

Supporting Information

NiS_x Quantum Dots Accelerate Electrons Transfer in Cd_{0.8}Zn_{0.2}S Photocatalytic System via rGO Nanosheet “Bridge” towards Visible-Light-Driven Hydrogen Evolution

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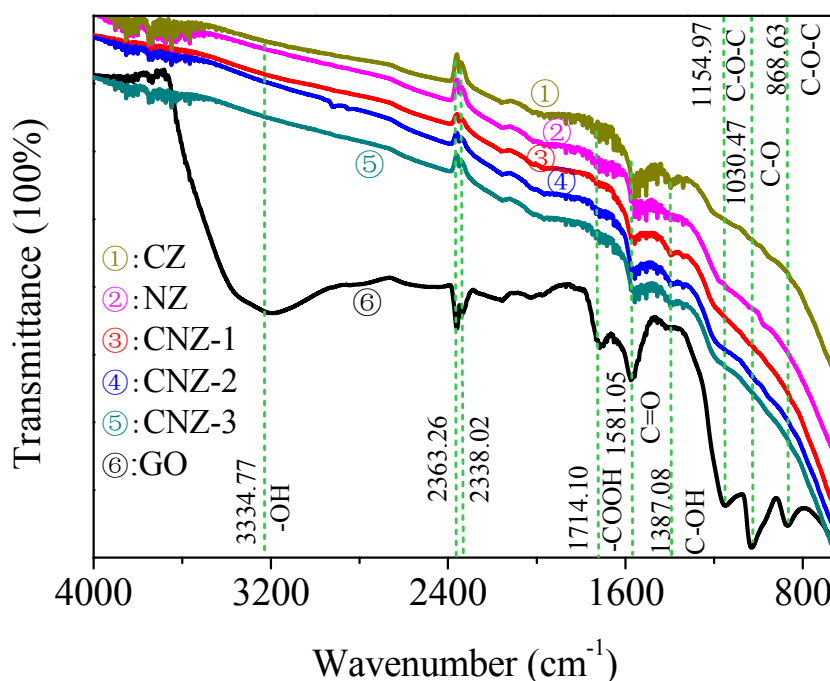


Figure S1. FT-IR spectra of the as-fabricated samples.

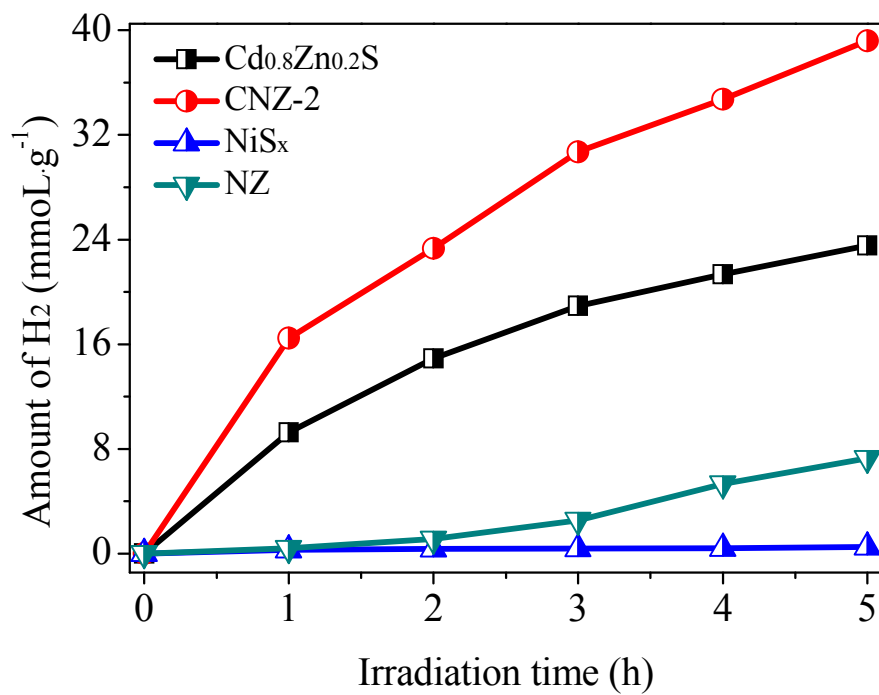


Figure S2. Time-dependent amounts of H₂ evolution over various photocatalysts under irradiation with visible light ($\lambda > 420$ nm).

