# Novel Device Architecture of Quantum Dot Light-Emitting Diodes Employing Orthogonal Process

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The attention to colloidal nanocrystal quantum dots (QD) have been increasing in expectation of developing future display technologies due to the excellent optical and electrical properties, such as emission wavelength tunability, narrow emission bandwidths and solution processibilty [1]. For producing efficient full color QD-based light emitting diodes (QLED), the issues of hole transport materials would be detrimental to better hole carrier injection between QD layer and hole transport layer (HTL). During the QD deposition process, the pre-formed HTL must sustain its property throughout their exposure to the organic solvents, which can dissolve QDs.

Here, we suggest the answer focused on solving these issues, particularly in the context of Fluorous Materials Chemistry, which will enable the integration of organic/bio materials for advanced electronic applications[2]. In general, perfluorous solvents do not interact extensively with non-fluorinated materials. Thus, fluorous QD solutions ($R_F$-QD) in perfluorous solvents, orthogonal solvent, enabled the solution-casting of QD films on top of an organic hole-transporting layer without damage. Higher efficiency and uniform brightness over the entire pixel of operating device with $R_F$-QD presented the possiblity of the fluorous solutions for large-area display fabrication (Fig. 1). Based on the results, we ensured the compatibility of fluorous QD process with various organic hole-transporting materials in QD fabrication process. It is believed that this method will provide a way of selecting organic functional materials for the construction of QD, which will lead to fabricate practicable QLEDs with RGB patterned pixels as well as white QLED for diverse applications.

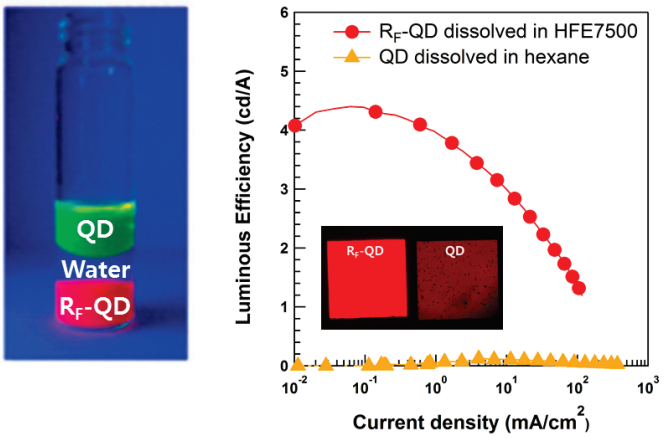


**Fig. 1. Efficiency characteristics of QLEDs with $R_F$-QD**

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## References

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