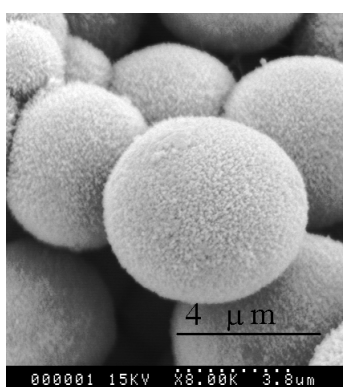


# Supporting Information

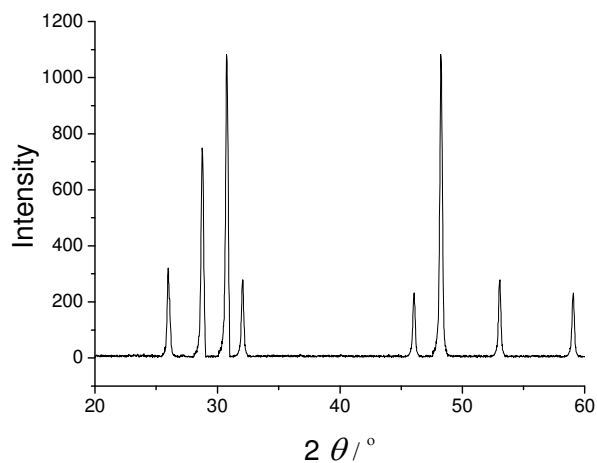
## 1 . Synthesis of CuO colloids

5 mL of 0.001 mol/L sodium dodecylbenzene sulfonate (DBS) solution was added into 20 mL of 0.2 mol/L cupric nitrate solution, and then 20 mL of 0.2 mol/L sodium carbonate solution was added into the mixture. The reaction mixture was stirred with a SWF-23 magnetic stirrer (Shanghai Experimental Apparatus, China) at 25 °C for 3 min. Then the reaction mixture was left undisturbed at 25 °C for 30 h. After reaction, the mixture was centrifuged; the precipitates were washed with water and ethanol for three times respectively, dried in vacuum at 50 °C for 2 h and then calcined at 280 °C for 2 h.

Figure S1 is the SEM image of the as-prepared CuO colloids. Figure S2 is the XRD pattern of the synthesized CuO colloids collected by a Rigaku D/MAX-3C X-ray diffraction meter. All peaks can be well indexed to the monoclinic lattice of CuO (JCPDS No. 80-1268).

