

Electronic Supplementary Materials

ZnSe:Te/ZnSeS/ZnS Nanocrystals: An Access to Cadmium-Free Pure-Blue Quantum-Dot Light-Emitting Diodes

Zhen Bao^{a†}, Zhen-Feng Jiang^{b†}, Qiang Su^{c†}, Hsin-Di Chiu^b, Heesun Yang^{*d}, Shuming Chen^{*c}, Ren-Jei Chung^{*b}, and Ru-Shi Liu^{*aef}

^aDepartment of Chemistry, National Taiwan University, Taipei 106, Taiwan

^bDepartment of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei 106, Taiwan

^cDepartment of Electrical and Electronic Engineering, Southern University of Science and Technology, Shenzhen 518055, China

^dDepartment of Materials Science and Engineering, Hongik University, Seoul 04066, Korea

^eAdvanced Research Centre of Green Materials Science and Technology, National Taiwan University, Taipei 106, Taiwan

^fDepartment of Mechanical Engineering and Graduate Institute of Manufacturing Technology, National Taipei University of Technology, Taipei 106, Taiwan

Figures and tables

Tab. S1 Summary of three-order multiexponential fitting parameters the for time-resolved PL decays of ZnSe:xTe/ZnSeS/ZnS QDs.

Te/Se ratio	A ₁ (%)	τ ₁ (ns)	A ₂ (%)	τ ₂ (ns)	A ₃ (%)	τ ₃ (ns)	τ _{avg} (ns)
3.0%	46.4	2.6	40.9	12.2	12.7	36.6	10.8
3.3%	59.5	1.9	30.1	9.9	10.4	32.8	7.5
3.7%	48.7	2.2	41.1	9.9	10.2	31.2	8.3

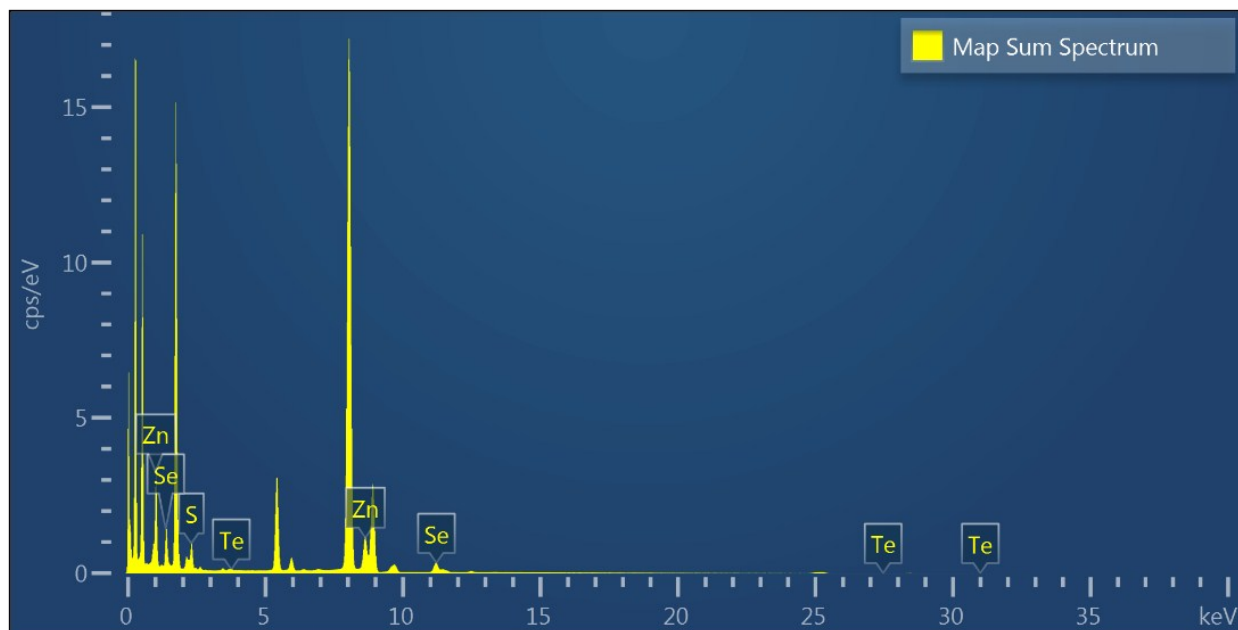


Fig. S1. Elemental composition and atomic ratios of ZnSe:0.03Te/ZnSeS/ZnS as determined by EDS.

Tab. S2. EDS elemental ratio of Zn, Se, S, and Te.

Element	Zn (%)	Se (%)	S (%)	Te (%)	Total (%)
Atomic ratio	44.4	21.8	30.9	2.9	100.0

Tab. S3. Summary of different structure QLEDs fabricated by ZnSe:0.03Te/ZnSeS/ZnS.

