Enhancing the internal electric field *via* twinning for boosting photocatalytic plastic reformation and H_2 production

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Supporting Figures

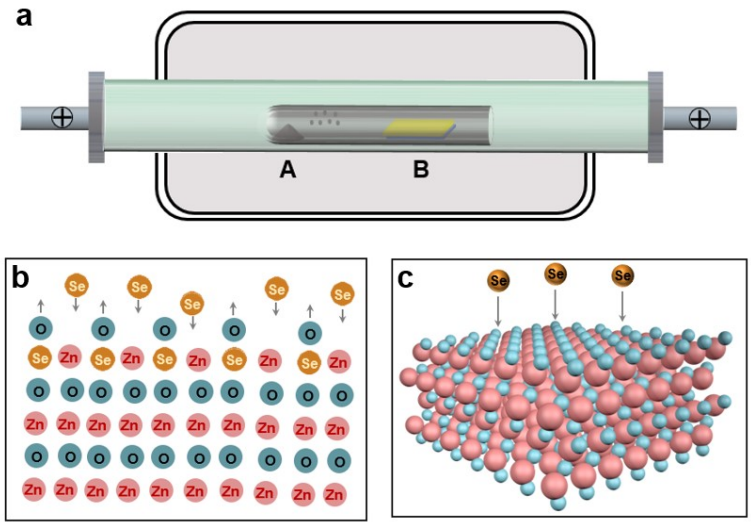

Fig. S1 Schematic diagram of ZnSe synthesis. (a) Schematic of the experimental apparatus for the cation exchange method. (b) and (c) Schematic illustration of anion exchange reaction for the synthesis of T-ZnSe nanowires.

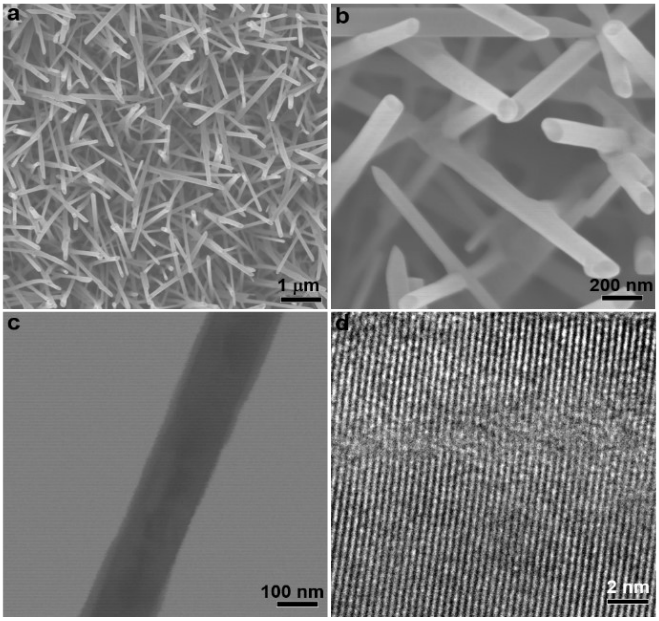

Fig. S2 Synthesis of ZnO nanowires template.(a) Low and (b) high-magnification SEM images of ZnO nanowires (c) Low and (d) high-magnification TEM images of ZnO nanowires.

