Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Copper Thiocyanate/Copper Iodide Based Hole Transport Composites with Balanced Properties for Efficient Polymer Light-Emitting Diodes

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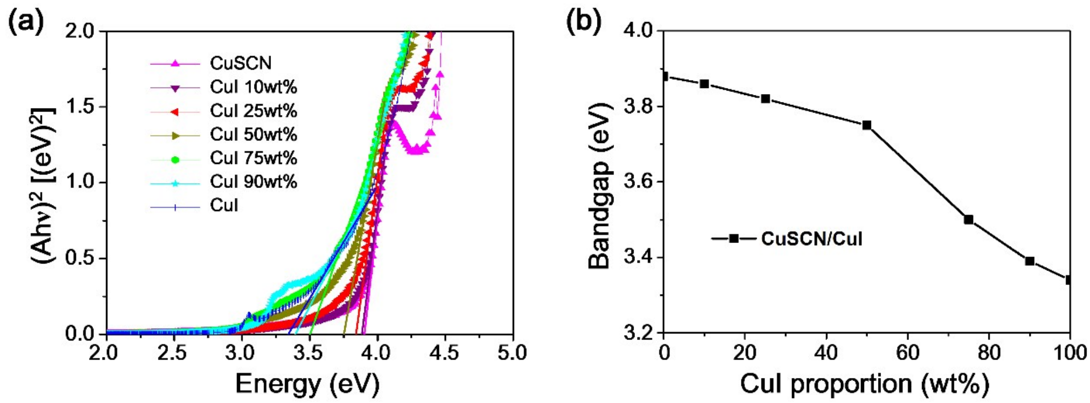

Fig. S1 (a) Plots of $(Ah\nu)^2$ calculated from the absorption spectra of the composite CuSCN/CuI. The bandgaps are determined by fitting the linear regions of the curves. (b) Bandgaps of the composite CuSCN/CuI as a function of the CuI proportion.

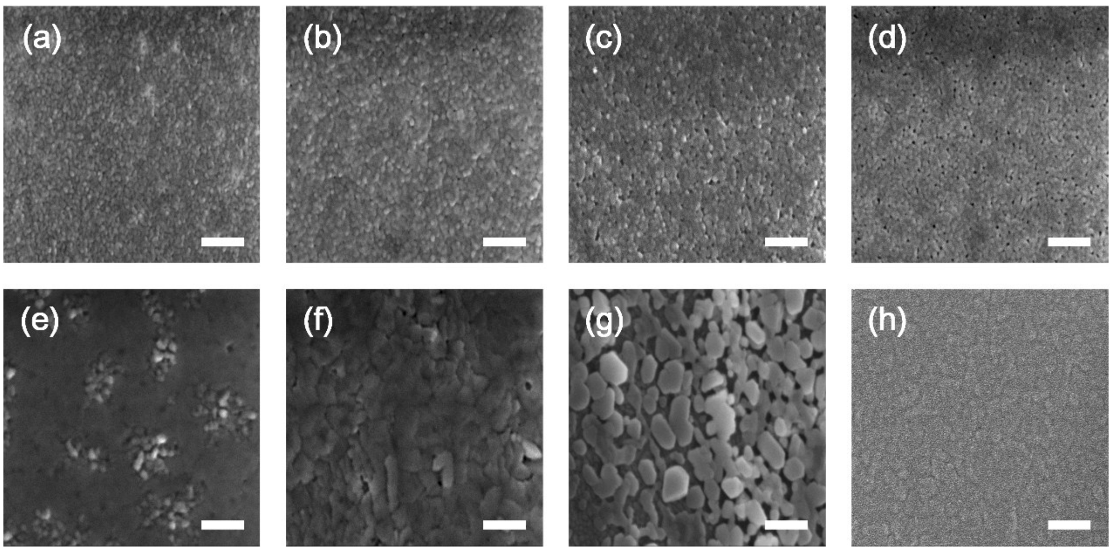

Fig. S2 SEM images of the composite CuSCN/CuI films on ITO glasses with different CuI proportions. (a) 0wt%, (b) 10wt%, (c) 25wt% (d) 50wt%, (e) 75wt% (f) 90wt%, (g) 100wt% and (h) PEDOT:PSS film for comparison. The scale bars are 200 nm.

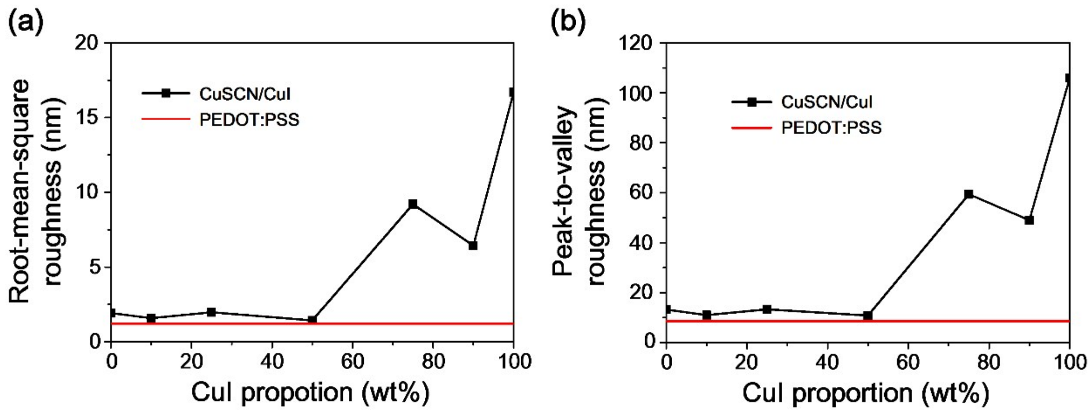

Fig. S3 (a) Root-mean-square roughness and (b) peak-to-valley roughness of the composites films on the ITO glasses.

