Electronic Supplementary Information

A novel 1D/2D core/shell CdS@SnS_2 heterostructure for efficient piezocatalytic hydrogen evolution and pollutant degradation

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Supplementary Figures

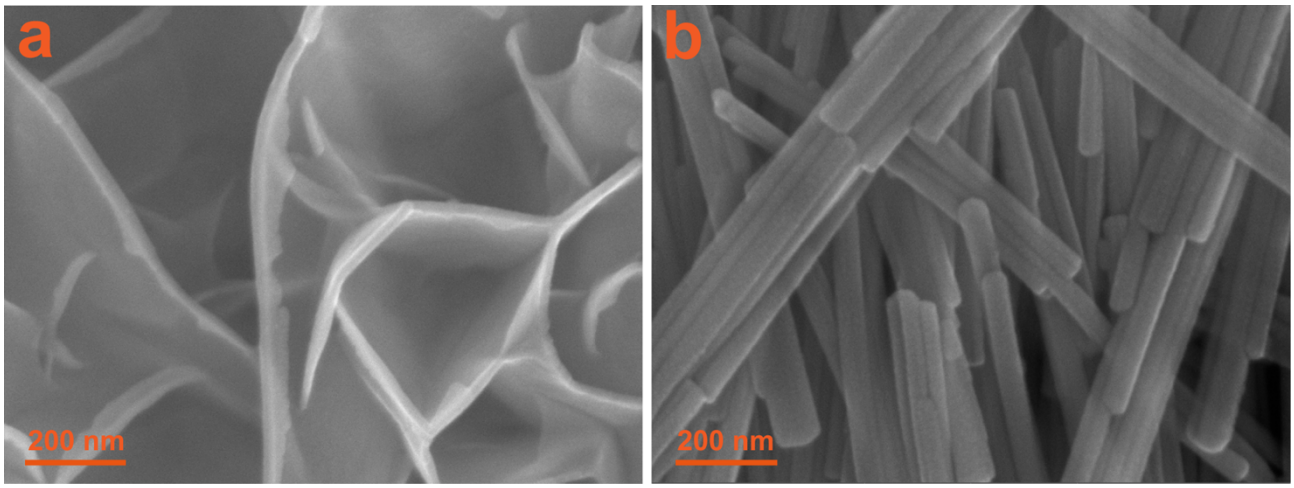

Fig. S1 High-magnification SEM images of the prepared (a) SnS_2 and (b) CdS samples.

