Supporting Information

Fig. S1 The spectrum of filter (λ>420 nm)

Fig. S2 A single nanosheet of flower-like ZnO with exposed (100) plane.
Fig. S3 SEM of ZnO under different concentration of NaOH when the reaction temperature was increased to 50°C.
(a-b 2:6, c-d 2:8, e-f 2:5)

Fig. S4 SEM of ZnO at higher concentration and different proportion of NaOH when the reaction temperature is kept at 40°C.
(a-b 1:5, c-f 1:6, e-f 1:8)
Fig. S5 XRD of the ZnO in Fig S2 and S3.

Fig. S6 XRD patterns of ZnO and ZnO/CdS in figure 3.
Fig. S7 EDS mapping of edge area of ZnO/CdS nanoflower.

Fig. S8 SEM (a-b) and XRD (c) of the CdS powder.
Fig. S9 EDS mapping of CdS nanoparticles and ZnO flower.

Fig. S10 XRD patterns of products in figure 4.
Fig. S11 SEM (a-b) and XRD (c) of ZnO/CdS when the ratio is 1:2.

Fig. S12 SEM (a-c) and XRD (d) of the products when we changed the load order of $S^{2-}$ and $Cd^{2+}$.

(a-ZnO+S, b-ZnO+Cd, c-ZnO+S+Cd)
Fig. S13 SEM (a-e) and XRD (f) of the products at different reaction concentration ratio of S and Cd when we changed the load order of $S^{2-}$ and $Cd^{2+}$.
(a-8:1, b-5:1, c-2:1, d-1:1, e-1:1.2)

Fig. S14 TEM of ZnO/CdS heterostructures.
Fig. S15 UV-vis absorption spectra and optical band gap of ZnO and ZnO/CdS 1:1.

Fig. S16 Optical band gap of CdS.

Fig. S17 XPS valence spectra of ZnO and CdS.
Fig. S18 Photoluminescence spectra of ZnO and ZnO/CdS 1:1 under 325 nm excitation.

Fig. S19 Photocurrent responses of ZnO/CdS (2:1, 5:1, 8:1, 10:1) under visible light (λ>420 nm) irradiation.