Electronic Supplementary Material (ESI) for Nanoscale.

Electronic Supporting Information

Full Color-Tunable Stacked Quantum Dot light Emitting Diodes for Next-Generation Display and Lighting

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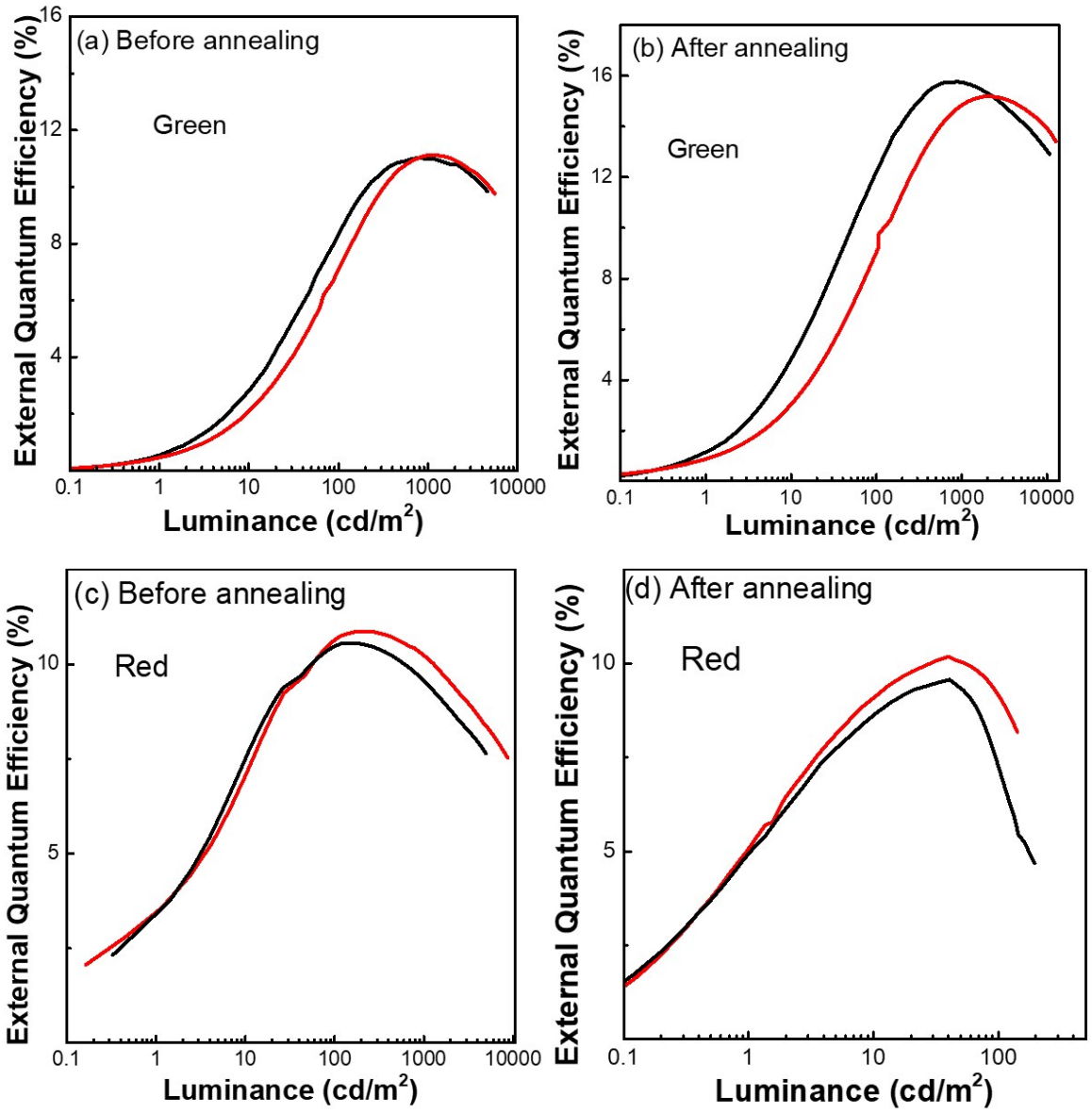

Figure S1. Impact of annealing on the green and red device performance**.** EQE of red and green QLEDs before and after baking bottom emitting device with Al cathode at 90 °C for 10 minutes (a) green device before annealing (b) green device after annealing at 90 °C (c) red device before annealing (d) red device after baking at 90 °C for 10 minutes. Red and black traces are from two pixels of a device. The very first or the bottom device needs to withstand multiple baking process, while fabricating subsequent subpixels. Therefore, we fabricated green device first which is situated at the bottom of the stacked QLEDs.

