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

Electronic Supplementary Information

Heating-up Synthesis of Cadimum-Free and Color-Tunable Quanternary and Five-Component Cu-In-Zn-S-based Semiconductor Nanocrystals

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Table S1.

Table S1. Summary of the parameters for synthesis of CIZS NCs with different Cu:In:Zn precursor ratios

CIZS NCs	Cu:In:Zn precursor ratios	CIZS Composition	PL peak(nm)	FWHM (nm)
CIZS-1	1:10:20	$Cu_{0.06}In_{0.64}Zn_{1.01}S_2$	520	84
CIZS-2	2:10:20	$Cu_{0.08}In_{0.68}Zn_{0.94}S_2$	584	93
CIZS-4	4:10:20	$Cu_{0.25}In_{0.85}Zn_{0.6}S_2$	654	110

Figure. S1

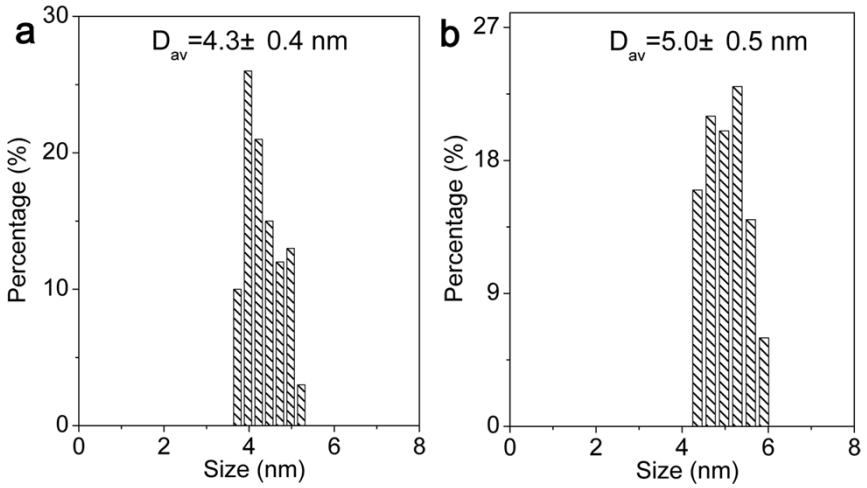

Fig. S1 Size distribution histograms of (a) CIZS-4 and (b) CIZS-4/ZnS