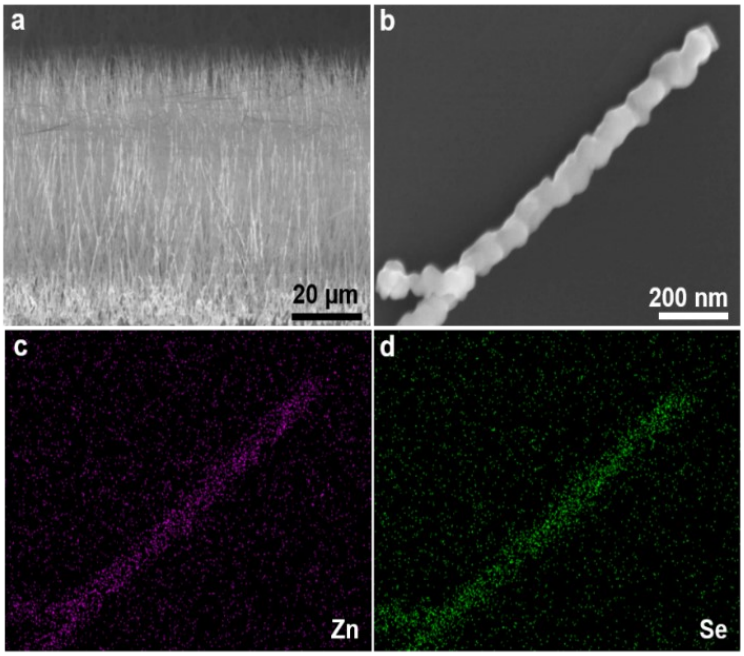

Fig. S3 Synthesis of T-ZnSe nanowires. (a) Cross SEM of T-ZnSe nanowires. (b) SEM images of T-ZnSe nanowires. (c) and (d) the corresponding elemental mappings of Zn and Se, respectively.

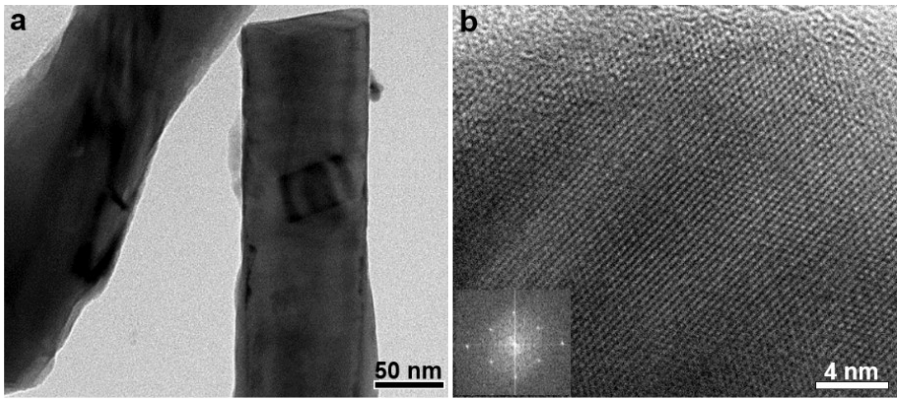

Fig. S4 Synthesis of S-ZnSe photocatalyst. (a) Low and (b) high-magnification TEM images of of S-ZnSe nanowires.

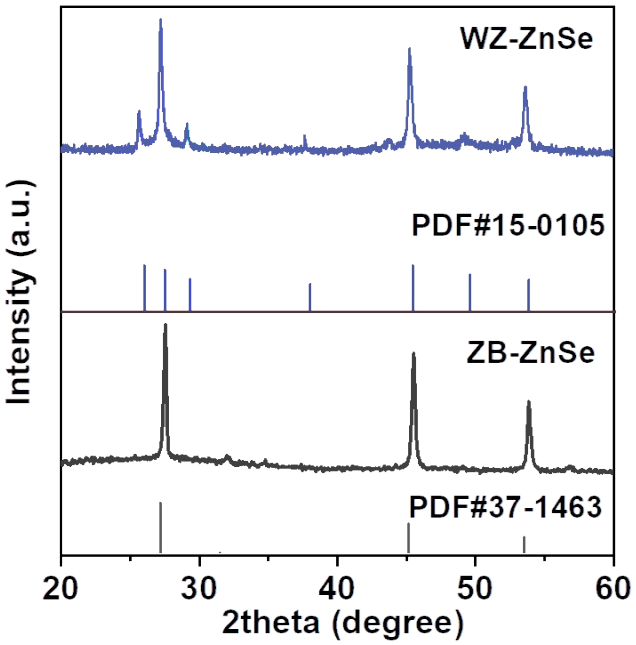

Fig. S5 XRD pattern of ZB-ZnSe and WZ-ZnSe nanowires.

