Electronic Supplementary Information

Rapid microwave assisted synthesis of nearly monodisperse aqueous $CuInS_2/ZnS$ nanocrystals

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Materials:

The following chemicals were purchased and used as received without further purification. Indium(III) chloride ($InCl_3$) 98%, copper (I) acetate ($Cu(Ac)_2$) 98%, thioglycolic acid (TGA) 98%, sodium sulfide (Na_2S) 98%, zinc acetate ($Zn(Ac)_2$) 99%, were all purchased from Sigma-Aldrich. TiO_2 P25 nanoparticles was supplied by EVONIK (Degussa) Industries. 1.5 cm × 1.5 cm ITO coated glass electrodes were supplied by Prazisions Glass & Optik GmbH.

TiO_2 Paste formation:

2 mL of DI water and 50 μL of acetic acid was taken in a mortal and pestle. To this 2g of TiO2 particles (P25, Degussa) was added and crushed to form a smooth paste. Following this 50 μL of triton x-100 was added as a surfactant to prevent any aggregation of particles suspended in the paste.

Instrumentation:

Photoluminescence spectroscopy and quantum yield measurements were carried out on an Edinburgh Instruments Fluorometer FLS980. XPS measurements were undertaken using monochromatised Al Kα X-rays (300 W) in a Kratos Axis-Ultra spectrometer (10 eV analyzer pass energy). The analysis spot size was ~300 × 700 μm. UV-Visible spectroscopy measurements were carried out on an Agilent Cary 300 spectrometer. Transmission electron microscopy was carried out on a JEOL JEM-2100F with an acceleration voltage of 200 kV. Dynamic Light Scattering (DLS) measurement was carried out at 25 °C by using a Zetasizer-Nano instrument from Malvern, UK. X-ray diffraction was carried out using a Scintag ARL X'tra diffractometer and Cu Kα radiation.

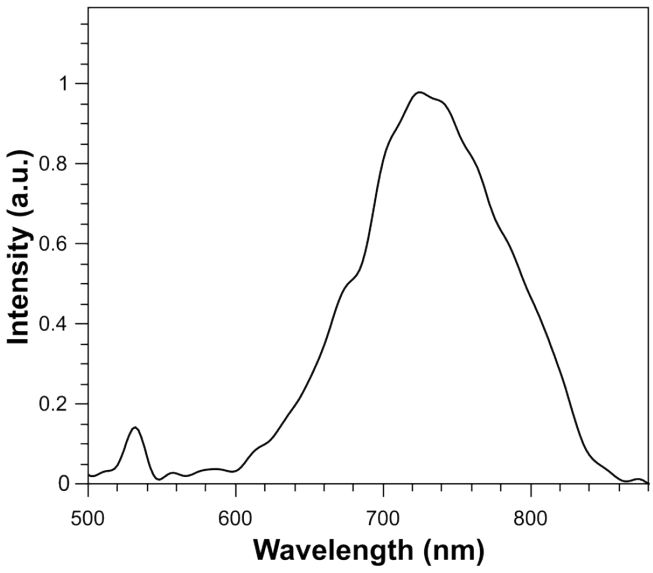

Fig. S1. Emission spectra of $CuInS_2$-Core

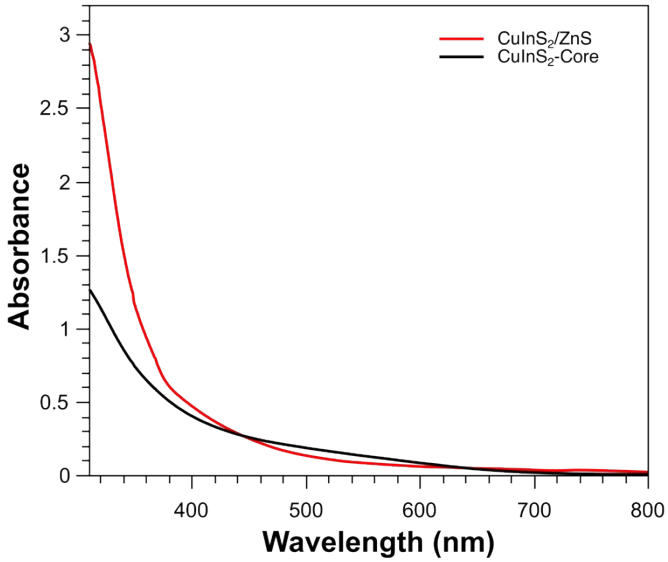

Fig. S2. Absorption spectra of $CuInS_2$-Core (black) and $CuInS_2$/ZnS NCs (red)