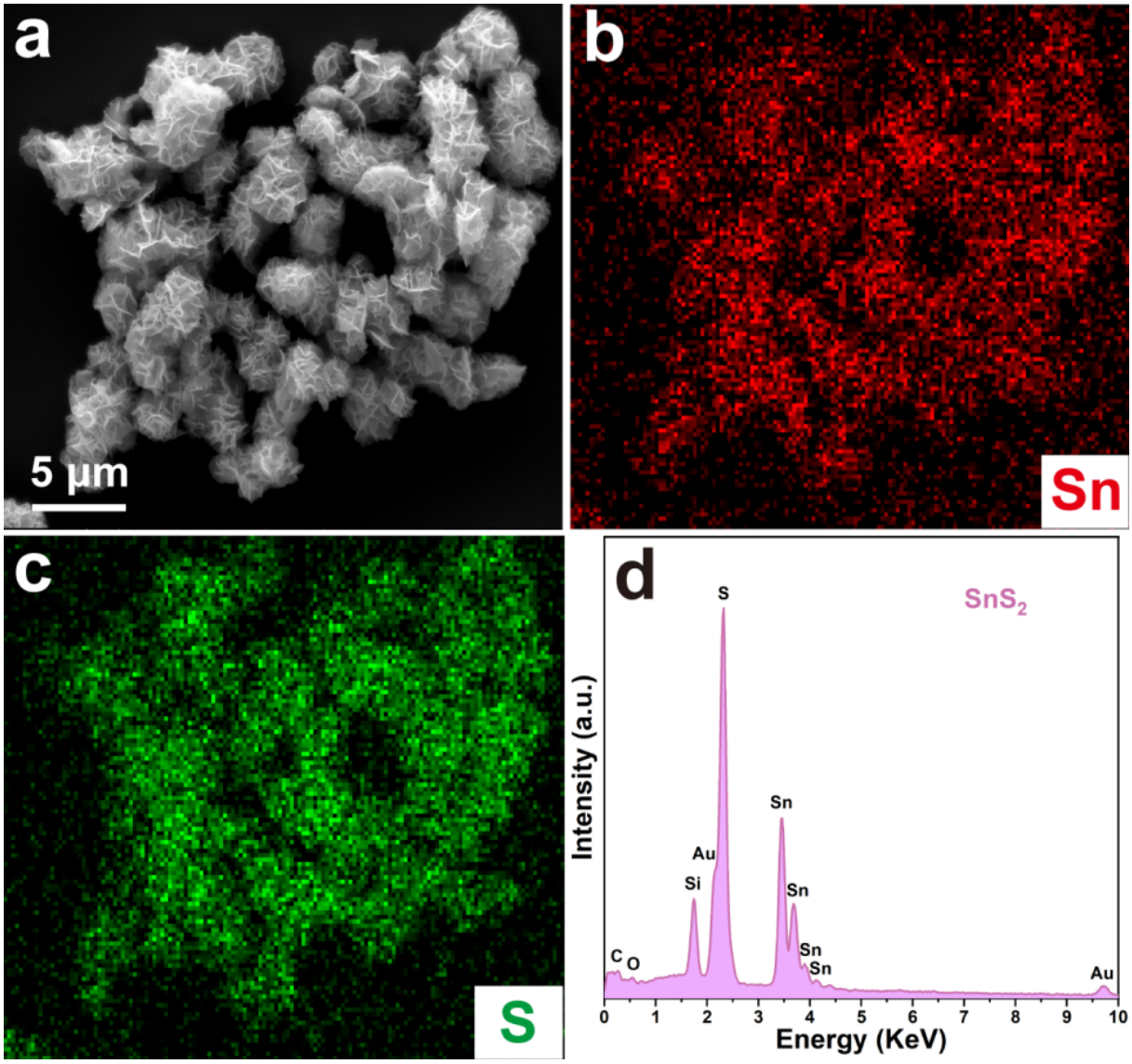

Fig. S2 (a-c) EDS elemental mapping images and (d) EDS spectrum of the prepared SnS_2 sample.

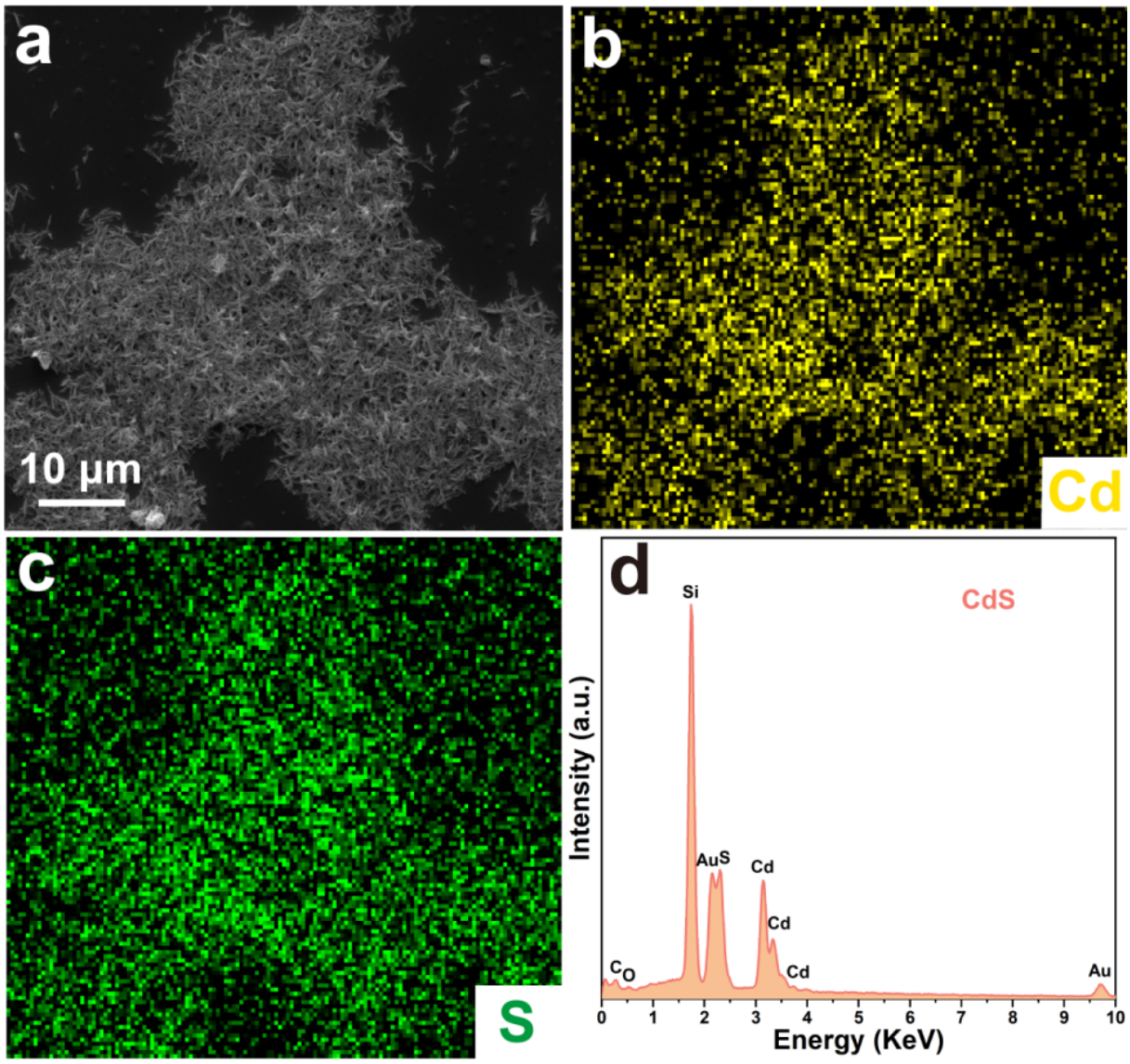

Fig. S3 (a-c) EDS elemental mapping images and (d) EDS spectrum of the prepared CdS sample.

