Supplementary Information

High Luminance of $CuInS_2$-based Yellow Quantum Dot Light Emitting Diodes Fabricated by All-solution Processing

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Figure S1 shows the FTIR spectra of pure DDT and EHT. In spectrum of DDT, vibrations of symmetrical and asymmetrical stretching of C-H bonds appear some red-shifted as compared with the corresponding ones in EHT. Besides, we find that obvious differences of these two spectra emerge in the so-called fingerprint region where mainly belongs to the vibration of C−S bonds. Vibrational modes of C−S bonds in DDT and EHT locate at 654 cm^{-1} and 669 cm^{-1}, respectively.

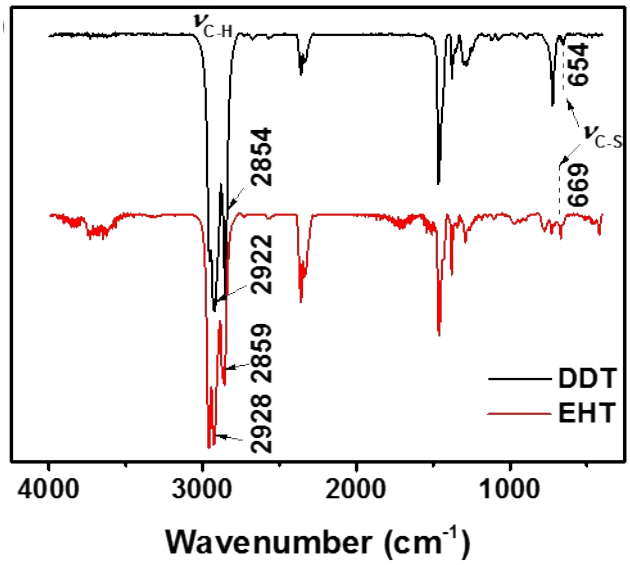

Figure S1. FTIR spectra of DDT and EHT.

Figure S2 depicts the structural and optical properties of ZnO nanoparticles. TEM iamges show that the ZnO nanoparticles have a uniform size of 4.8 nm and possess a good crystallinity. XRD diffractional pattern reveals that ZnO nanoparticles are crystalline and have a wurtzite structure similar to that of bulk ZnO. An obvious absorption peak at 333 nm in UV-Vis spectrum is observed which correponds to a band gaps of 3.72 eV. In addition, photoluminescent spectrum of ZnO nanoparticles exhibits a broad defect-related emission with a 517 nm central fluorescent peak.

