Electronic Supplementary Information

Facile fabrication of porous ZnS nanostructures with

controlled amount of S vacancies for enhanced photocatalytic

performances

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Sample	Crystallite size ^a (nm)	Element (atomic %)		S vacancy
		Zn	S	(atomic %) ^b
ZE0	32.6	52	48	8
ZE2	29.4	55	45	18
ZE3	12.9	57	43	25
ZE4	11.0	59	41	31
ZE5	10.1	56	44	21

 Table S1
 Crystallite sizes and elemental compositions of ZE nanostructures

^a Calculated from the (110) diffractions of XRD patterns. ^b Calculated from (1-S/Zn)100.



Fig. S1 TEM images of ZE2 (left), ZE4 (middle), and ZE5 (right) prepared via hydrothermal treatment in a 1:1 water:EG mixture (top) and pure EG (bottom). Each scale bar represents 500 nm.



Fig. S2 SEM images of ZE4 nanostructures. Each scale bar represents 200 nm.



Fig. S3 FTIR spectra (a) and TGA curves (b) of indicated ZE nanostructures.



Fig. S4 HRTEM image (a) and FFT pattern (b) of a porous ZE4 nanostructure. Yellow lines indicate lattice alignments while red circles mark pore regions.



Fig. S5 EDX elemental profiles (top) scanned along the lines of the STEM images (bottom) of a ZE4 nanostructure.



Fig. S6 Low-magnification SEM images (left) and EDX elemental profiles (right) scanned inside the square lines of the SEM images of ZE0 (a), ZE2 (b), ZE3 (c), ZE4 (d), and ZE5 (e) nanostructures.

Sampla	S/Zn atomic ratio	
Sample	S	
ZE0	1.00	
ZE2	0.88	
ZE4	0.80	

 Table S2
 S/Zn atomic ratios in ZE nanostructures, obtained from XPS spectra in Fig. 5



Fig. S7 Extinction spectra of indicated nanostructures suspended in ethanol.



Fig. S8 Absorption spectra of RhB solutions in the presence of light without nanocatalysts (a), with commercial ZnS (b), and with nanocatalysts of ZE0 (c), ZE1 (d), ZE2 (e), ZE3 (f), ZE4 (g), ZE5 (h), and ZE6 (i), measured at elapsed times indicated in the units of min.



Fig. S9 TEM images of commercial ZnS. Each scale bar represents 500 nm.



Fig. S10 N_2 adsorption-desorption isotherms (a) and pore-size distributions (b) of indicated ZE nanosturctures.



Fig. S11 Photoluminescence spectra of indicated ZE nanostructures (black). The samples were suspended in ethanol and excited with 266 nm laser pulses of 6 ns. Blue, green and red lines correspond to deconvoluted Gaussian curves while dotted orange lines correspond to the sum of fitted Gaussian curves.



Fig. S12 Stability test of ZE4 nanostructures via repeated photocatalytic RhB-degradation experiments.