

Supplementary material

An efficient strategy for the fabrication of CuS as a highly excellent and recyclable photocatalyst for the degradation of organic dyes

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Experimental section:

Preparation of 3D hierarchical CuS catalysts

Note: During the experiment, we explored the optimal conditions by changing the molar ratio of sulfur to copper foam, the heating sulfuration temperature. In the process of heating sulfuration, copper foam is more effectively contacted with S to realize a one-step reaction.

Synthesis of bulk CuS

Bulk CuS was synthesized according to the literature [1]. In a typical synthesis, 40 mmol of sodium hydroxide, 8 mmol ascorbic acid, 4 mmol copper(II) nitrate trihydrate ($\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$) were dissolved in 50 mL of ethylene glycol. The solution was heated and maintained stirring for 20 min at 175°C. Then, a given amount of thiourea was quickly injected and the mixture was transferred into a Teflon-lined stainless steel autoclave and maintained at 160 °C for 24 h. Finally, the resulting black precipitate was collected by centrifugation and washed with ethanol and deionized water several times.

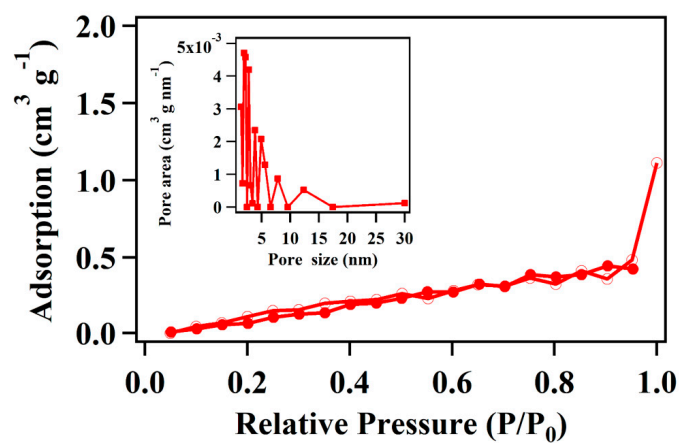


Figure S1. N_2 adsorption-desorption isotherm and pore size (inset) of the as-prepared CuS.

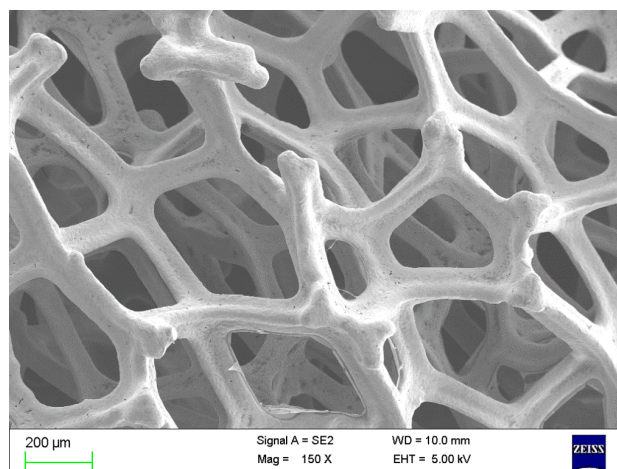


Figure S2. SEM image of the copper foam.

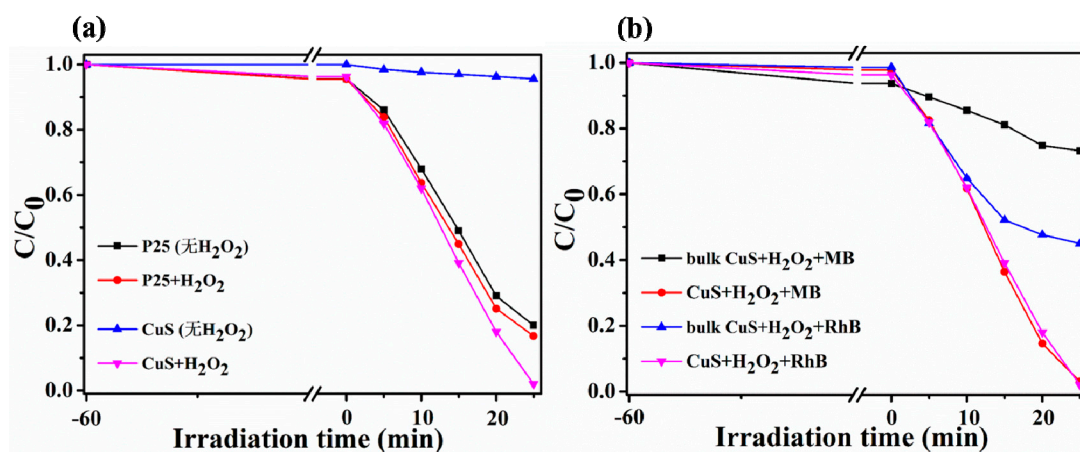


Figure S3. (a) Control experiments for the degradation of RhB under different conditions; (b) Control experiments for the degradation of MB and RhB under different conditions.

Table S1. Removal rate of TOC with the as-prepared CuS.

Dye solutions	TOC removal (%)
RhB	63.87
MB	70.32

Reference

1. Heydari, H.; Moosavifard, S. E.; Elyasi, S.; Shahraki, M. Nanoporous CuS nano-hollow spheres as advanced material for high-performance supercapacitors. *Appl. Surf. Sci.* 2017, 394, 425–430.