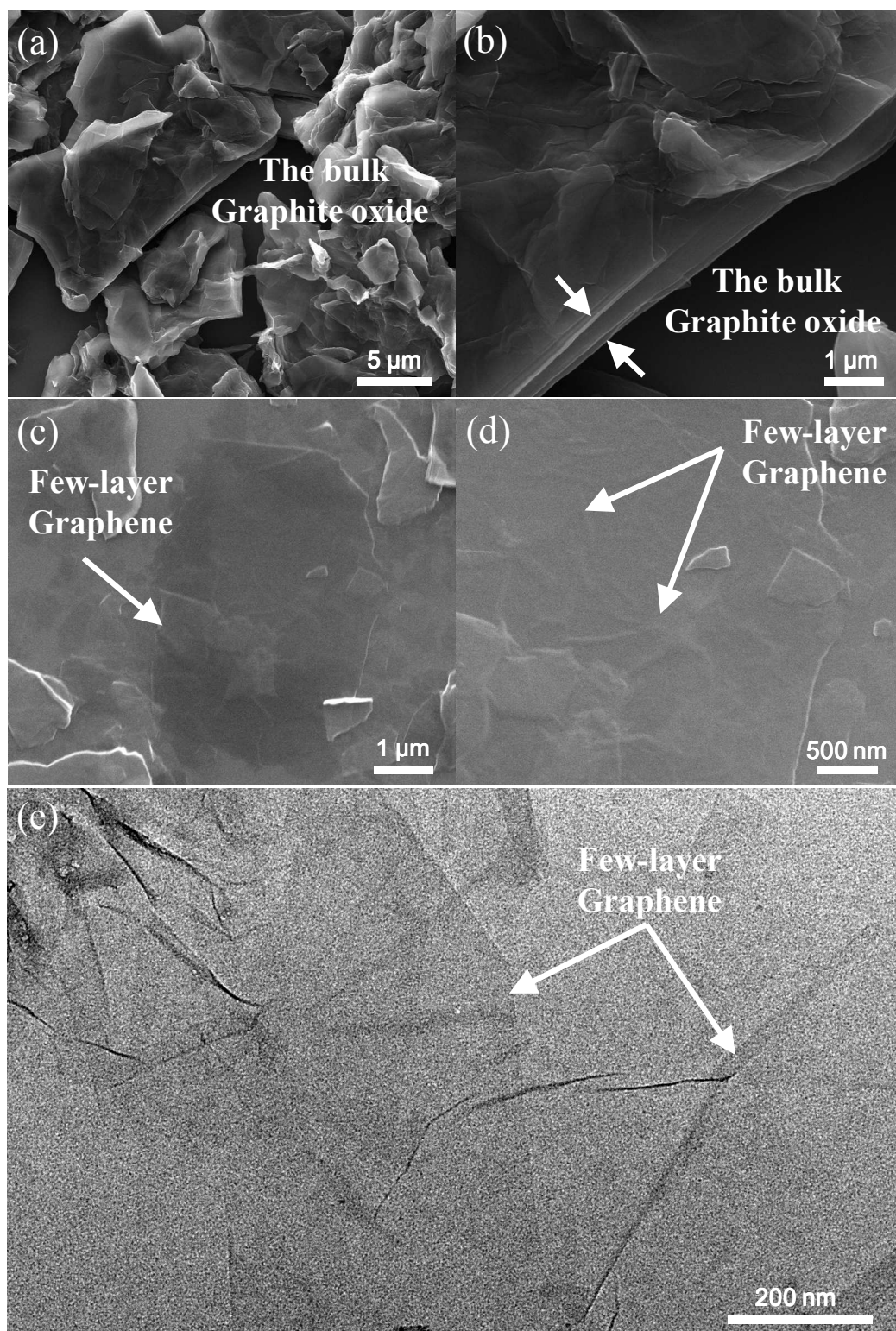


Figure S3. (a, b) SEM images of the Graphite oxide before ultrasonic exfoliation; (c, d) SEM images and (e) TEM image of the obtained GO nanosheets after ultrasonic exfoliation.