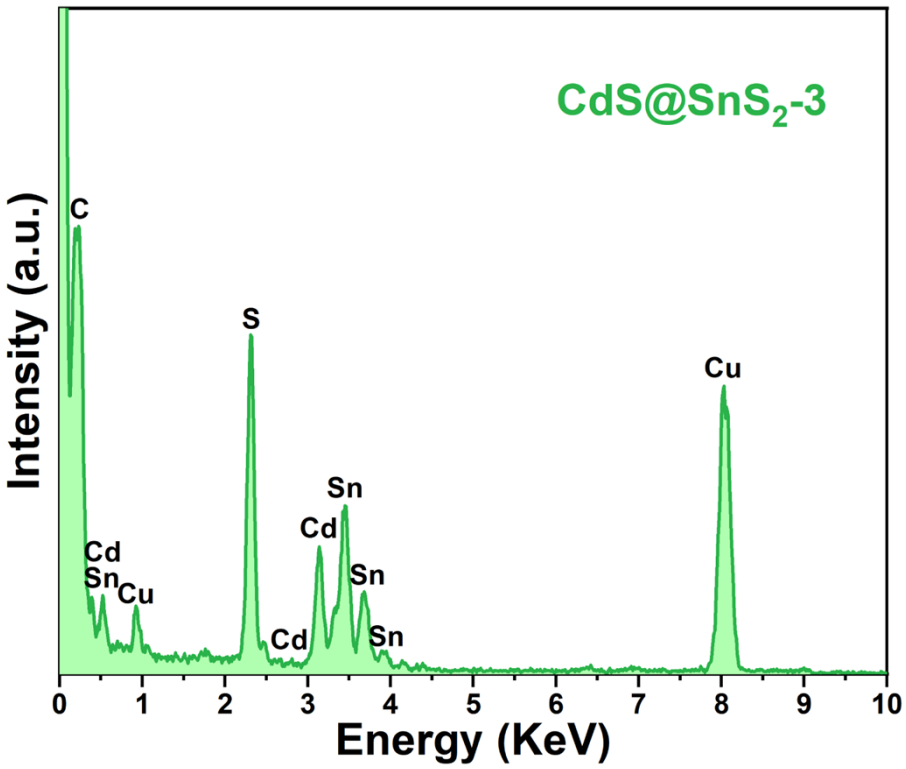

Fig. S4 EDS spectrum of the prepared CdS@SnS_2-3 composite sample.

