Supporting Information

Doping Zn\(^{2+}\) in CuS Nanoflower into Chemically Homogeneous Zn\(_{0.49}\)Cu\(_{0.50}\)S\(_{1.01}\) Superlattice Crystal Structure as High-Efficient n-Type Photoelectric Semiconductor

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1. EDS spectra for Zn-doped CuS nanoflowers.

**Fig. S1** EDS spectrum of (a) pure CuS, (b) Zn$_{0.06}$Cu$_{0.94}$S, (c) Zn$_{0.26}$Cu$_{0.73}$S$_{1.01}$, (d) Zn$_{0.36}$Cu$_{0.62}$S$_{1.02}$, (e) Zn$_{0.49}$Cu$_{0.50}$S$_{1.01}$ and (f) Zn$_{0.58}$Cu$_{0.40}$S$_{1.02}$. 
2. SEM images of the $\text{Zn}_{0.06}\text{Cu}_{0.94}\text{S}$, $\text{Zn}_{0.26}\text{Cu}_{0.73}\text{S}_{1.01}$, $\text{Zn}_{0.36}\text{Cu}_{0.62}\text{S}_{1.02}$ and $\text{Zn}_{0.58}\text{Cu}_{0.40}\text{S}_{1.02}$ nanoflowers.

Fig. S2 SEM images of (a) $\text{Zn}_{0.06}\text{Cu}_{0.94}\text{S}$, (b) $\text{Zn}_{0.26}\text{Cu}_{0.73}\text{S}_{1.01}$, (c) $\text{Zn}_{0.36}\text{Cu}_{0.62}\text{S}_{1.02}$ and (d) $\text{Zn}_{0.58}\text{Cu}_{0.40}\text{S}_{1.02}$ nanoflowers.
3. Time-dependent absorption spectrum of a solution of RhB solution with the different Zn-doped CuS catalysts

Fig. S3 Time-dependent absorption spectrum of a solution of RhB solution (5mg/L, 50 mL) with the different Zn-doped CuS catalysts (20 mg) of (a) pure CuS, (b) Zn$_{0.06}$Cu$_{0.94}$S, (c) Zn$_{0.26}$Cu$_{0.74}$S$_{1.01}$, (d) Zn$_{0.36}$Cu$_{0.62}$S$_{1.02}$, (e) Zn$_{0.49}$Cu$_{0.50}$S$_{1.01}$ and (f) Zn$_{0.58}$Cu$_{0.42}$S$_{1.02}$ vs. the exposure time under illumination with a 500 W high-pressure Xenon lamp.