Supplementary Material (ESI) for Journal of Materials Chemistry

Supplementary Information

Magnetically-induced Synthesis of Highly-Crystalline Ternary Semiconductor Chalcopyrite Nanocrystals via a Magnetic Doping at ambient condition

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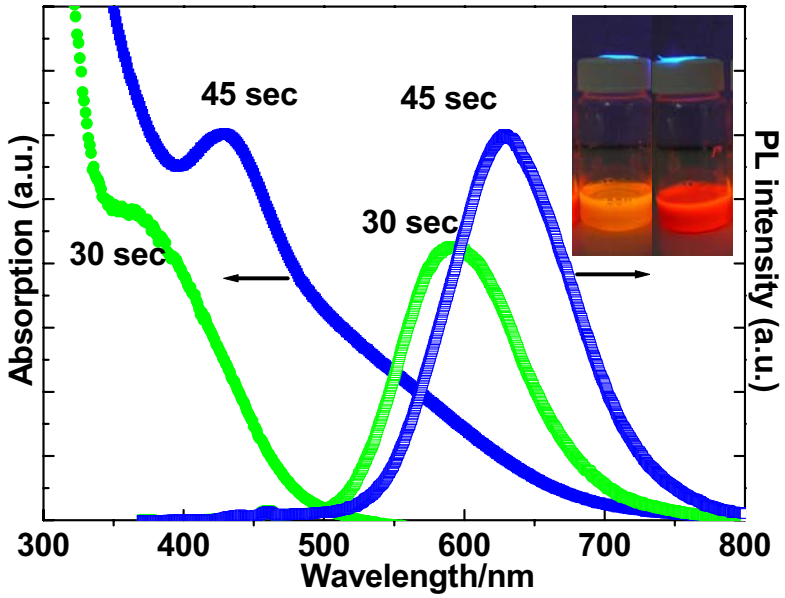


Figure S1 Absorption (left) and photoluminescence (right) spectra of ZCIS colloids obtained by HFMF in 30 and 45 seconds. Inset shows the visual image of these two ZCIS colloids under a 365 nm UV lamp irradiation.