Device structure	PL (nm)	EL (nm)	Von [V]	Max. EQE (%)	Max. CE (cd/A)	Max. PE (lm/W)	Max. L (cd/m ²)
TFB	450	452	13.75	0.12	0.07	0.01	96
PVK	450	451	12.1	0.18	0.02	0.01	67
PVK + 10% TFB	450	455	6	0.33	0.34	0.15	261
Inverted structure	450	472	8.8	0.07	0.23	0.11	57

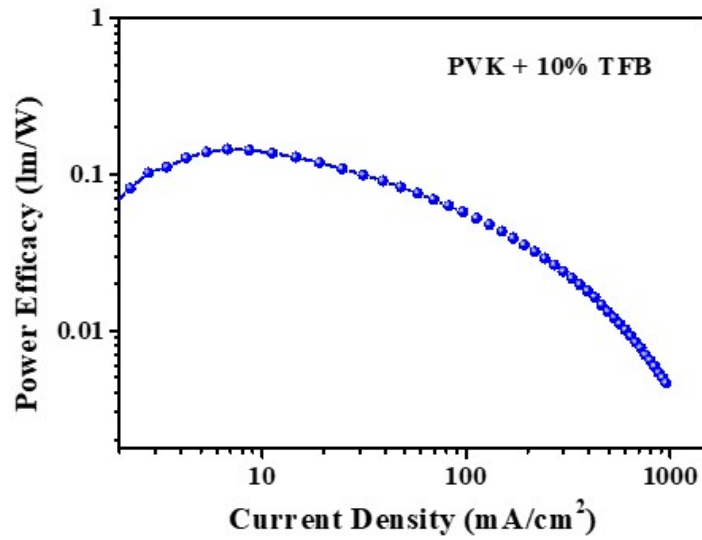


Fig. S2. Power efficacy–current density curve of the ZnSe:0.03Te/ZnSeS/ZnS fabricated QLED device with a mixed hole-transfer layer of 10%TFB in PVK.

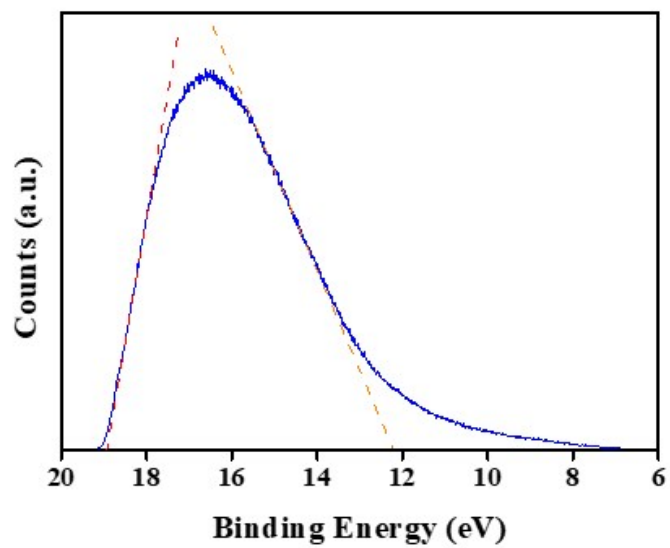


Fig. S3. UPS spectrum of the ZnSe:0.03Te/ZnSeS/ZnS QDs.



Fig. S4. EQE–Voltage curve of the ZnSe:0.03Te/ZnSeS/ZnS fabricated QLED device with a mixed hold-transfer layer of 10%TFB in PVK.

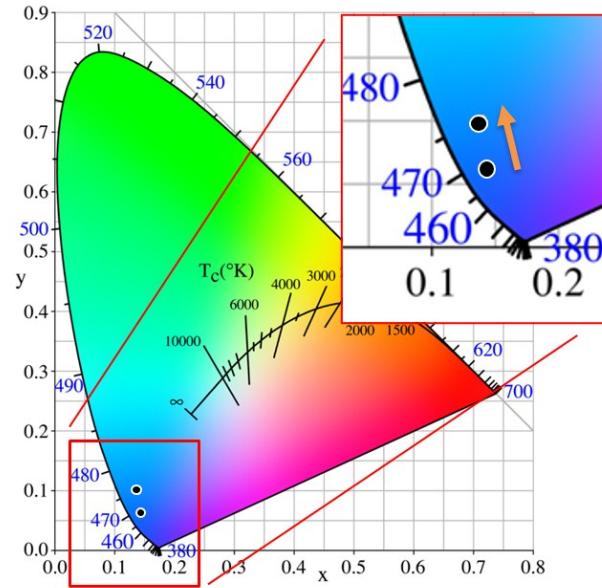


Fig. S5. The shift of CIE coordinate between PL and EL in CIE Figure.