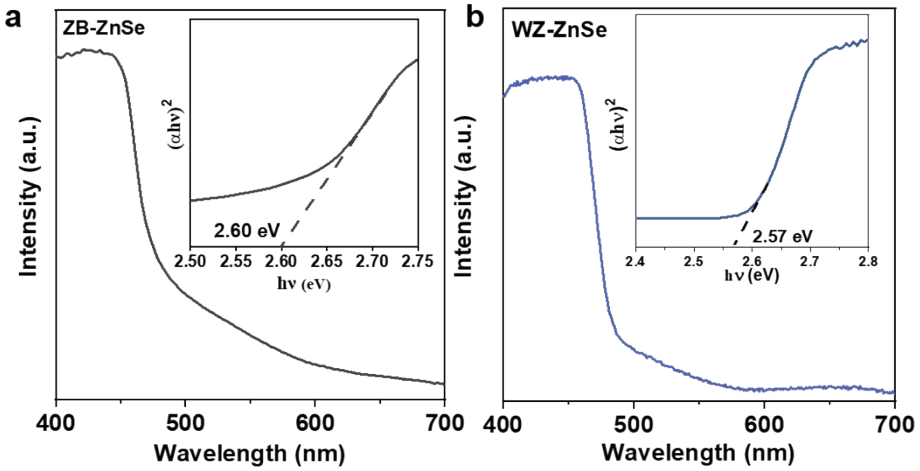

Fig. S6 UV-vis spectra of (a) ZB-ZnSe and (b) WZ-ZnSe nanowires and the insets are Tuac plots.

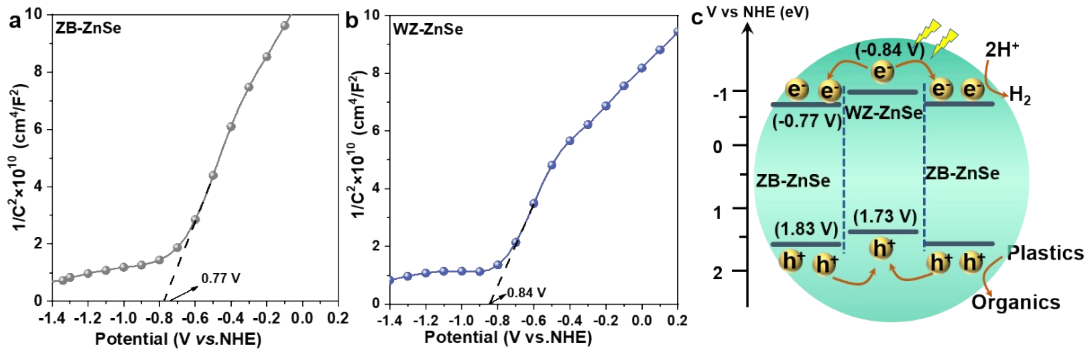

Fig. S7 Mott-Schottky plots of (a) ZB-ZnSe and (b) WZ-ZnSe nanowires. (c) Schematic diagram of the band structure of T-ZnSe.

