

Supplementary information

Solution-processable Li-doped transition metal oxide hole injection layer for highly efficient quantum-dot light-emitting diodes

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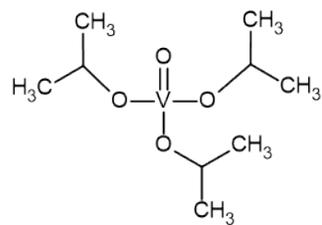


Figure S1. Structural formulas of the vanadium(V) triisopropoxide oxide.

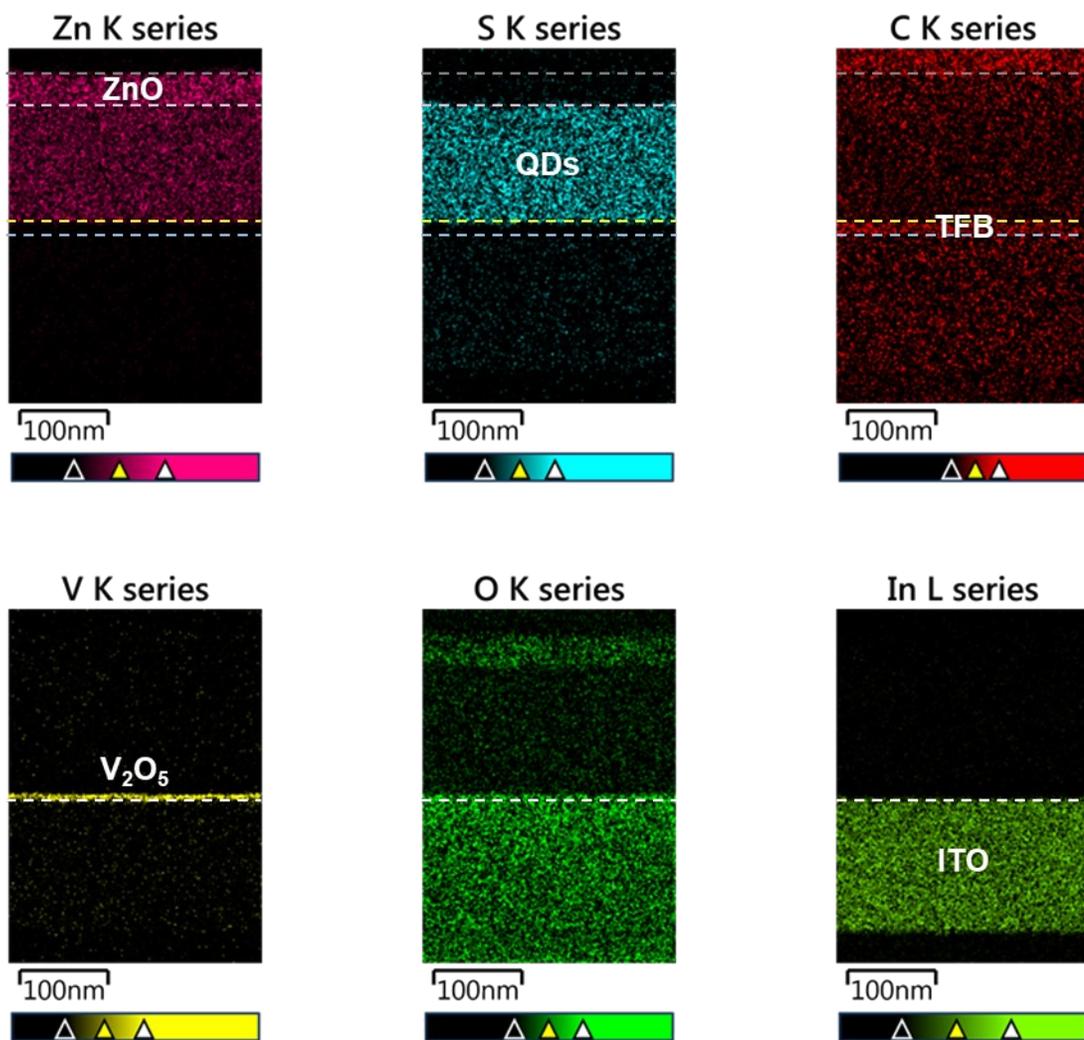


Figure S2. EDS mapping images of various elements (Zn, S, C, V, O and In) in the QLED with Li-doped V₂O₅.

