

Improved Stability and Optical Properties of Perovskite Quantum Dots by metal-Ligand Complex: Fabrication of Full-Color Light-Emitting Diode

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In recent years, perovskite quantum dots (PeQDs) have received a lot of attention for many applications. However, PeQDs were particularly unstable and the optical properties were readily degraded because of its structural instability. To overcome these problems, we synthesized perovskite quantum dots which has high stability at harsh environment using novel Zinc-triethylphosphine oxide (Zn-TOPO) complex compare to the conventionally used ligand. Zn-TOPO capped PeQDs are showed high quantum yields of over 90% and improved thermal stability than pristine PeQDs. In particular, it is clarified that Zn and TOPO are combined and attached to the surface of the PeQDs through ³¹P NMR both solution and solid. Additionally, we conducted XPS measurements for more detailed surface analysis of PeQDs, and founded that the Zn-TOPO complex decrease lead-oxide (Pb-O) bonding in the lattice. Finally, we fabricated electroluminescence (EL) devices using these materials.