Supporting Information for

Self-assembled three-dimensional flowerlike Mn$_{0.8}$Cd$_{0.2}$S microspheres as efficient visible-light-driven photocatalysts for H$_2$ evolution and CO$_2$ reduction

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Fig. S1 Particle size distribution histogram of MCS-F
Fig. S2 (a) HAADF-STEM, (b-d) elemental mapping images and SAED pattern (inset) of the single petal of MCS-F

Fig. S3 (a) XRD pattern and (b) SEM image of MCS-P
Fig. S4 XRD patterns of the Mn$_{0.8}$Cd$_{0.2}$S products synthesized with different amount of PVP

Fig. S5 Comparison of CH$_3$OH production rate in different solution media
Fig. S6 (a) XRD patterns and (b-d) XPS spectra of the flowerlike Mn$_{0.8}$Cd$_{0.2}$S before and after the photocatalytic reactions

(Used 1-after photocatalytic H$_2$-production; Used 2-after photocatalytic reduction of CO$_2$)
Fig. S7 (a) HAADF-STEM and (b-d) elemental mapping images of the flowerlike $\text{Mn}_{0.8}\text{Cd}_{0.2}\text{S}$ after the photocatalytic reactions