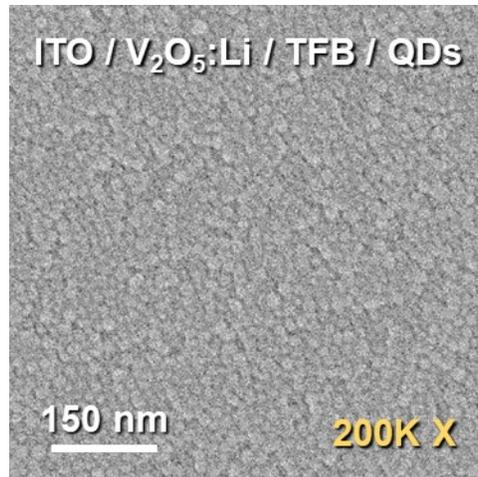


Figure S3. FE-SEM image of the QD layer on ITO/V₂O₅:Li (10%)/TFB.

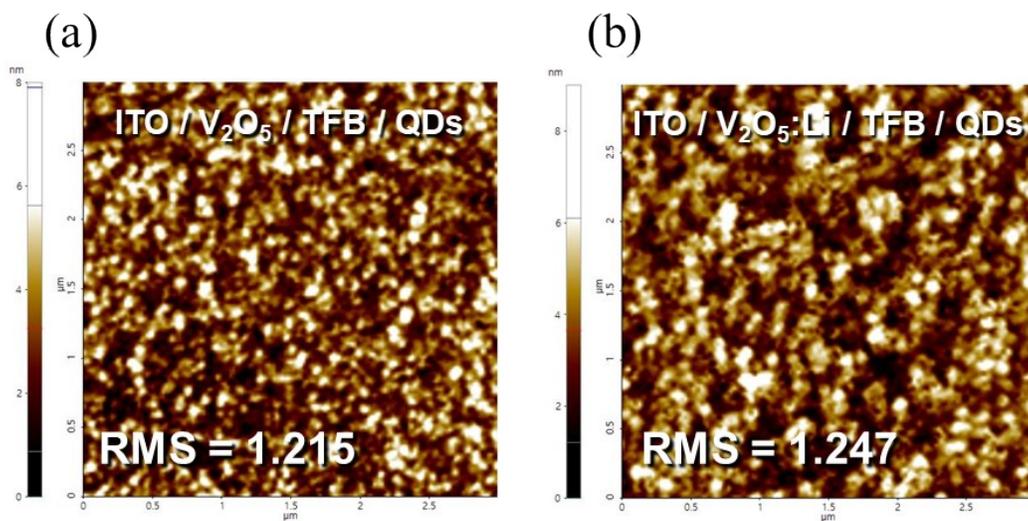


Figure S4. AFM images of QD layers on (a) ITO/V₂O₅/TFB and (b) ITO/V₂O₅:Li (10%)/TFB.

Scan area $3 \times 3 \mu\text{m}^2$.