Figure. S2

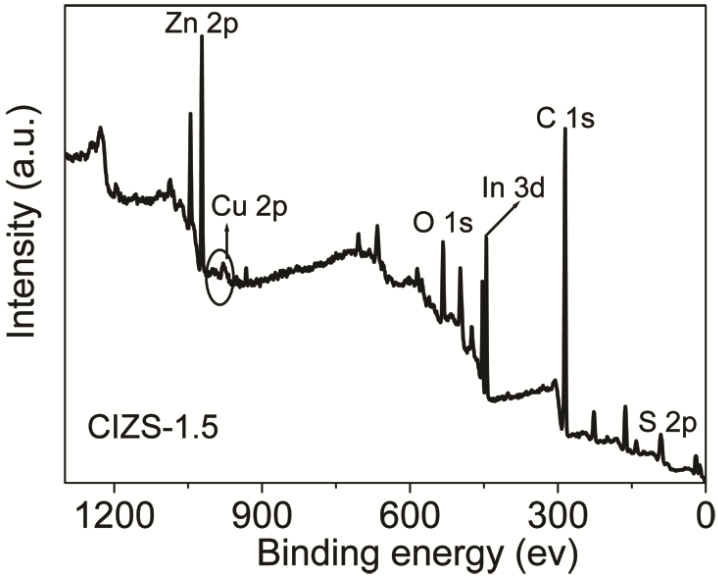

Fig. S2 Survey XPS spectrum of CIZS-1.5 NCs

Figure. S3

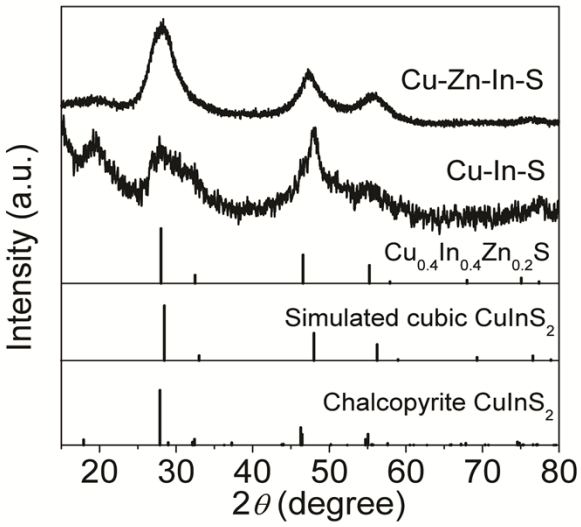

Fig. S3 XRD patterns of the Cu-In-S and Cu-Zn-In-S NCs obtained at 150 °C, and the bottom lines represent the standard diffraction lines of $Cu_{0.4}In_{0.4}Zn_{0.2}S$, simulated cubic $CuInS_2$ and chalcopyrite $CuInS_2$ NCs.

Figure. S4

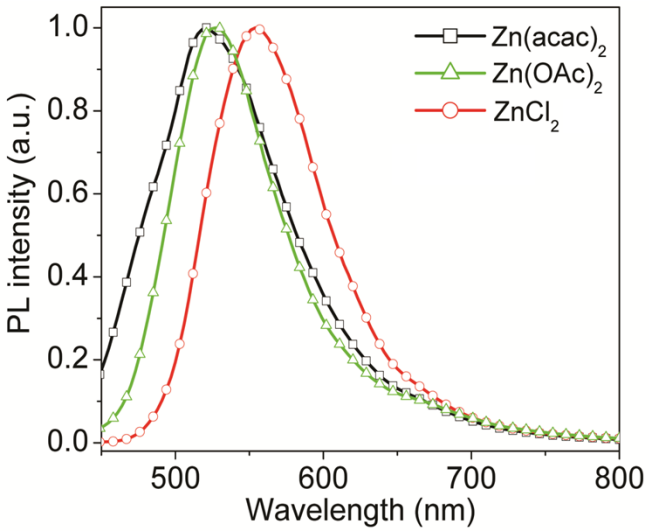

Fig. S4 PL spectra of CZIS NCs synthesized by using different Zn sources, in which the Cu:In:Zn precursor ratio is 1:10:20.

Figure. S5

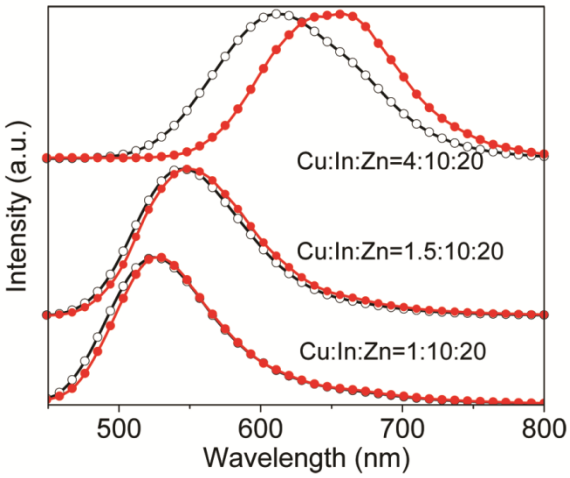

Fig. S5 Comparison between the PL spectra of CIZS (red) and CIZS/ZnS core/shell NCs for different initial Cu:In:Zn ratios.

