Electronic Supplementary Information (ESI)

High-efficiency quantum dot light-emitting diodes employing lithium salt doped poly(9vinlycarbazole) as a hole-transporting layer

Ying-Li Shi, Feng Liang, Yun Hu, Xue-Dong Wang, Zhao-Kui Wang, and Liang-Sheng Liao*

Jiangsu Key Laboratory for Carbon-Based Functional Materials & Devices, Institute of Functional Nano & Soft Materials (FUNSOM), Soochow University, Suzhou, Jiangsu 215123, China.

*E-mail: lsliao@suda.edu.cn

Experimental details

CdSe-CdS core-shell QDs was purchased from China Beida Jubang company. PVK (average molecular weight, 25000-50000 g/mol), zinc acetate hydrate, and Li-TFSI were phurchased from Sigma-Aldrich. Chlorobenzene, acetonitrile, n-hexane, and *n*-butylalcohol phurchased from Ethyl were Acros. acetate, tetramethylammoniumhydroxide (TMAH), dimethylsulphoxide (DMSO) were purchased from Alfa-Aesar. Acetone was purchased from Sinopharm Chemical Reagents. All reagents used in this study were without any other purification.



Fig. S1 (a) UV-Vis (blue line) and PL (black line) spectra of the CdSe-CdS core-shell QDs film. (b) X-ray diffraction profile of these correponding QDs on the quartz substrate.



Fig. S2 The electrical measurement on the electron-only devices (ITO/ZnO/Al). The thickness of all the layers is identical to those used in the QLEDs.



Fig. S3 The time-resolved photoluminance decay curves of QDs with the structure of ITO/PEDOT:PSS/pure (black line), 1.5 wt.% (red line), 3.0 wt.% (blue line), or 4.5 wt.% (green line) Li-TFSI-doped HTLs/QDs films, respectively.



Fig. S4 (a) SEM image of the pure PVK film with a scale bar of 5 μ m. (b-d) SEM images of 1.5 wt.%, 3.0 wt.%, and 4.5 wt.% Li-TFSI-doped PVK films with the scale bars of 5 μ m, respectively.



Fig. S5 Stability data for the QLED devices with pure PVK and Li-TFSI doped PVK (3.0 wt.%). The initial luminance, L_0 , is 1500 cd/m².



Fig. S6 The AFM characterization of the Li-TFSI doped PVK film with the doping ratio of 4.5 wt.%. The insert table is the size of the pinholes in the film.