Supporting Information

Microwave-Assisted Hydrothermal Synthesis of Cu/Cu_2O Hollow Spheres with Enhanced Photocatalytic and Gas Sensing Activities at Room Temperature

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Measurement of adsorption activity

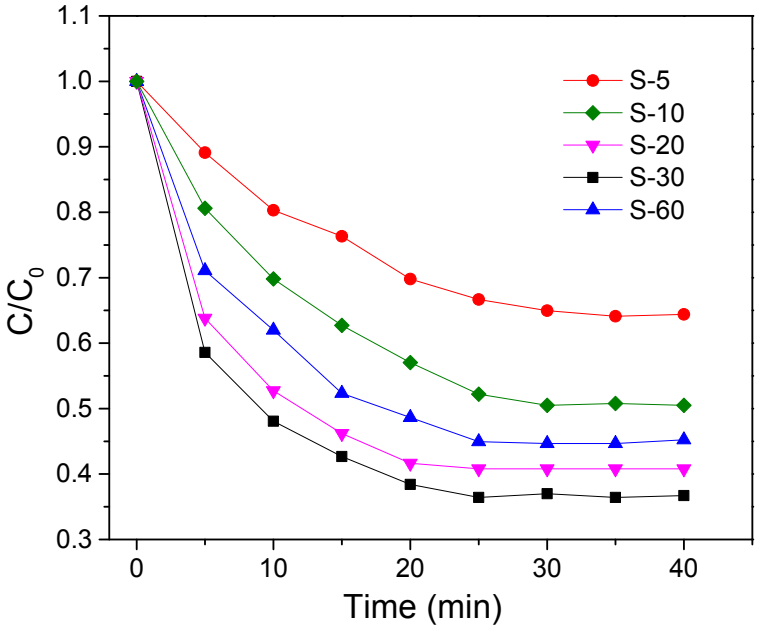

Figure S1 Adsorption ratios of different products to MO under dark.

Measurement of electrochemical impedance spectroscopy (EIS)

The electrochemical impedance spectroscopy (EIS) measurements were performed with an electrochemical workstation (CHI660e, Chenhua, Shanghai, China) in a frequency range from 10 mHz to 100 kHz and an AC amplitude of 5 mV at room temperature under visible light irradiation. Typically, 5 mg of as-prepared Cu-Cu_2O hollow spheres composite was added to 2 mL of ethanol and then grinded for 15 min. Afterward, the viscous paste was bound onto the ITO glass via doctor-blading method, which formed the Cu-Cu_2O/ITO glass working electrode and then dried at 70 °C in air for 6 h. A Pt sheet and Ag/AgCl electrode were used as counter electrode and reference electrode, respectively. Na_2SO_4 (0.01 M) aqueous solution was employed as electrolyte.

Measurement of hydroxyl radicals

Hydroxyl radical $^{\cdot}OH$ can be detected by a photoluminescence (PL) method using terephthalic acid (TA) as a probe molecule. The test procedure is similar to the photocatalytic degradation measurement, except that the aqueous MO solution is replaced with 0.4 mM TA and 2 mM NaOH. TA readily reacts with the generated $^{\cdot}OH$ to produce a highly fluorescent 2-hydroxy-TA (TA-$^{\cdot}OH$), which is measured by a fluorescence spectrophotometer (Hitachi F-4600, Japan) at 425 nm emission wavelength and 315 nm excitation wavelength. Fig. S2 shows fluorescence emission spectra for the different products at same irradiation time of 30 min.

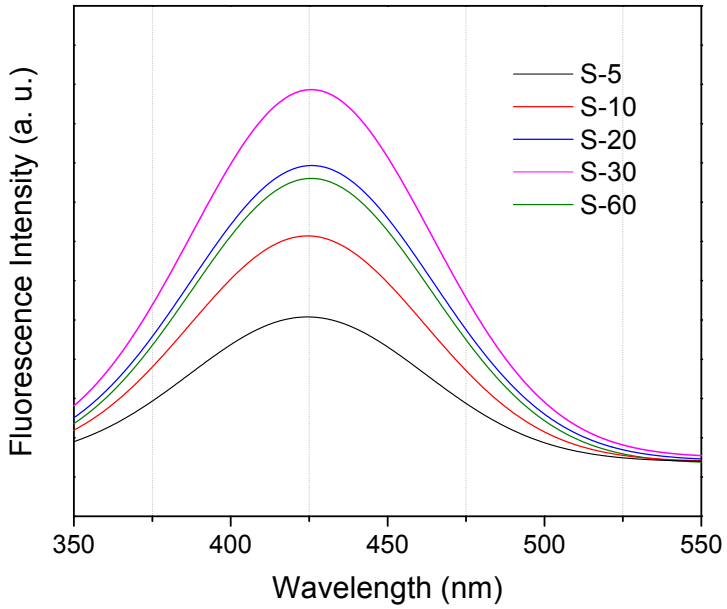

Fig. S2 Fluorescence emission spectra in the presence of different products at same irradiation time of 30 min