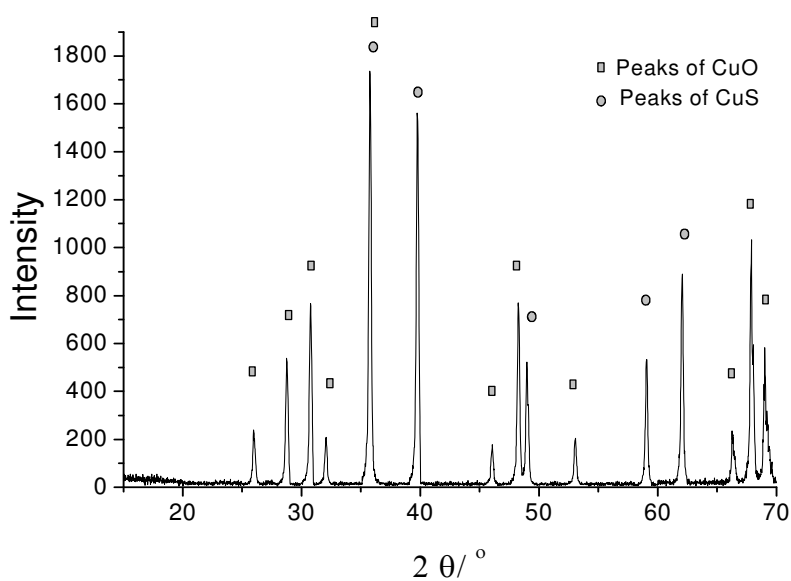


**Figure S1.** SEM image of CuO colloids



**Figure S2.** XRD pattern of the CuO colloids.

**2. XRD patterns showed that the CuO/CuS colloids consisted of monoclinic CuO and hexagonal CuS (Figure S3)**

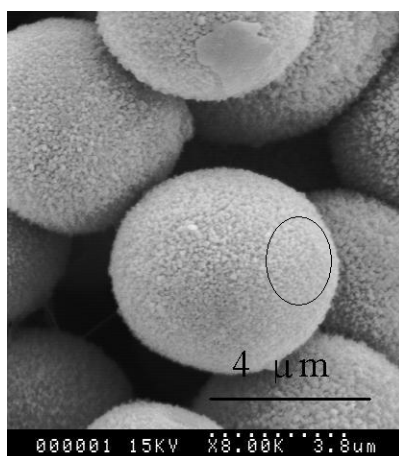


**Figure S3.** XRD patterns of the Janus CuO/CuS colloids collected by a Rigaku D/MAX-3C X-ray diffraction meter.

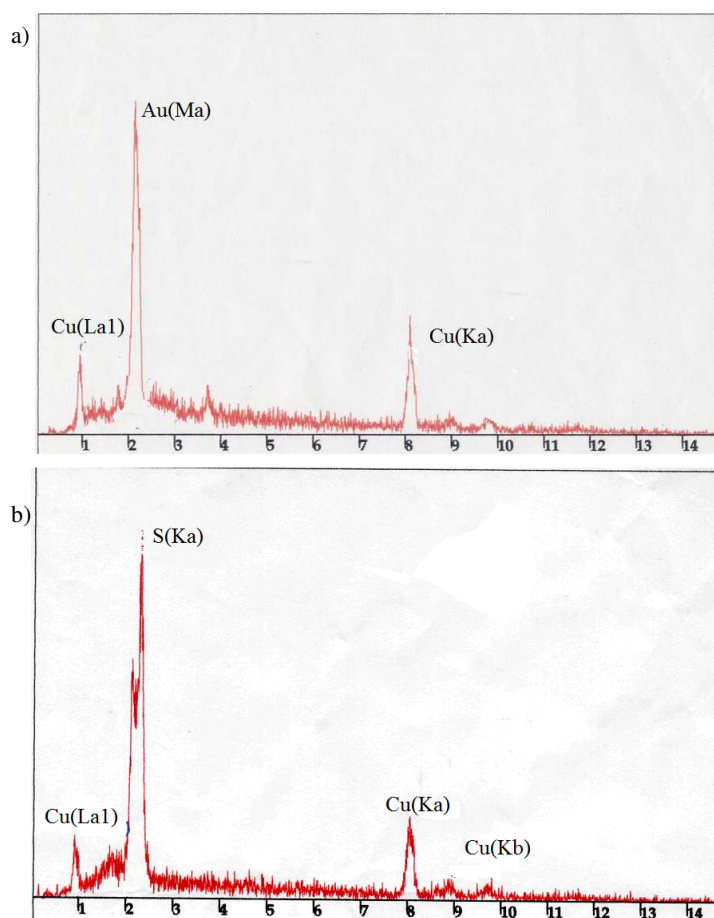
### 3. Energy dispersion spectrum (EDS) analysis

EDS traces of the Janus CuO/CuS colloids (Figure S4) were collected by a Hitachi S-2700 scanning electron microscope equipped with an EDS unit. There is no

signal of sulfur inside the circular region at the surfaces of the CuO/CuS colloids (Figure S5a), while there is a signal of sulfur out of the circular region (Figure S5b).

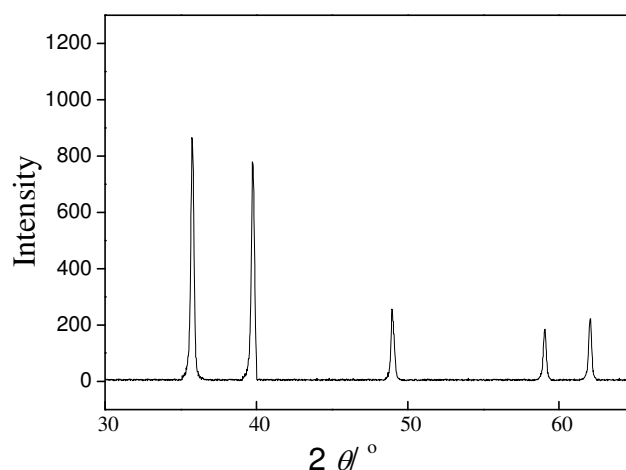


**Figure S4.** SEM images of the Janus CuO/CuS Colloids. There is no signal of sulphur inside the circular region (see Figure S5).