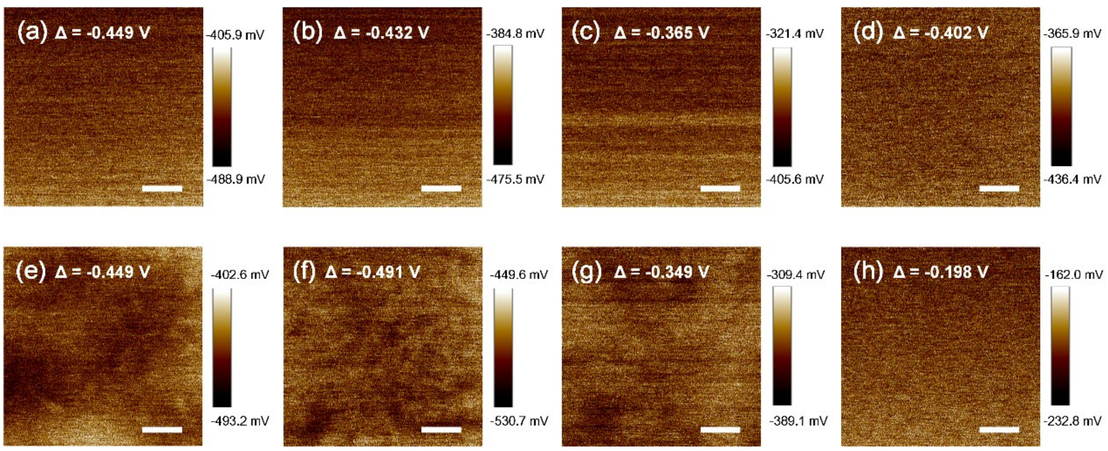

Fig. S4 Kelvin probe force microscopy characterization of CuSCN/CuI composites on ITO with different CuI proportions. (a) 0wt%, (b) 10wt%, (c) 25wt% (d) 50wt%, (e) 75wt% (f) 90wt%, (g) 100wt% and (g) Sputtered golden film for calibrating the work function (WF) of the AFM tip. The potential difference (Δ) between the sample and the tip, which is related to the WF difference between the sample and the tip ($\Delta = (WF_{sample} - WF_{tip}) / e$), is shown. So the WF of the CuSCN/CuI composites is calculated by the equation $WF_{sample} = WF_{tip} + e\Delta$ with calibrated WF_{tip} = 5.398 eV assuming the WF of the gold is 5.20 eV. The scale bars are 400 nm.

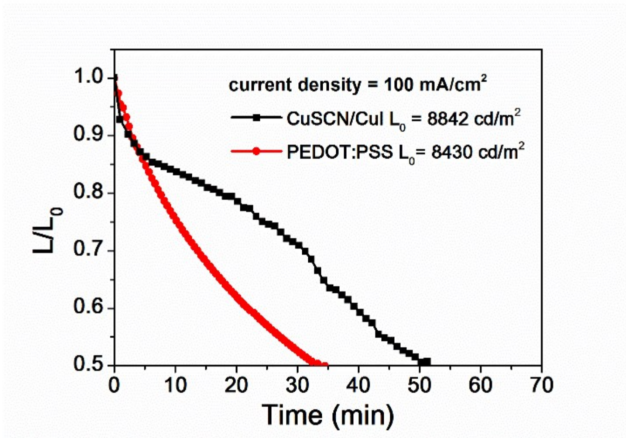

Fig. S5 The curves of normalized luminance as a function of time for devices with optimized CuSCN/CuI composite (CuI 25wt%) and PEDOT:PSS HTLs. The devices work at a constant current density of 100 mA/cm^2. The half-lifetime (T_{50}), which is defined to be the period of time for the initial luminance (denoted as L_0) decreased to half of its value, is 51 min and 35 min for CuSCN/CuI and PEDOT:PSS based devices, respectively.

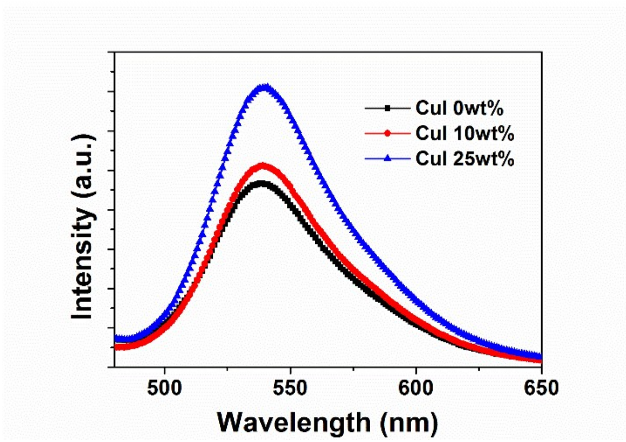

Fig. S6 Photoluminescence (PL) intensities of Supper Yellow (≈ 10 nm) on CuSCN/CuI composites with CuI proportion from 0wt% to 25wt%.