Figure. S6

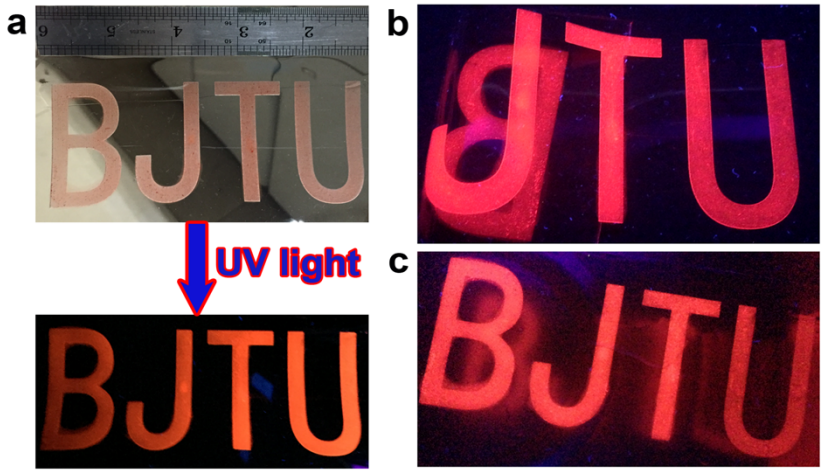

Fig. S6 Digital images of the PDMS membranes based on CZIS-4/ZnS: (a) before and after UV light; (b) flexible demo (after bending); (c) in water.

Figure. S7

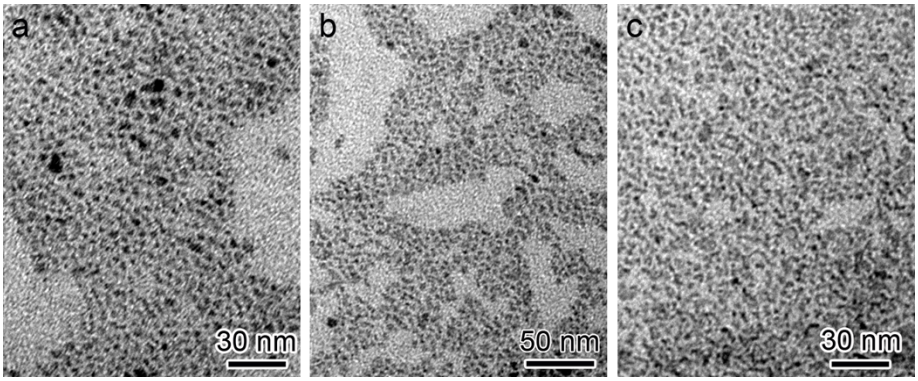

Fig. S7 TEM images of (a) CAZIS; (b) CAZIS/ZnS and (c) CMZIS NCs

Figure. S8

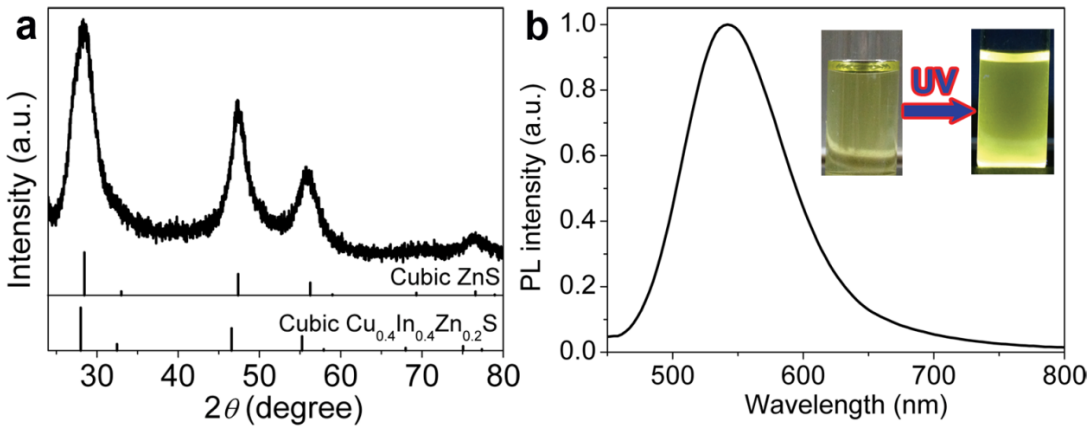

Fig. S8 (a) XRD patterns and (b) PL spectra of the CMZIS nanocrystals, and the inset shows the digital image of the CAZIS/ZnS nanocrystals before and after illumination under UV light.