

The Synthesis and Characterization of the Highly Stable Perovskite Quantum Dots for Display Application

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Perovskite quantum dots (PeQDs) is a very promising material that is being extensively studied at various research fields such as solar cells and display because it has outstanding optical properties. However, perovskite has stability issues related to heat, air, and light. To overcome them, we have developed highly stable PeQDs using metal, ligand and metal-ligand complex.

Firstly, mixed-cation $Cs_xRb_{1-x}PbX_3$ ($X = Cl, Br, I$) PeQDs are developed and show high quantum yields of 93% and 86% for green and blue wavelengths, respectively. The stability is significantly improved under heat, UV, and water aging conditions.

Also, we synthesized that having photostability $CsPbI_3$ PeQDs using thiol as an exchanged ligand. PeQDs used for conventional synthesis structurally unstable. To overcome these problems, thiol (-SH) as an exchanged ligand was used to stabilize the structure and could maintain the structural and optical properties.

Finally, we have developed highly stable PeQDs using Zn-TOPO complex. They not only have high quantum efficiency and sharp FWHM values (15-30 nm), but also improved long-term stability at high temperature.