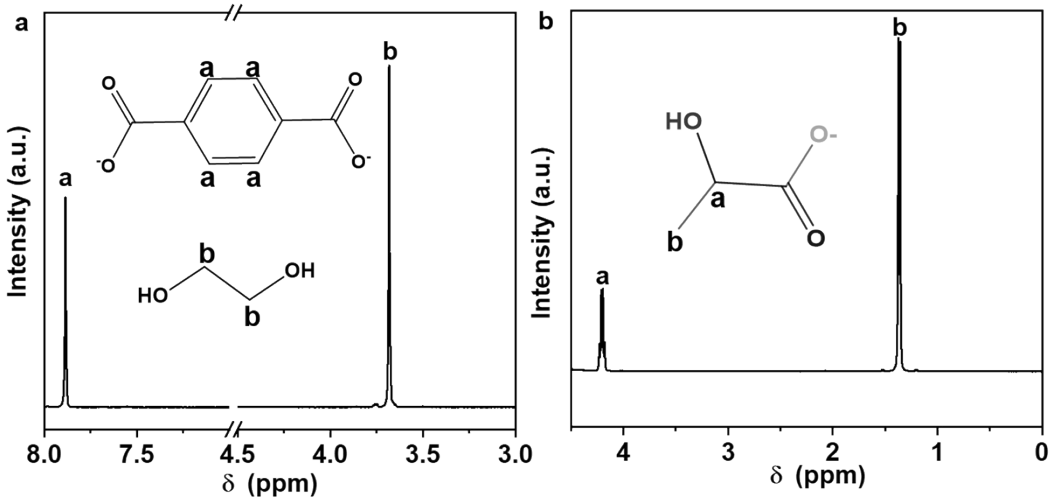

Fig. S8 ^{1}H NMR spectra for substrates. (a) PET (b) PLA.

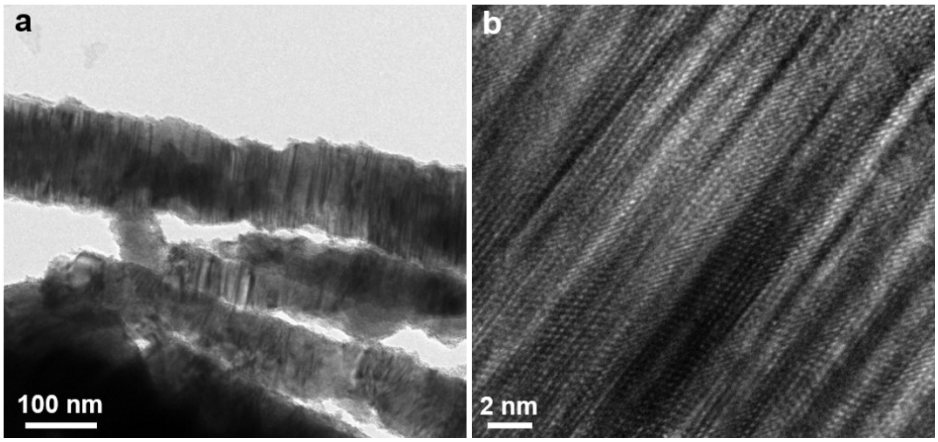

Fig. S9 Low magnification and High magnification TEM images of T-ZnSe after 12 hours of photocatalytic reaction.

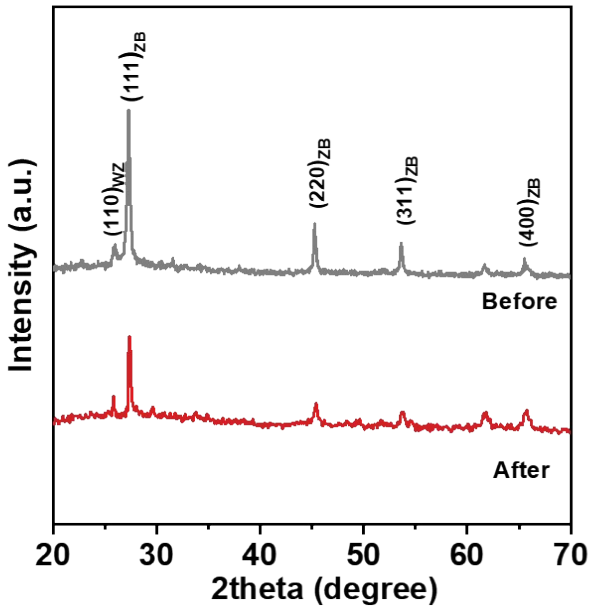

Fig. S10 XRD pattern of T-ZnSe nanowires before and after 12 hours of photocatalytic reaction.