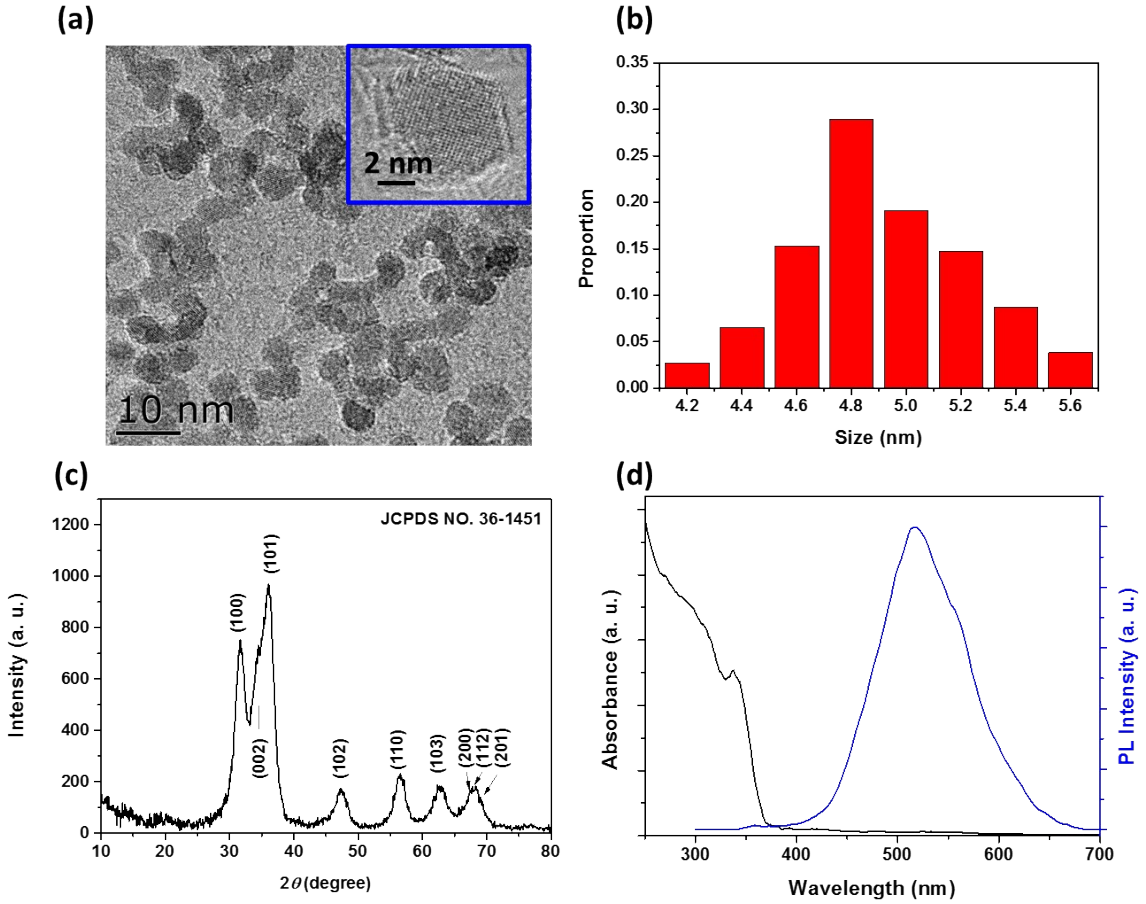

Figure S2. structural and opitcal properties of ZnO nanoparticales meausred by TEM, XRD, UV-vis absorption and PL measurements. (a) TEM image of ZnO nanoparticles. Inset of high-resolution TEM image shows that the ZnO have a good crystallinity. (b) Histogram of ZnO nanoparticles size based on the survey of 100 particles from different regions of the grid. (c) XRD pattern of ZnO nanoparticles. (d) UV-Vis absorption spectrum and the coresponding PL spectrum of ZnO nanoparticles.

Figure S3 shows the voltage dependence of current density in electron devices. These current density-voltage characteristics are mainly affected by the thickness of ZnO layer. It shows that, at a given voltage, a thicker ZnO layer possibly results in a higher current density.

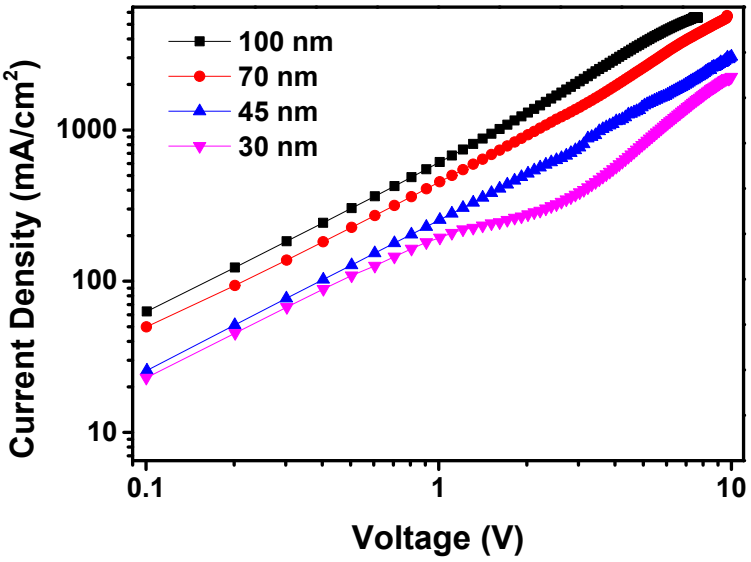

Figure S3. Current density-voltage characteristic curves in electron-only devices with different thickness of ZnO layer.

Figure S4 shows the structure schematic of electron-only and hole-only devices and their corresponding energy band diagram. In electron-only devices, two ZnO layers in electron-only devices are used to block the hole injection from electrode. Similarly, the two PVK layers used in hole-only devices prevent the electrons from injecting to the QDs layer.

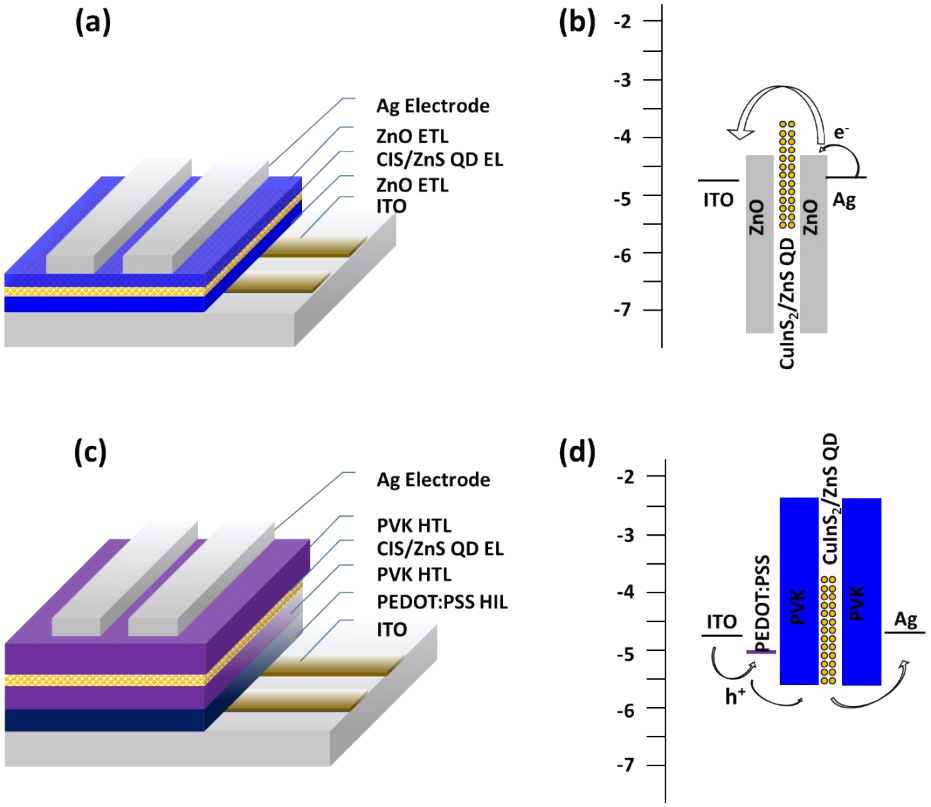

Figure S4. (a) Structure schematic and (b) energy band diagram of electron-only devices. (c) Structure schematic and (d) energy band diagram of hole-only devices.