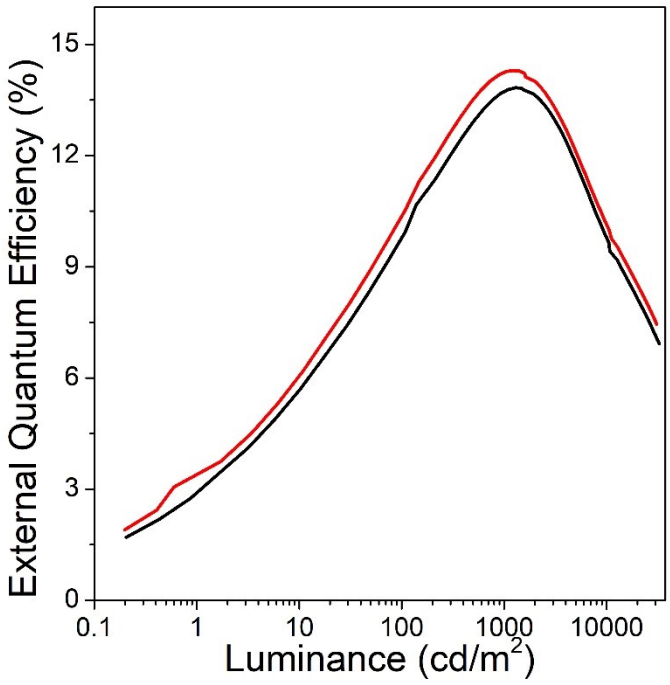

Figure S2: EQE of green QLED processed using lower annealing temperature of HIL and HTL. The device contains PEDOT: PSS HIL and TFB HTL which were annealed at 90 C° for 30 minutes and contains Al cathode

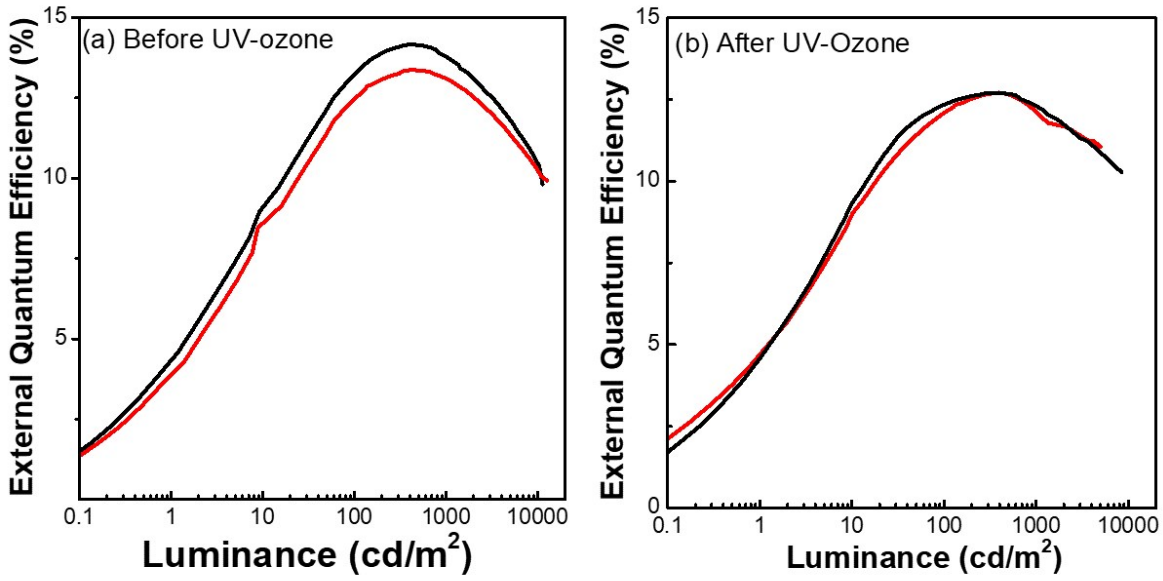

Figure S3: Impact of UV-ozone exposure on the bottom emitting red QLED with aluminium cathode. The device was scanned before and after UV-ozone exposure for 15 minutes. Red and black are two traces of two pixels of a device.