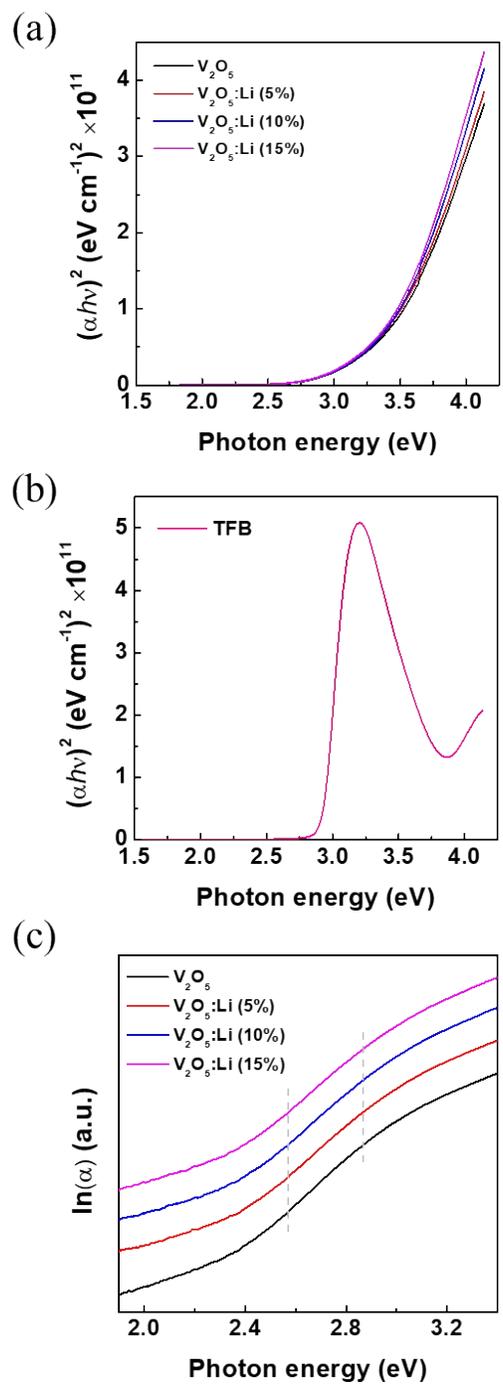


Figure S5. Tauc's plot of (a) different doping ratio of Li-doped V_2O_5 and (b) TFB film from UV-vis transmittance spectra. (c) Urbach plot of HILs. Where α is absorption coefficient.

Samples	$h\nu$ (eV)	α (cm ⁻¹)
V ₂ O ₅	2.50	27,193
V ₂ O ₅ :Li (5%)	2.50	27,738
V ₂ O ₅ :Li (10%)	2.50	28,865
V ₂ O ₅ :Li (15%)	2.50	30,447

Table S1. Urbach energy absorption coefficient (α) at the same photon energy.

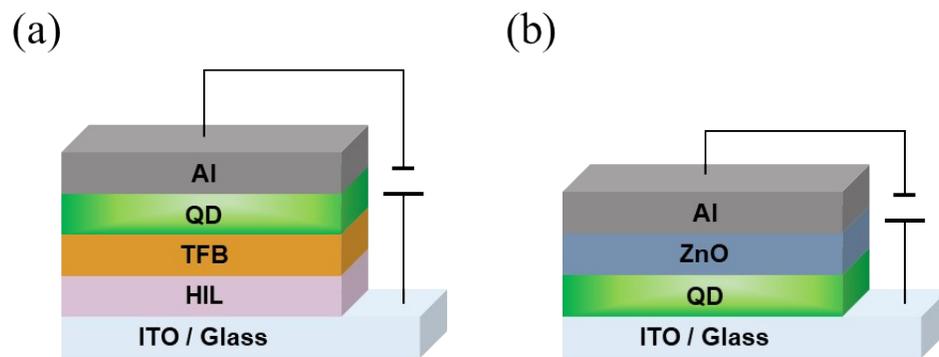


Figure S6. Schematic structure of (a) hole-only device (HOD) and (b) electron-only device (EOD).

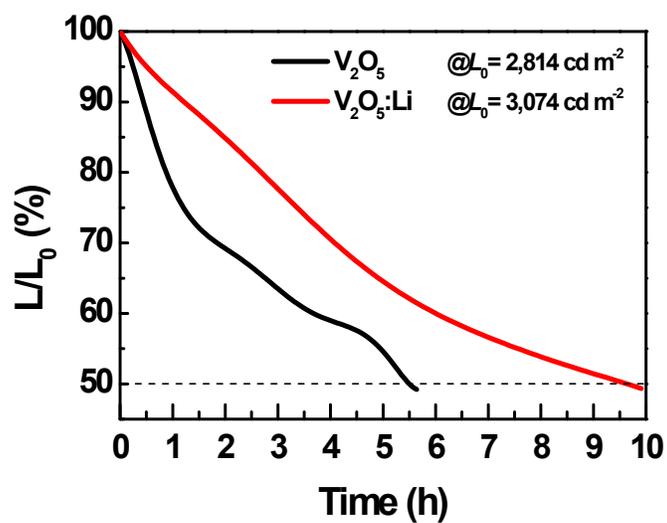


Figure S7. Operational lifetime measurements of QLEDs with V_2O_5 and $V_2O_5:Li$ (10%).