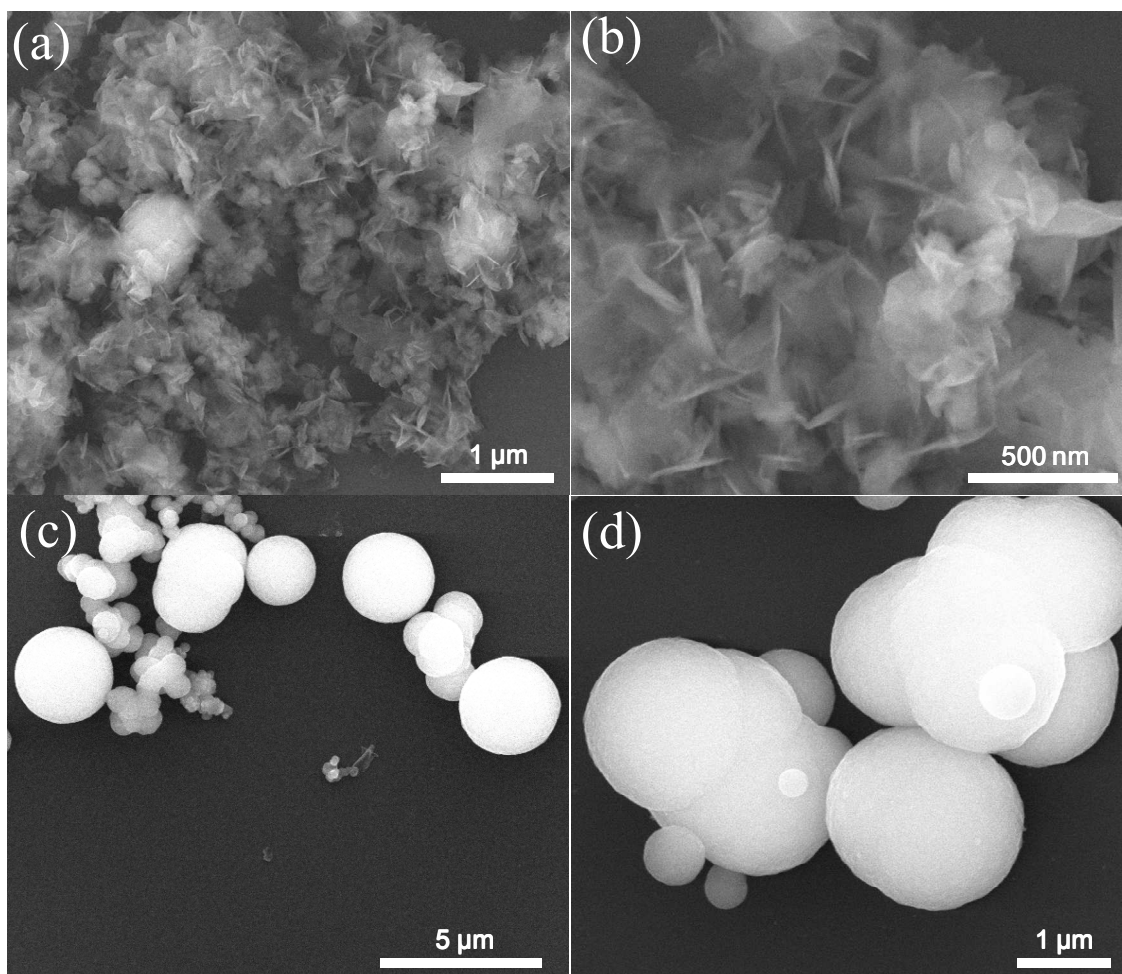


Figure S4. SEM images of (a, b) the pristine NiS_x nanoflakes and (c, d) the pure Cd_{0.8}Zn_{0.2}S microspheres.