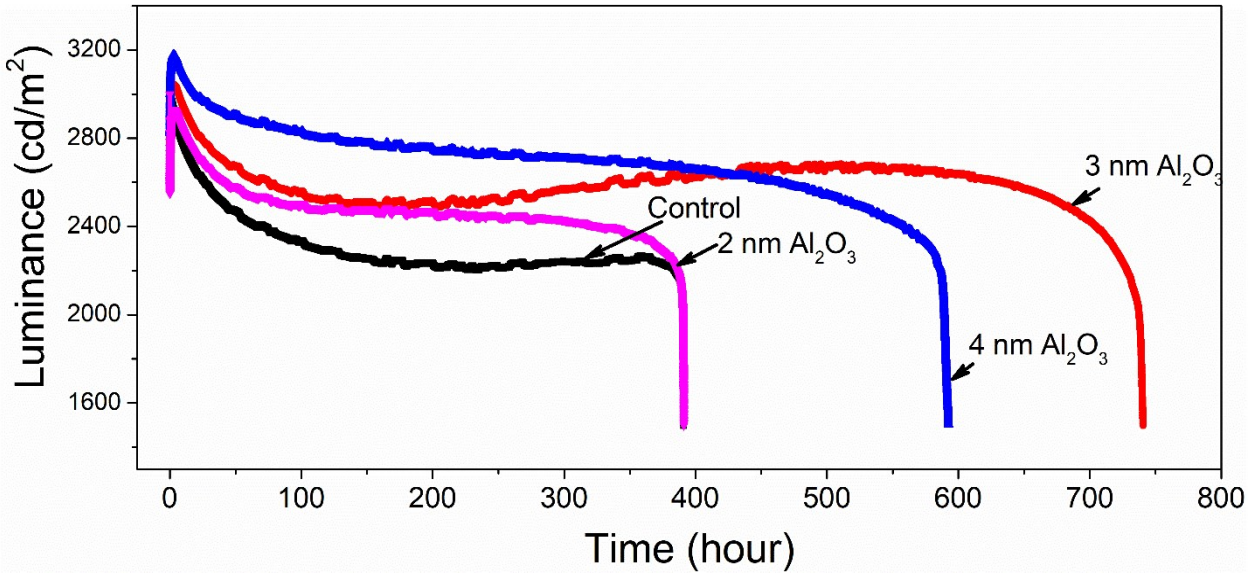

Figure S4 Comparison of the operational lifetime of Al_2O_3 coated device with uncoated device. 2nm, 3nm, and 4 nm Al was coated on the top of ZnO layer using vacuum thermal evaporation of aluminium shot and they were exposed to air for 10 minutes followed by vacuum thermal deposition of 100 nm aluminium cathode. The devices were tested in life-time station under constant current, QLEDs lifetime were found to be maximum when ≈ 3 nm Al_2O_3 was coated as

shown in figure below. Here, the thickness of Al and Al_2O_3 are used interchangeably for simplicity.