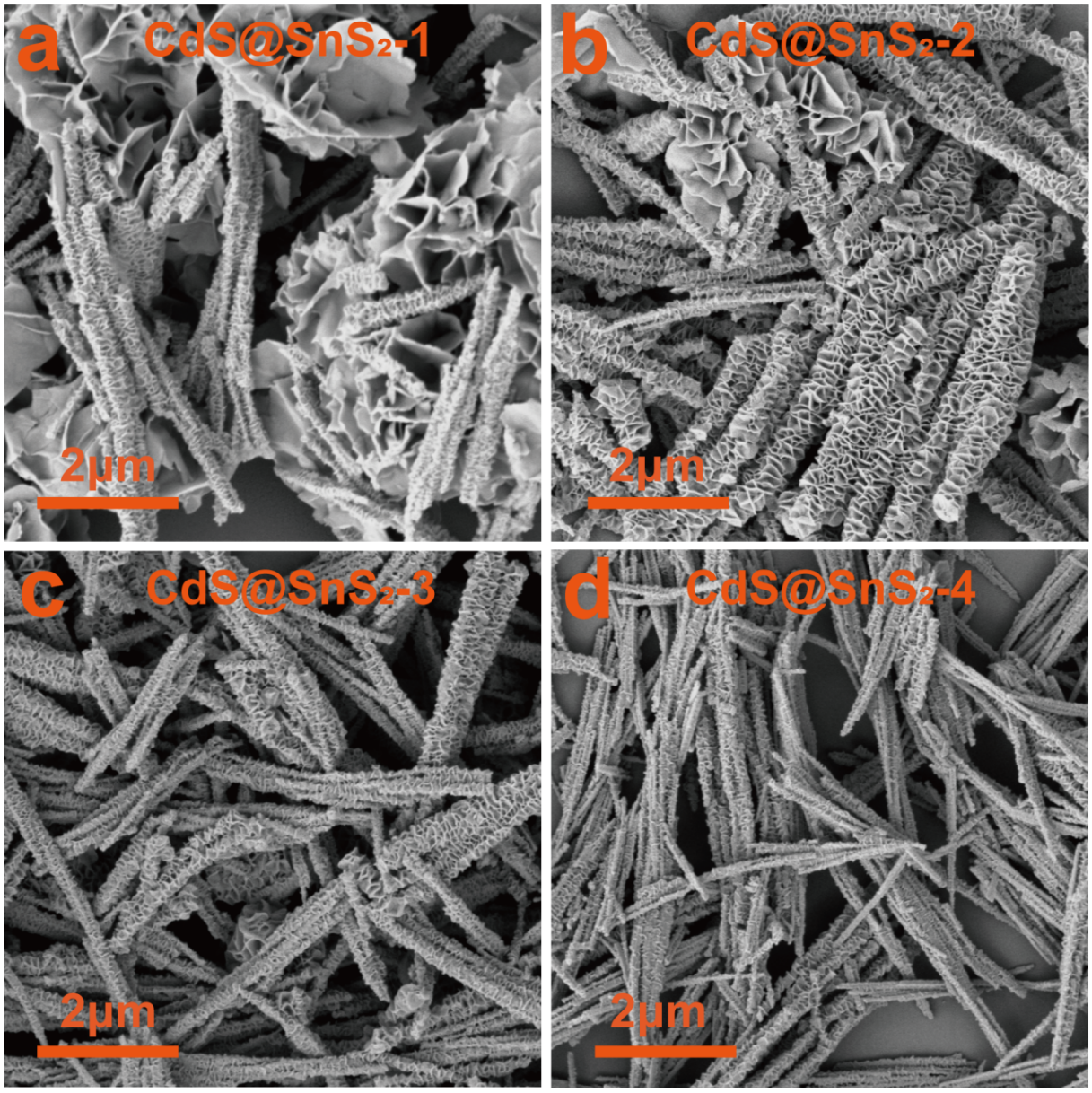

Fig. S5 SEM images of the as-synthesized samples with different molar ratio of SnS_2 to CdS for (a) CdS@SnS_2-1, (b) CdS@SnS_2-2, (c) CdS@SnS_2-3, and (d) CdS@SnS_2-4.

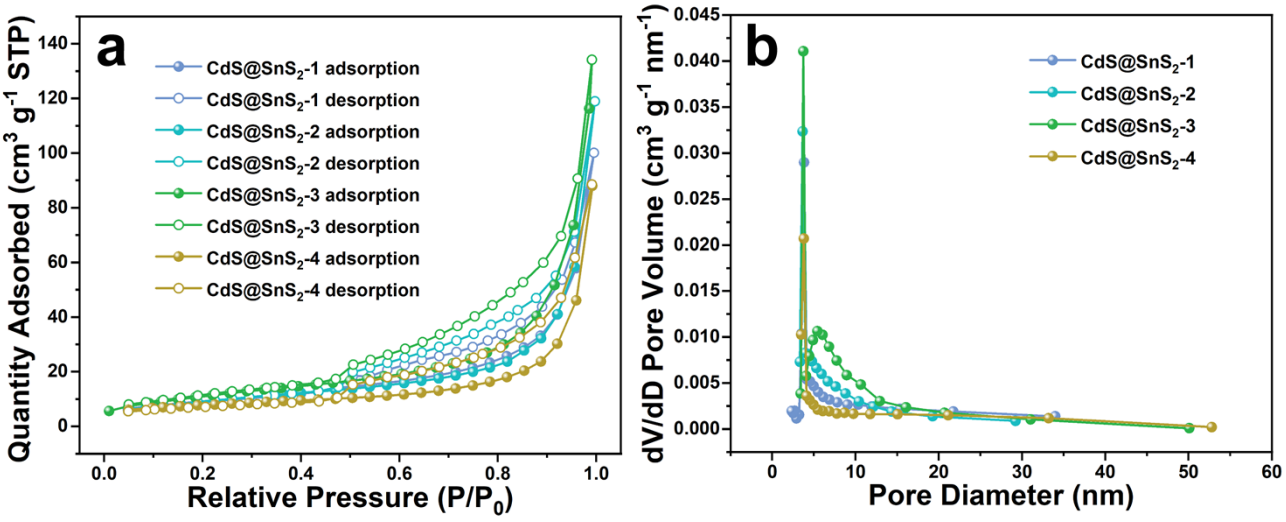

Fig. S6 (a) N_2 adsorption-desorption isotherms and (b) the corresponding pore size distribution curves of the prepared CdS@SnS_2-*x* composite samples.