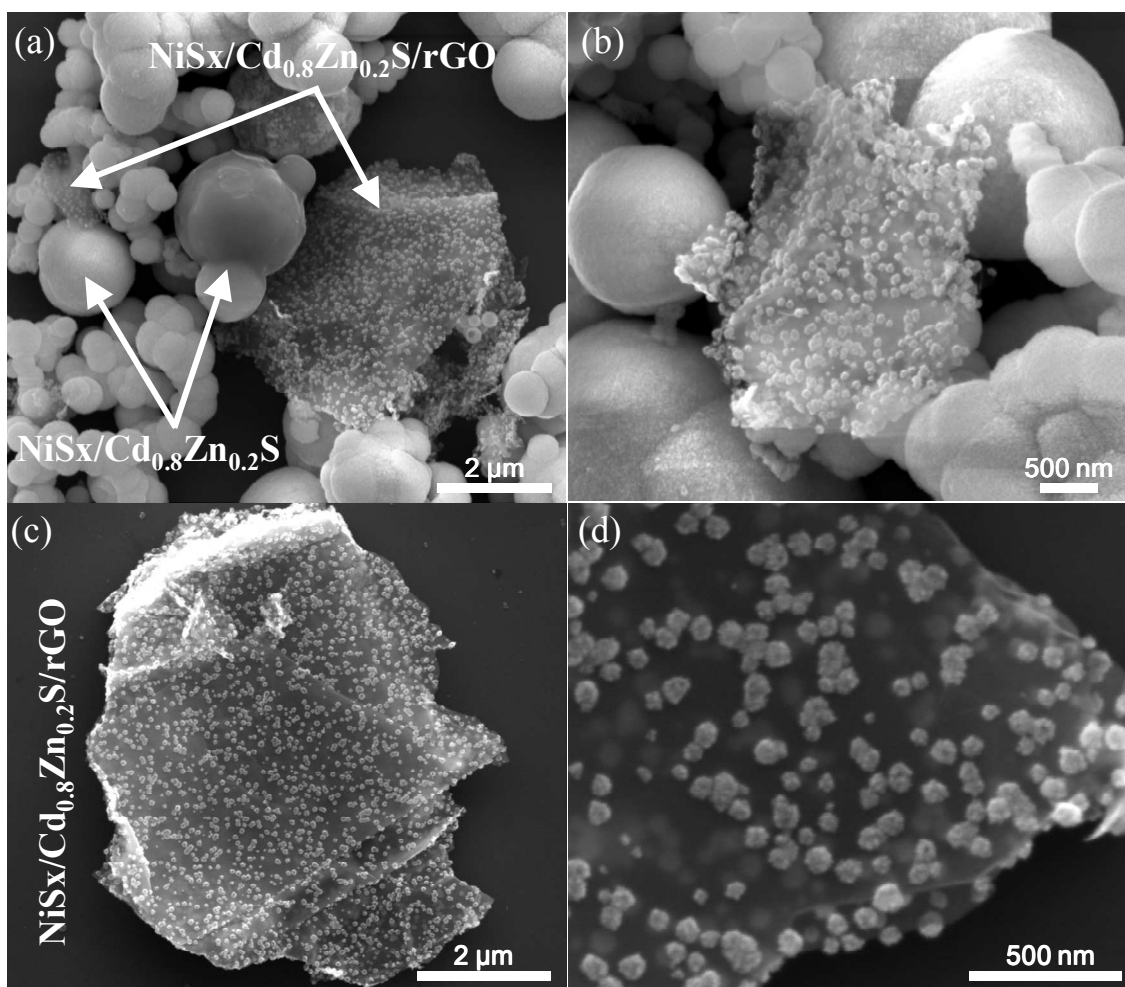


Figure S5. SEM images of (a, b) GZ-1 and (c, d) GZ-3 nanocomposites.