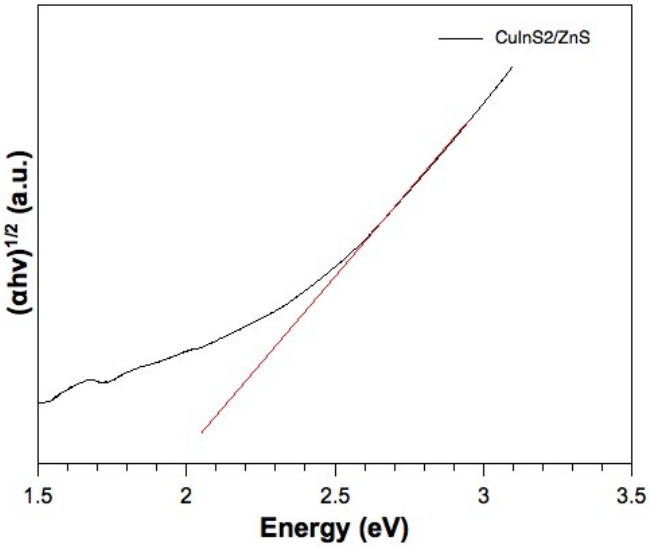

Fig. S3. Tauc plot for band gap estimation of $CuInS_2$/ZnS NCs

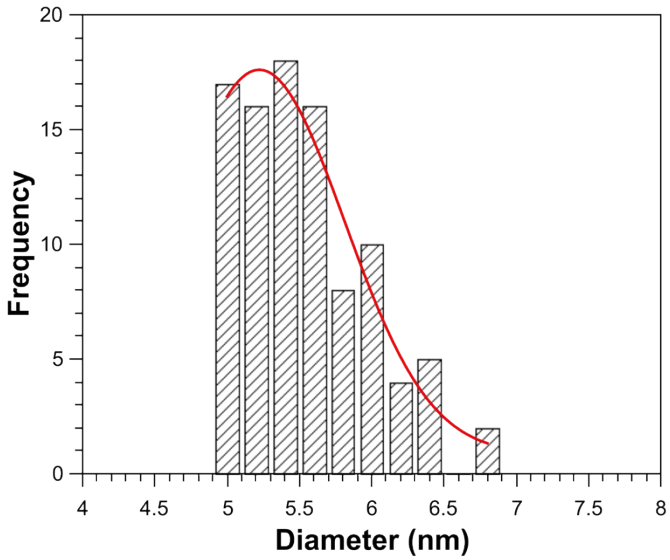

Fig. S4. Particle size distribution histogram of $CuInS_2$/ZnS NCs obtained from TEM micrographs.

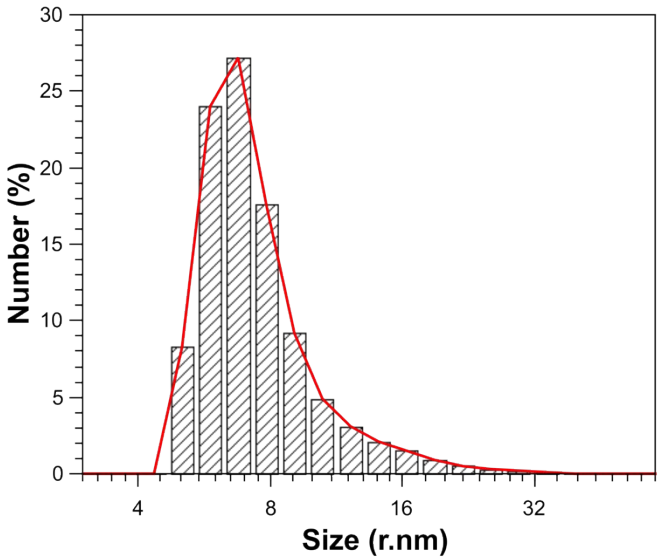

Fig. S5. DLS in r.nm for $CuInS_2$/ZnS NCs

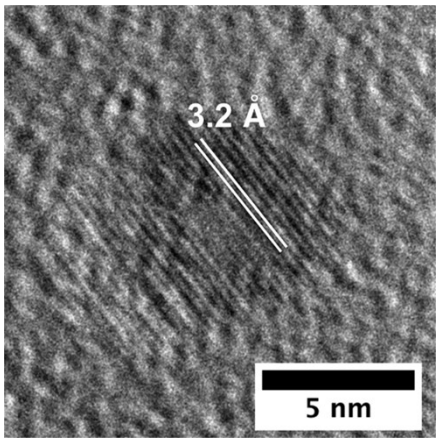

Fig S6. 5 nm $CuInS_2$/ZnS NC showing the lattice fringes