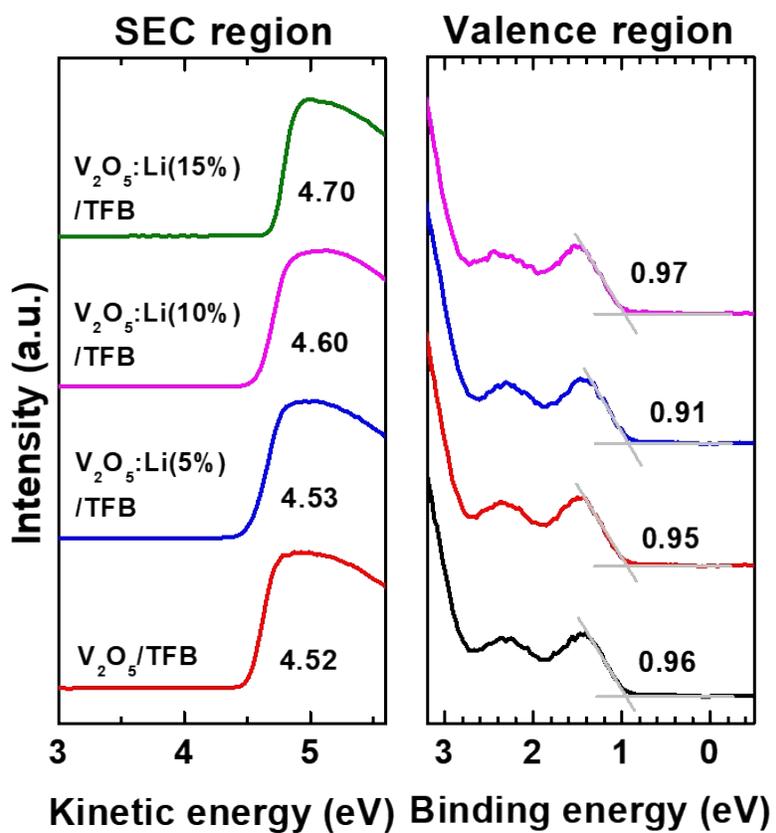


Figure S8. UPS spectra of TFB hole transport layer (HTL) deposited on ITO/HIL films.

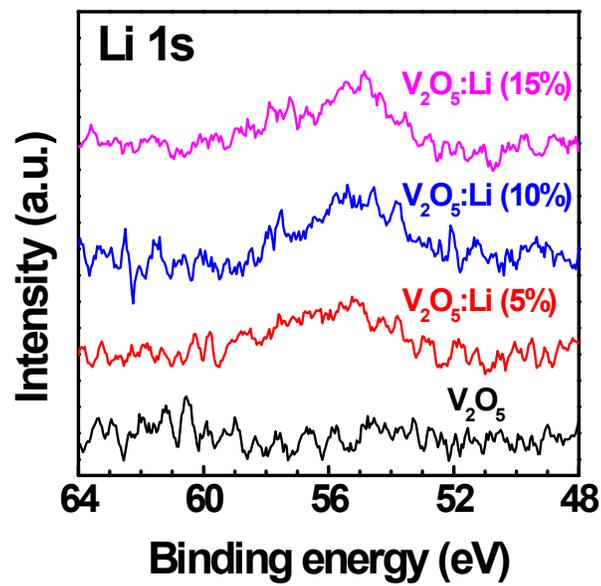


Figure S9. Li 1s XPS spectra of V₂O₅ and V₂O₅:Li (5, 10, 15%) films.