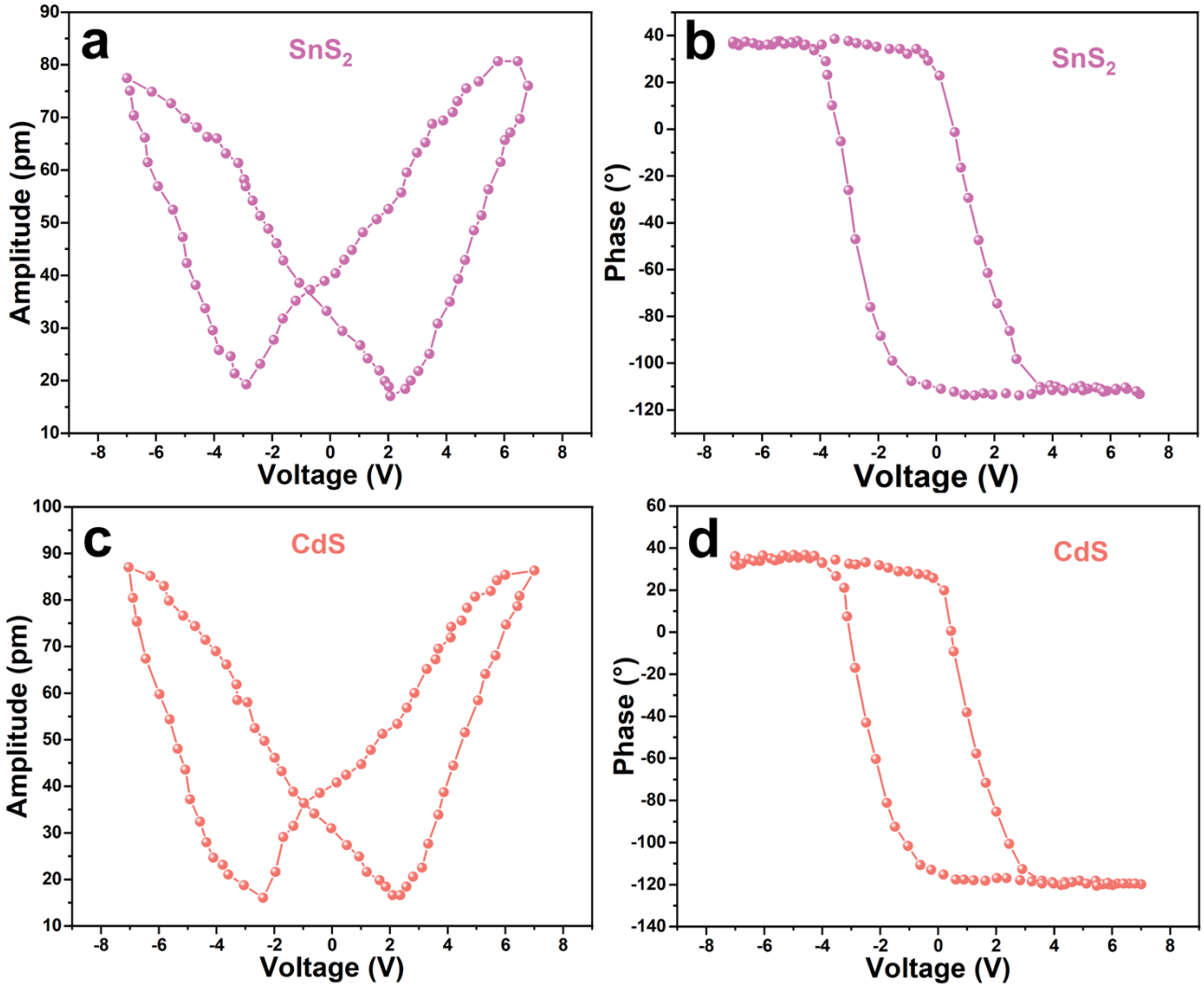

Fig. S7 (a) Displacement-voltage curve and (b) phase curve of the SnS_2 composite sample. (c) Displacement-voltage curve and (d) phase curve of the CdS composite sample.

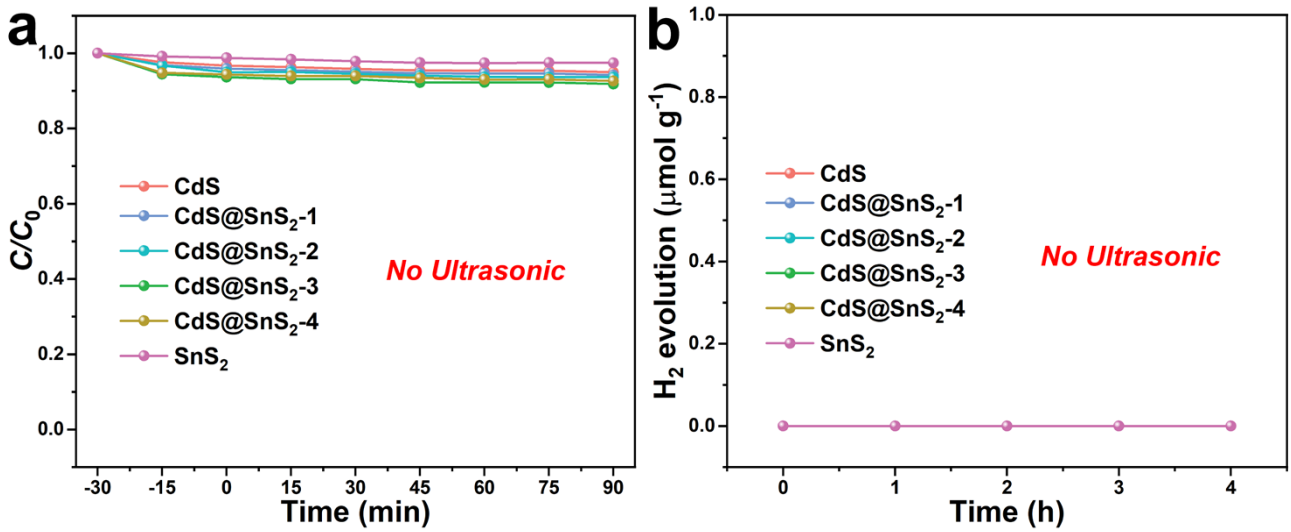

Fig. S8 (a) Time-dependent piezocatalytic RhB degradation and (b) time-dependent piezocatalytic H_2 evolution without ultrasonic vibration over the as-prepared piezocatalysts.