**Figure S5.** Typical EDS traces collected a) inside the circular region and b) out of the circular region.

**4. XRD patterns confirmed the ringent shells were made up of hexagonal CuS (Figure S6).**



**Figure S6.** XRD patterns of the ringent CuS shells (collected by a Rigaku D/MAX-3C X-ray diffraction meter). All peaks can be well indexed to the hexagonal lattice of CuS (JCPDS No. 06-0464).

#### **5. Measurement of the wettability of CuS and CuO colloids.**

The exact contact angles of CuS and CuO colloids against water were not obtained, because it is difficult to get satisfied compressed tablets of the samples.

The relative wettability of CuS and CuO was investigated by a *permeation rate test* (China National Standards GB/T 16913.8-1997). CuO (or CuS colloids) were put into a tube with an inner diameter of 4 mm (see Figure S7). The whole height of the colloid pillar is 30 mm. The upper side of the colloid pillar was covered by a layer of anhydrous cupric sulphate. To prevent the leakage of the colloids, the lower side of the tube was plugged by absorbent cotton. Then the lower side of the tube was immersed in water. When water reached the upper side of the colloid pillar, the color

of the cupric sulphate would become from white to blue.

The time for water to permeate through CuO and CuS pillars at 25 °C was 17.9 min and 32.8 min, respectively. This confirmed that the CuS colloids were more hydrophobic than CuO colloids.

The time for a thioacetamide solution (0.02 g thioacetamide was dissolved in 10 mL of water) to permeate through the CuS pillar at 25 °C was 33.2 min. This confirmed that the adsorption of thioacetamide had slight effect on the wettability of the CuS colloids.

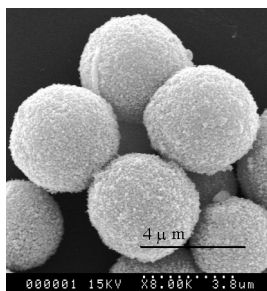


**Figure S7.** Tubes for testing the relative wettability of CuO colloids.

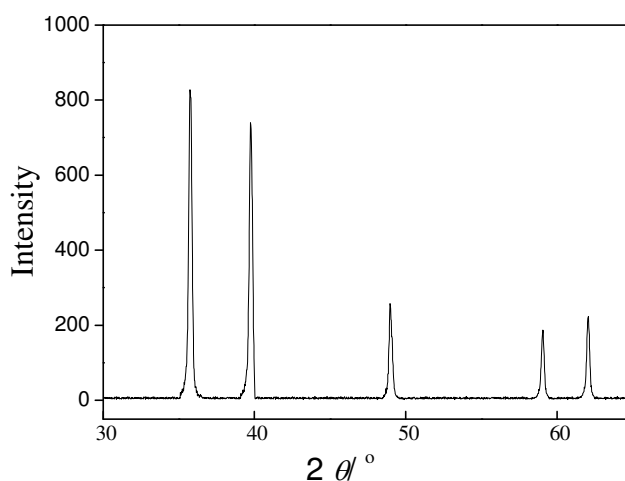
7. (i) 0.048 g of the resultant Janus CuO/CuS colloids (prepared using toluene as oil phase) were redispersed in 10 mL of water, and 2 mL of toluene was mixed with the dispersion. A stable toluene-in-water emulsion was formed by sonication. (ii) A quantity of 0.01 g of thioacetamide was dissolved in 5 mL of water, and this solution was dripped into the emulsion at a rate of 0.5 mL/h. After reaction for 10 h, the

emulsion was destabilized by adding alcohol. The mixture was filtrated. The residues were washed with water and alcohol for 3 times, respectively. The obtained colloids were dried at room temperature under vacuum. (iii) The colloids were immersed in 0.01mol/L hydrochloric acid under agitation for 2 h to make CuO completely dissolved. Finally intact spherical CuS colloids were obtained (see Figure S8).

XRD patterns confirmed the intact spherical colloids were made up of hexagonal CuS (Figure S9).



**Figure S8.** SEM images of the intact spherical CuS colloids.



**Figure S9.** XRD patterns of the intact spherical CuS colloids (collected by a Rigaku D/MAX-3C X-ray diffraction meter) .