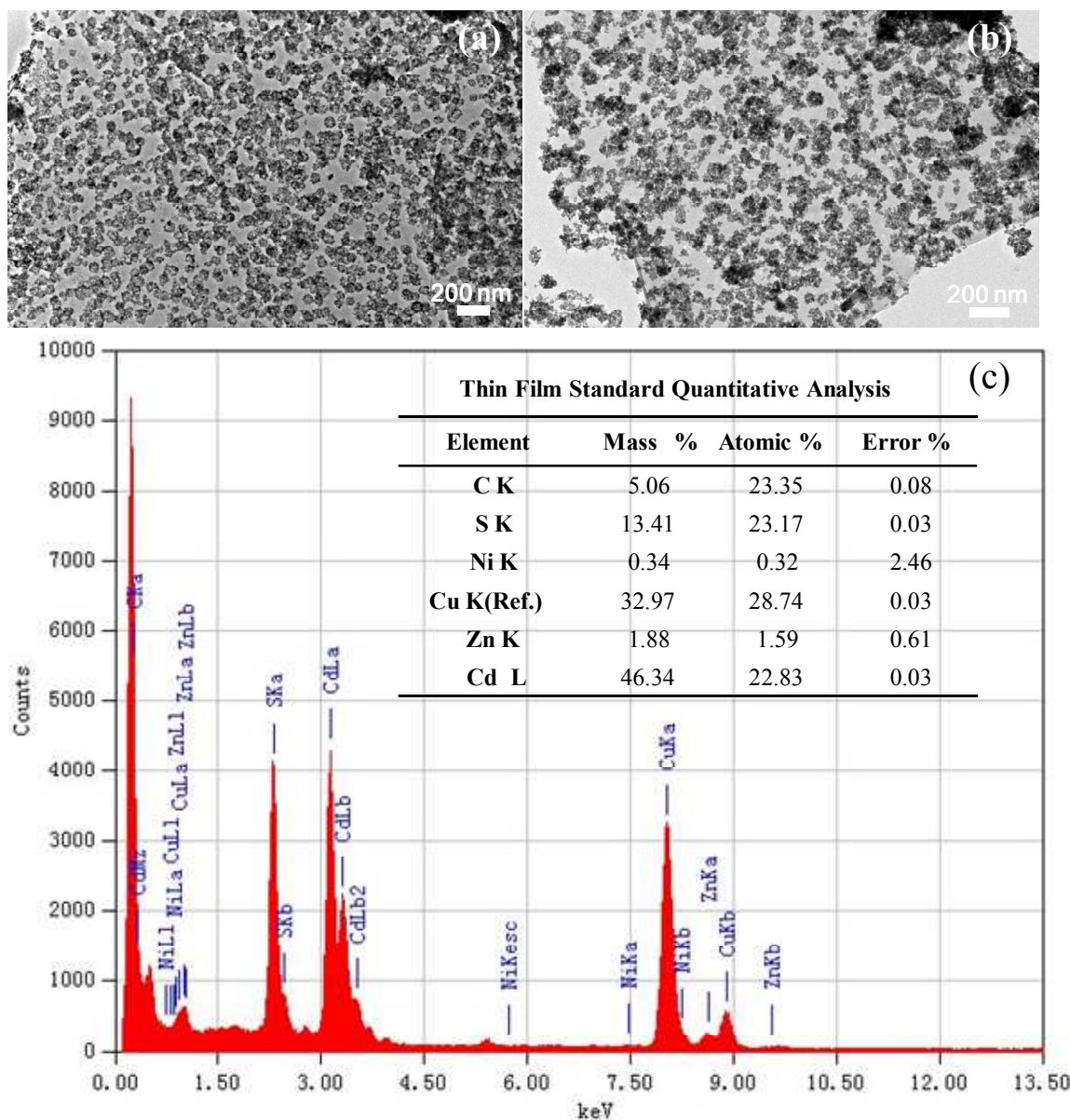


Figure S6. TEM images of CNZ-2 nanocomposite after photocatalytic reaction for 5 h (a) and 25 h (b); (c) The corresponding EDX spectrum of CNZ-2 nanocomposite after five cycle test.

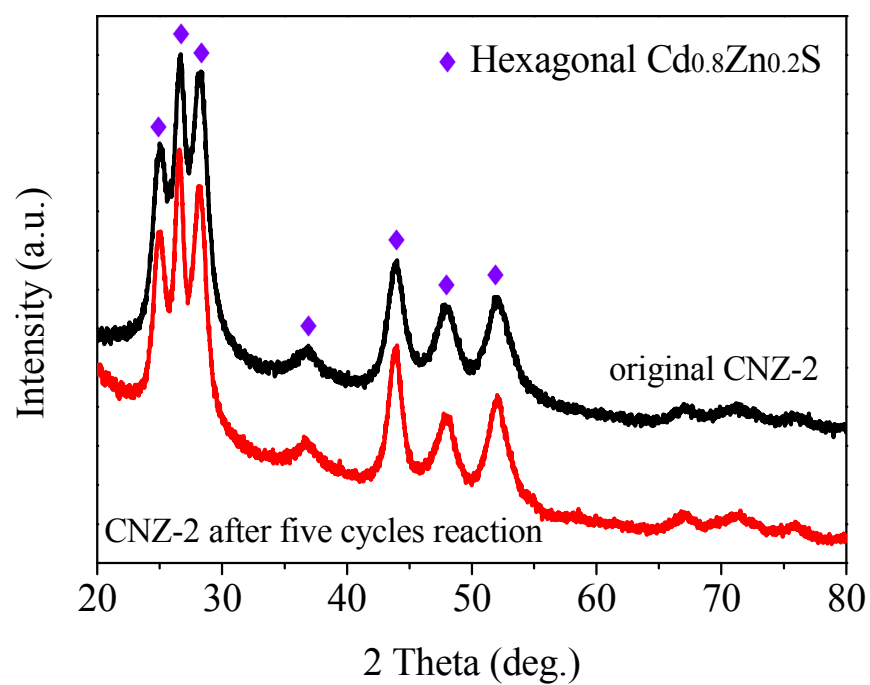


Figure S7. XRD patterns of the original CNZ-2 nanocomposite and CNZ-2 nanocomposite after five cycle test.