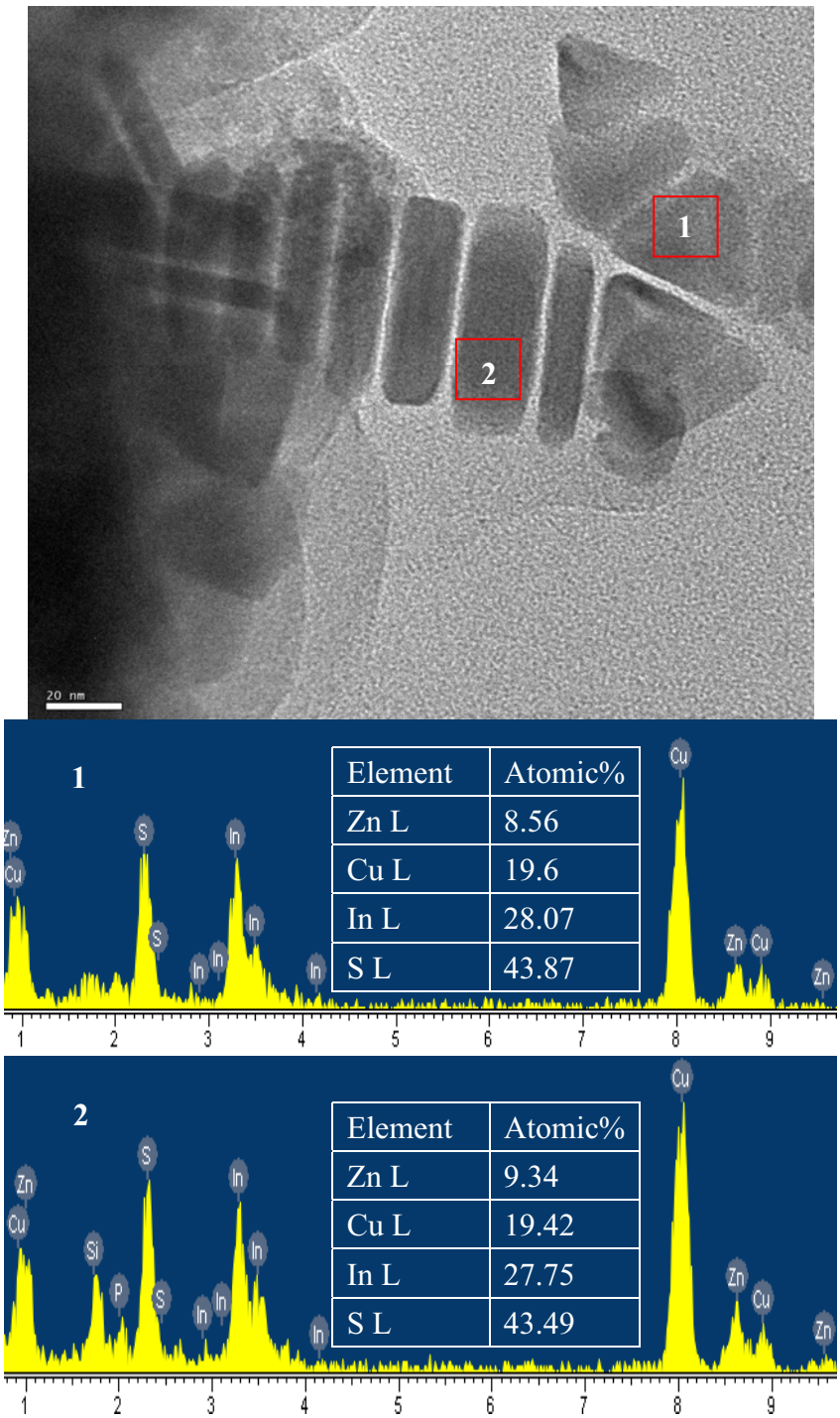


Figure S2 Energy dispersive X-ray spectra (EDX) and corresponding TEM images of nanobar shaped ZCIS nanocrystals. EDX analysis evidences components of ZCIS nanocrystals. Larger pyramidal shape of ZCIS crystals also found under long-term HFMF exposure, which indicated small pyramidal crystals kept growing along three directions and eventually coexisted with nanorod crystals.

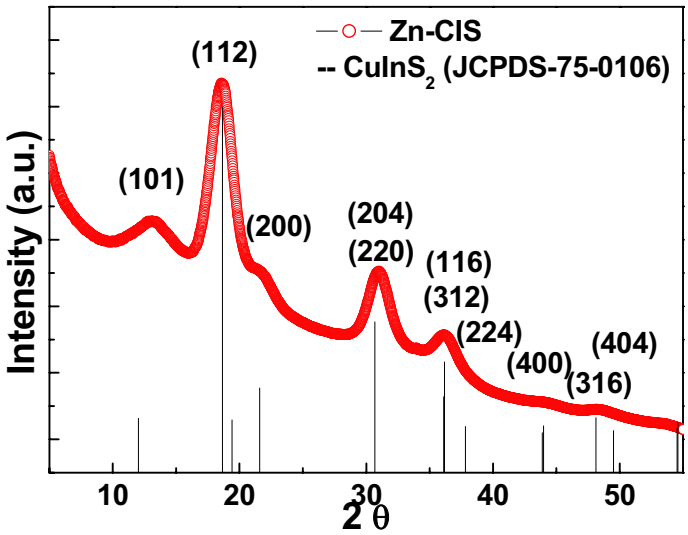


Figure S3 XRD spectrum of Zn-CIS nanobar by using higher-energy XRD, bottom inset is the chalcopyrite structure $CuInS_2$ for comparison.

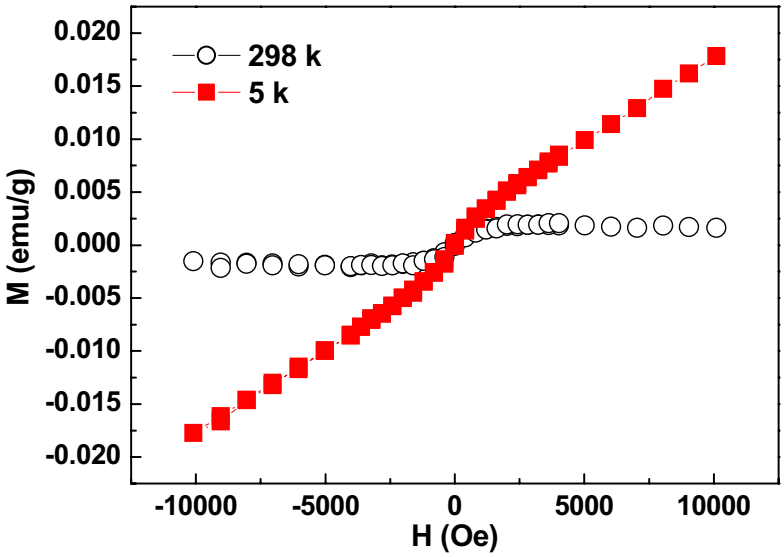
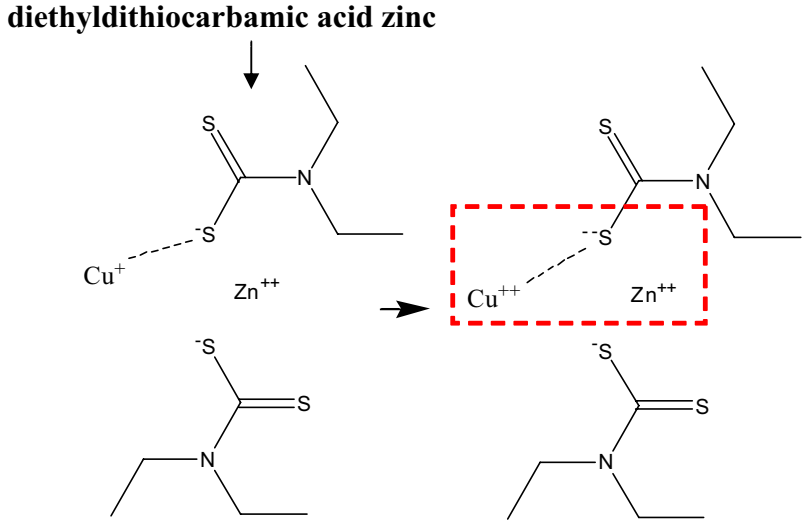