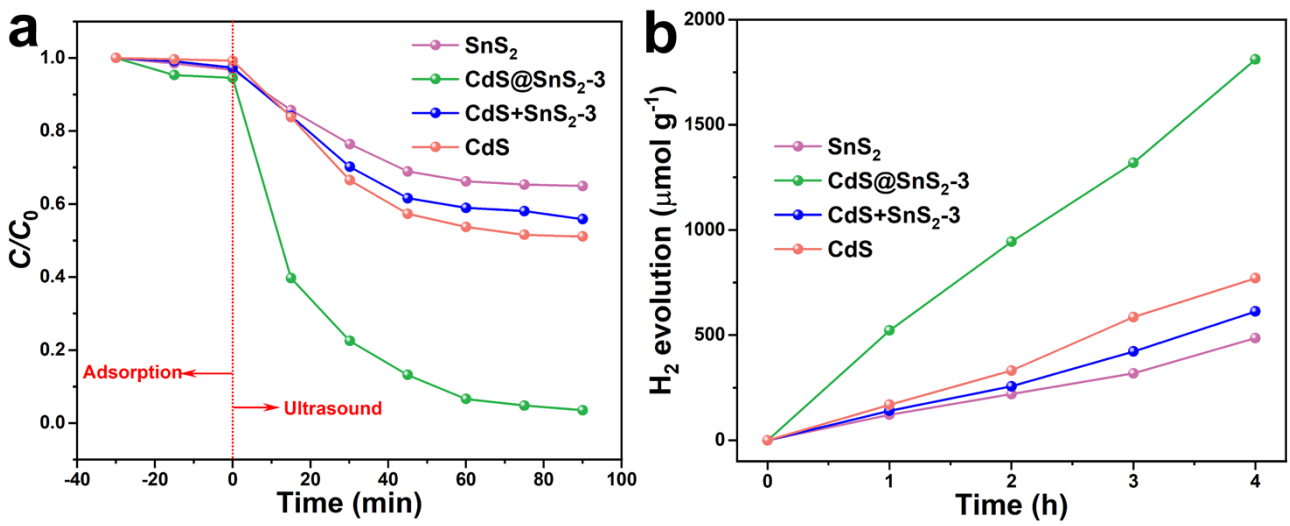

Fig. S9 (a) Time-dependent piezocatalytic RhB degradation and (b) time-dependent piezocatalytic H_2 evolution under ultrasonic vibration over the prepared CdS, SnS_2 and CdS@SnS_2-3 samples, as well as the CdS+SnS_2-3 mixed sample.