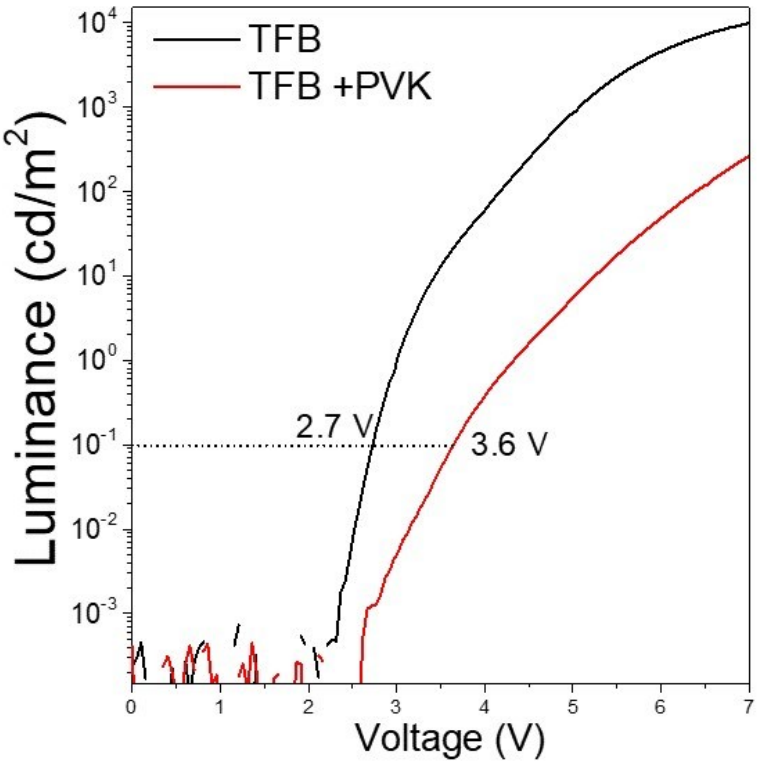

Figure S5: Comparison of turn-on voltage of a bottom emitting planar QLEDs made with TFB and TFB with PVK bilayer hole transport materials in ITO anode and Al cathode device.

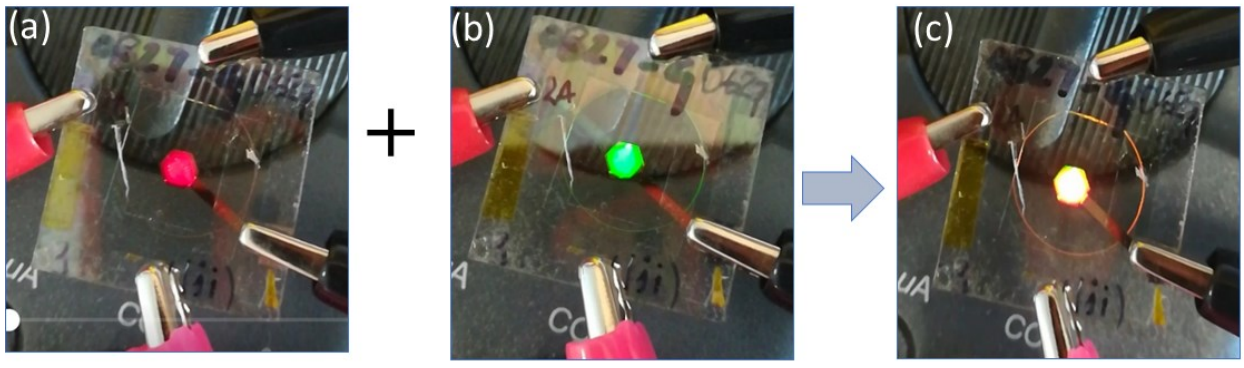

Figure S6 QLED device with two stacked subpixels that produces secondary color. Images when (a) only red subpixel is turned on (b) only when green subpixel turned on (c) both red and green subpixels are turned on producing yellow color.

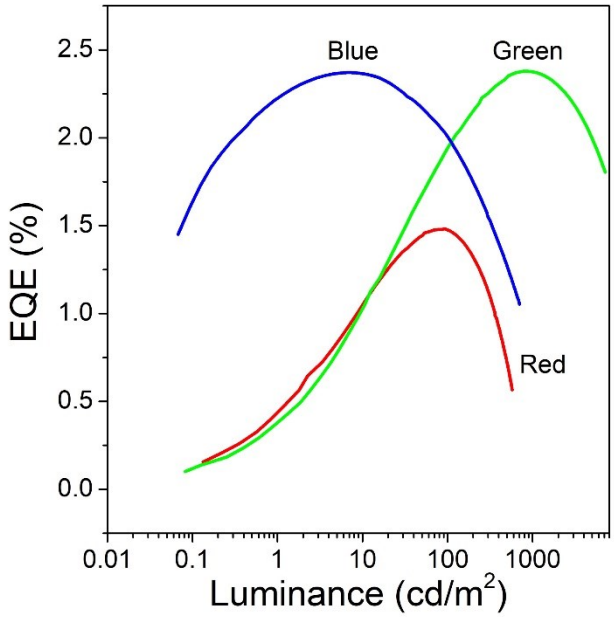

Figure S7: EQE at various luminance of transparent single red, green, and blue QLEDs. The devices are processed using standard methods.