effectively protect QDs due to high oxygen and moisture infiltration as well as low heat resistance and flexibility. In this work, we fabricated matrix-free QD-polymer nanocomposites using short/long chain colorless polyimides (CPI) as ligands of quantum dots. PI has excellent flexibility with high heat resistance, low oxygen and moisture penetration. We expect that this QD-CPI nanocomposite will secure high stability of QD with high concentration and will be used in various applications such as flexible displays and CCL.