Figure S4 Magnetization curves measured at different temperature for Zn-CIS QDs.



Scheme S1 Mechanism of "first paramagnetic nanocrystal" formation.

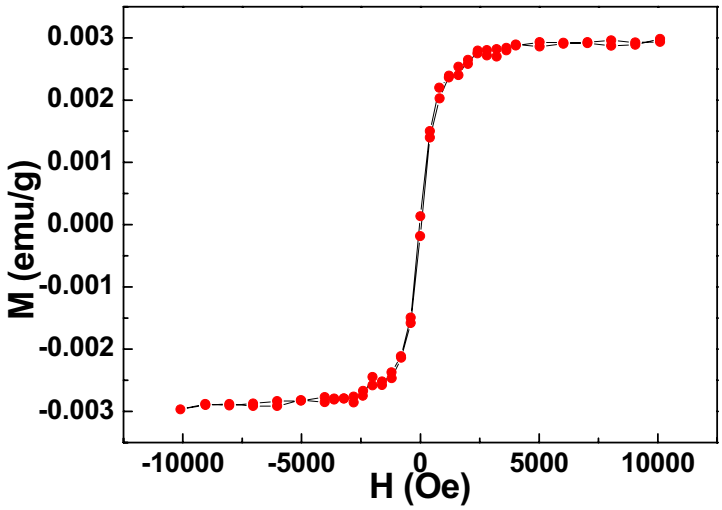


Figure S5 Magnetization curve of precipitation from Zn and Cu precursors.

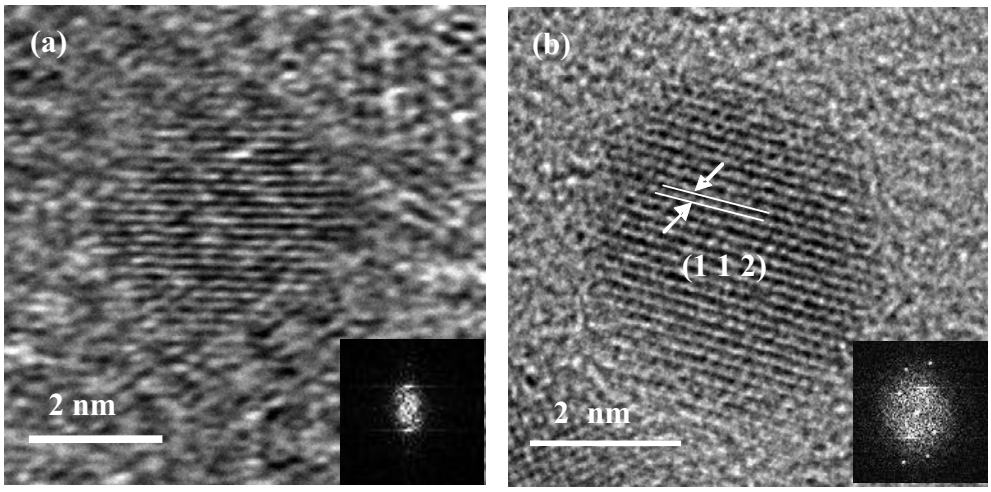


Figure S6 HR-TEM images of ZCIS nanocrystals synthesized through high-temperature organic solvent method (a) and HFMF (b). This comparison indicated that crystallinity of ZCIS nanoparticles was enhanced by HFMF.

Time (min)	1	2	3	4	5	7
Temperature(^{o}C)	65	72	92	138	140	155

Table 1 Duration time of precursor under high frequency magnetic field and the measured temperature of Zn-CIS precursor.

Shape	Particle (30sec)	Particle (45sec)	Cube/Pyramid	Bar
Zeta potential (mV)	7.25	14.3	9.36	9.74

Table 2 Zeta potential values of different shape Zn-CIS nanocrystals. Particles are the sample obtained under HFMF duration for 30 and 45 seconds which show emission peaks at 590 and 630 nm.