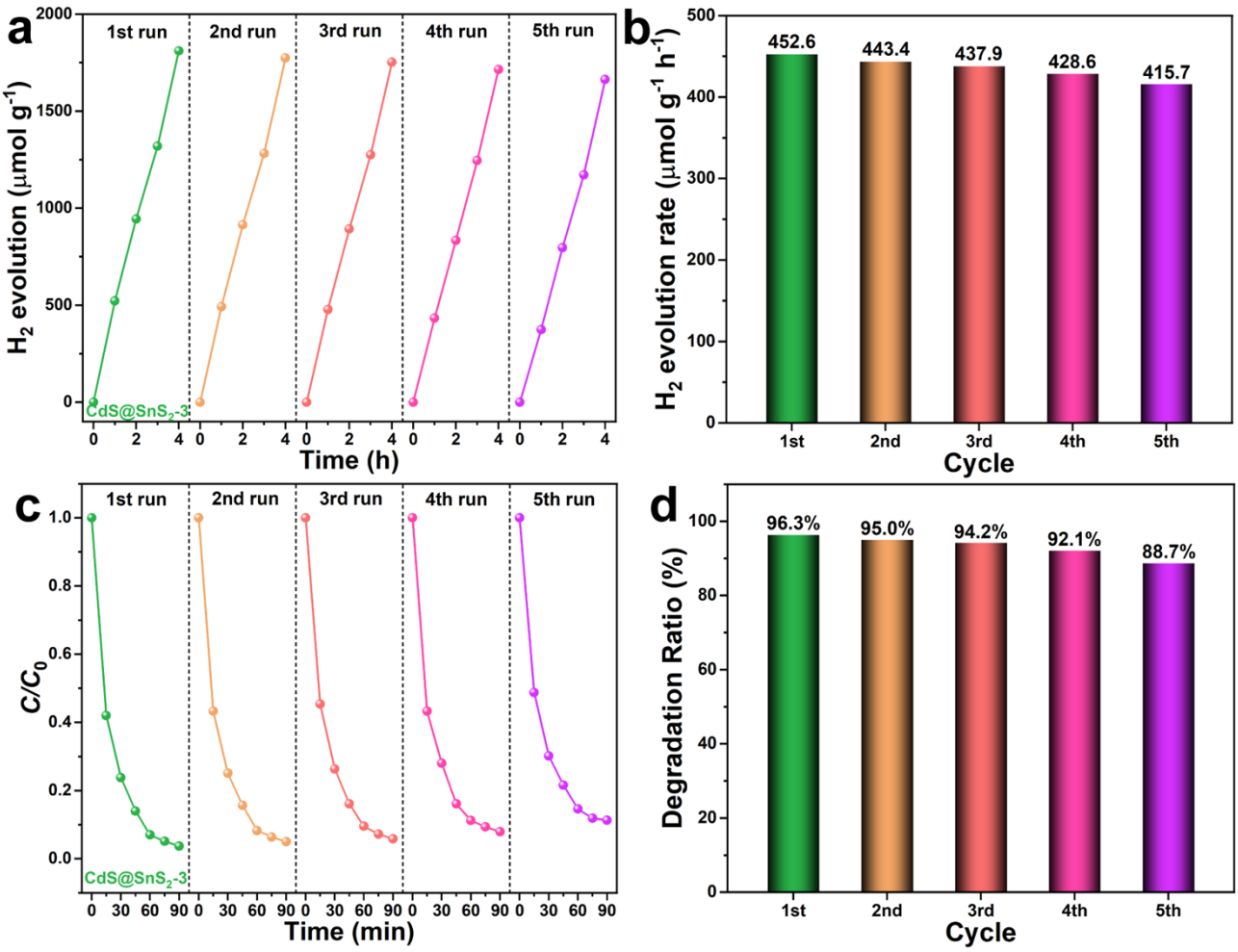

Fig. S10 (a) Cycling runs in the piezocatalytic H_2 evolution over the CdS@SnS_2-3 sample, and (b) the corresponding average H_2 evolution rates. (c) Cycling runs in the piezocatalytic RhB degradation over the CdS@SnS_2-3 sample, and (d) the corresponding RhB degradation ratios.

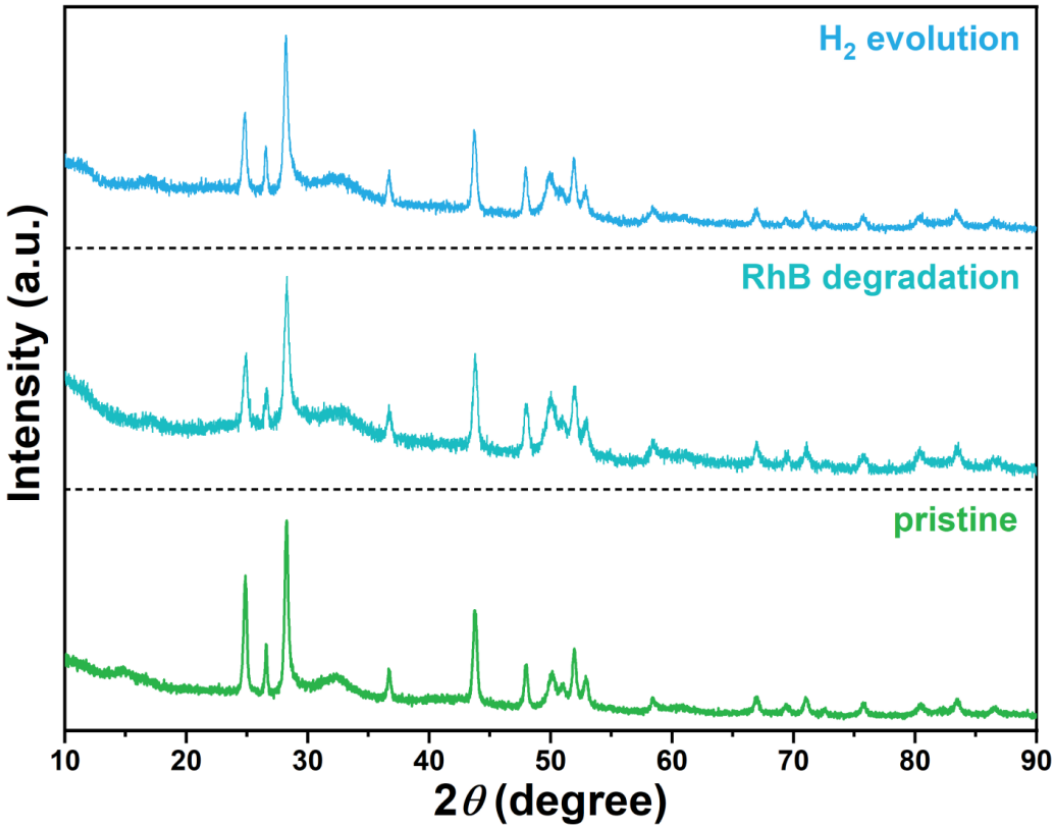

Fig. S11 XRD patterns of the CdS@SnS_2-3 piezocatalyst before and after the five-cycle piezocatalytic reactions of RhB degradation and water splitting for H_2 evolution.

