Suppression of exciton quenching in all-inorganic quantum dot light-emitting diode through surface treatment

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Inorganic hole transport materials in quantum dot light-emitting diodes (QD-LEDs) have emerged because of its inherently high stability in harsh driving conditions and oxygen and water-resistant properties. NiO is one of the suitable candidate for inorganic hole transport materials (HTM) owing to its stability and moderate mobility. However, NiO-based all-inorganic QD-LEDs exhibit poor performance than organic-HTL based QD-LEDs. low performance of NiO-based all-inorganic QD-LEDs is due to exciton quenching caused by free carriers and surface traps on the surface of NiO hole transport layers (HTLs). We try to suppress exciton quenching by passivating the trap site of NiO using an appropriate ligand. The ligand exchange method was applied to NiO, XPS will be conducted for analysis of NiO surface, and the suppression of exciton quenching will be evaluated through PL decay of QD/NiO.