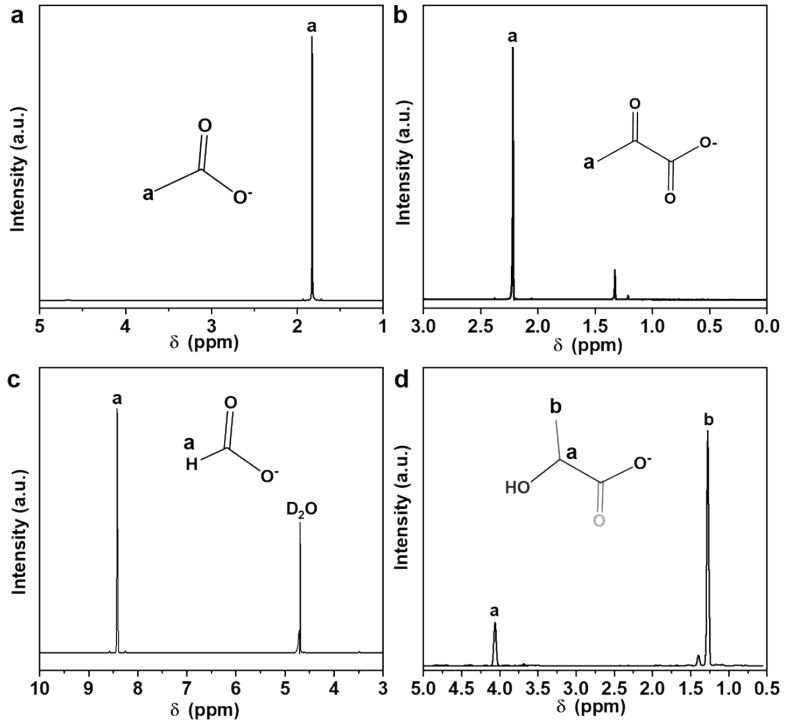

Fig. S11 ^{1}H NMR spectra for standard samples. (a) acetate (b) pyruvate (c) formate (d) lactate.

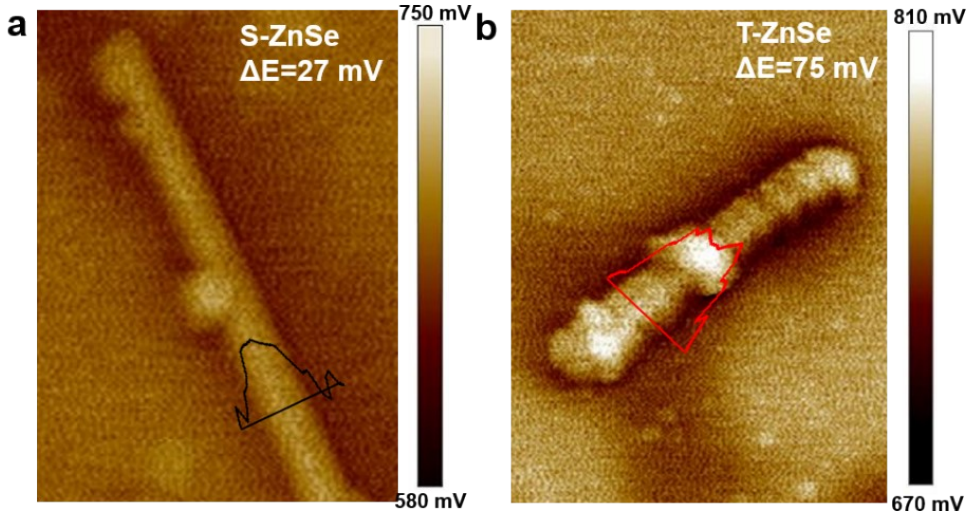

Fig. S12 AFM images at the surface potential mode for (a) S-ZnSe and (b) T-ZnSe.

Table S1 Plastic photoreforming performance for S-ZnSe and T-ZnSe photocatalysts.

Catalyst	substrate	H_2 (μmol h^{-1})	formate (μmol·12h)	acetate (μmol·12h)	lactate (μmol·12h)	ethanol (μmol·12h)	pyruvate (μmol·12h)
T-ZnSe	PET	42	41.9	25.8	10.7	7.9	/
	PLA	54	/	37.1	/	/	91.3
S-ZnSe	PET	8	9.6	4.6	2.0	1.8	/
	PLA	13	/	9.9	/	/	20.4