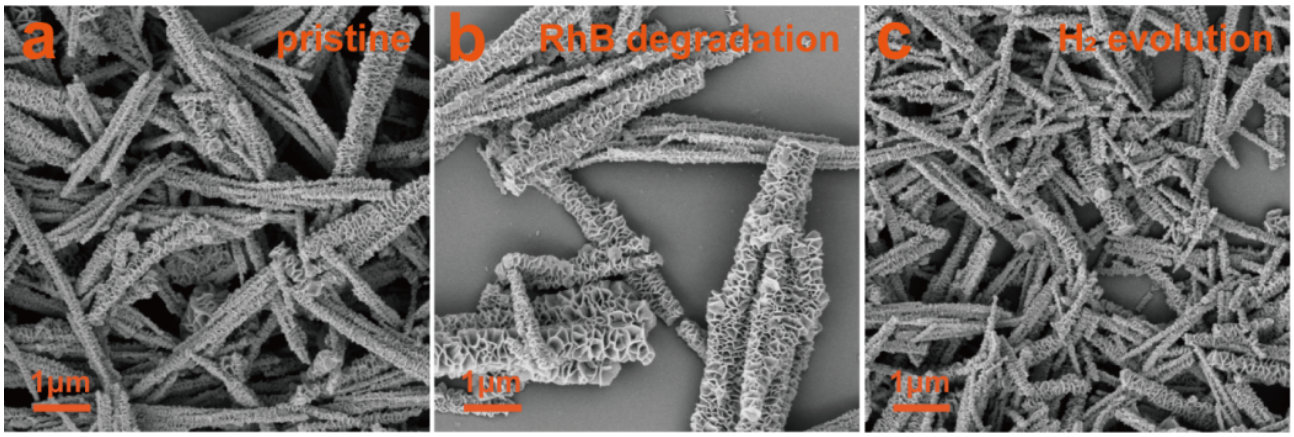

Fig. S12 SEM images of (a) the pristine CdS@SnS_2-3 photocatalyst, and those after the five-cycle piezocatalytic reactions of (b) RhB degradation and (c) water splitting for H_2 evolution.

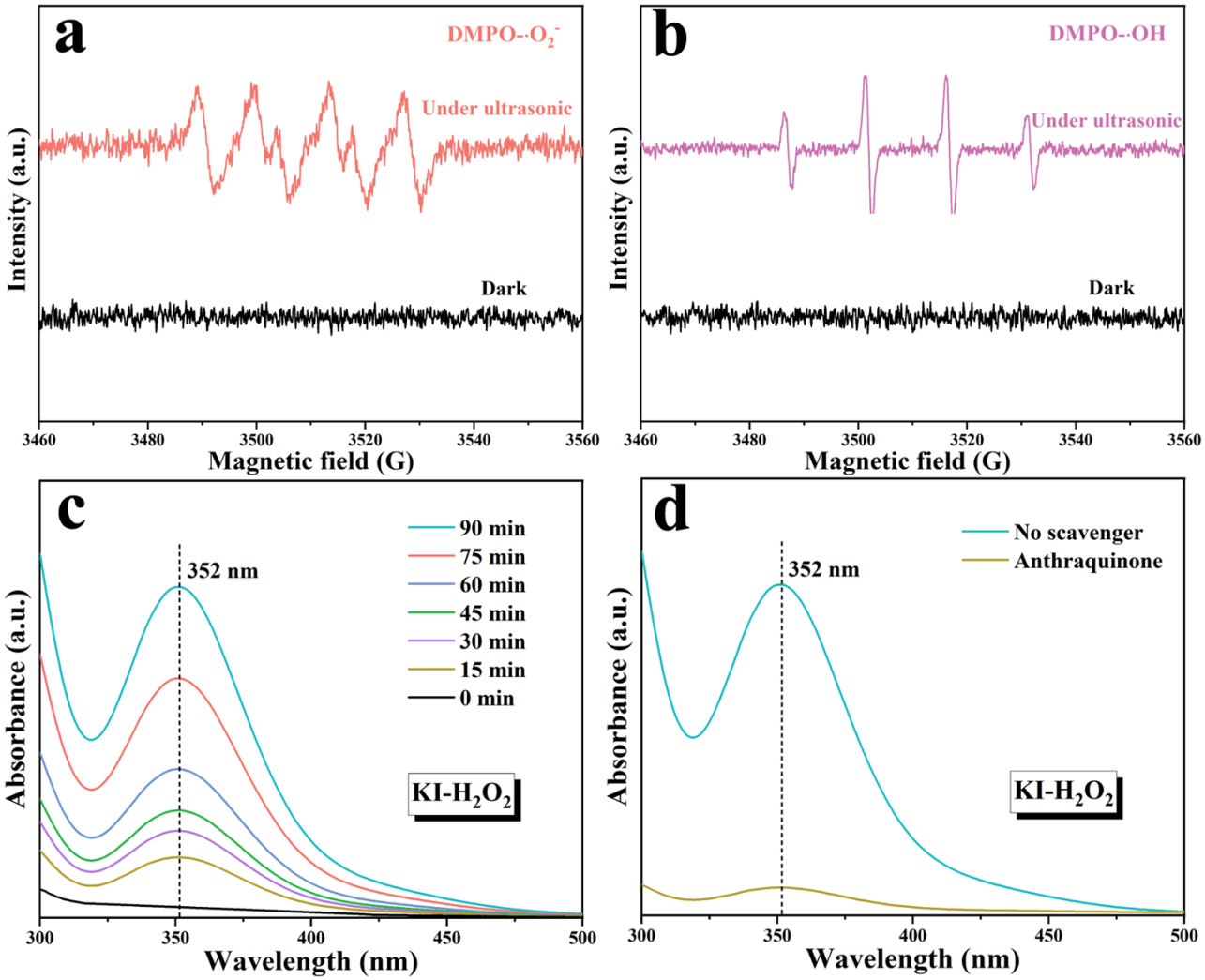

Fig. S13 EPR spectra of (a) DMPO-·O_2^- and (b) DMPO-·OH for CdS@SnS_2-3 sample after 30 min of ultrasonic vibration. (c) Temporal absorption spectra of H_2O_2 in the reaction solution under different ultrasonic time assessed by the iodometric method. (d) Temporal absorption spectra of H_2O_2 in the reaction solution with and without introduction of anthraquinone.