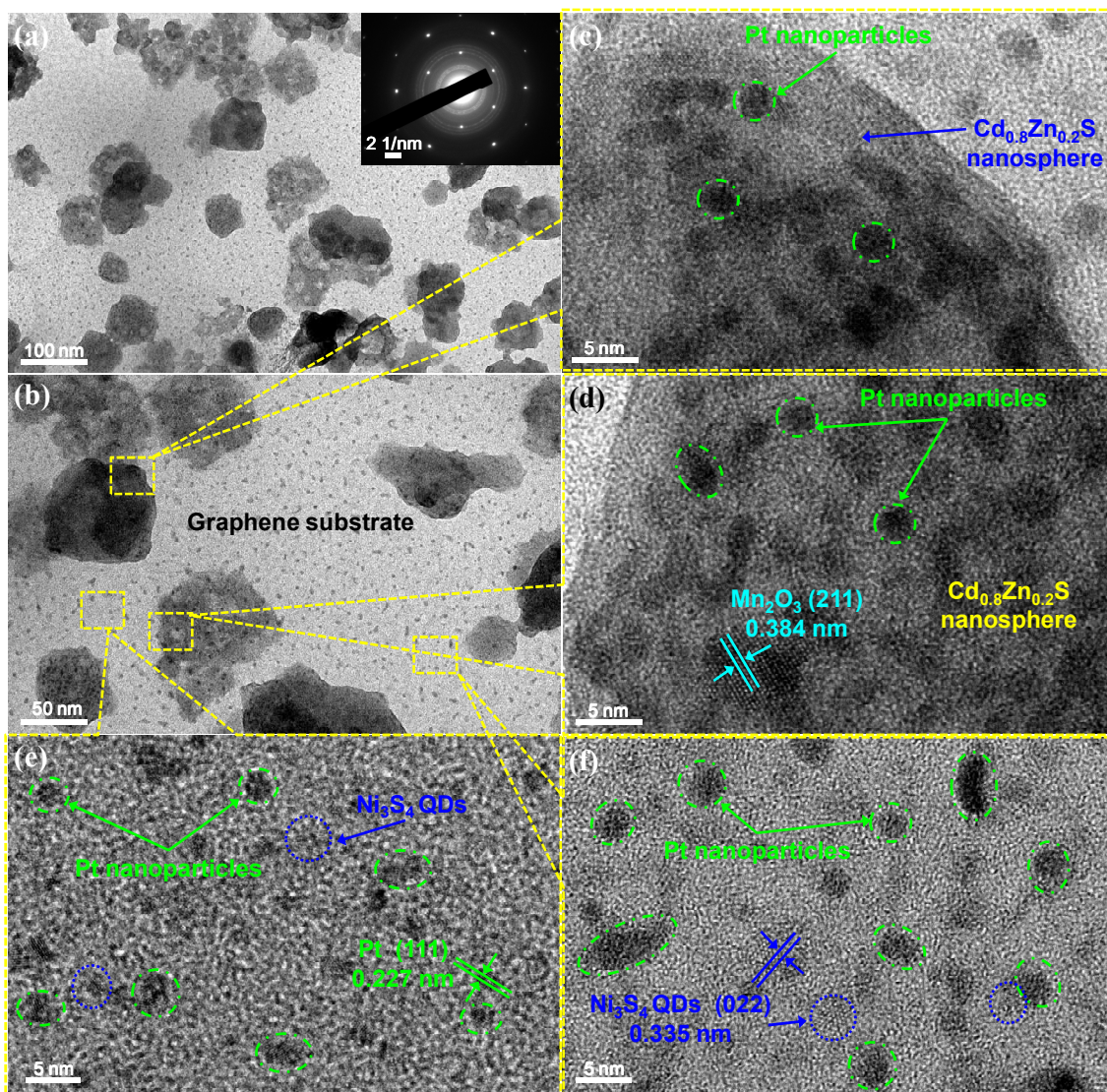


Figure S8. (a, b) TEM and (c-f) HRTEM images of CNZ-2 nanocomposite with simultaneously photo-deposited MnOx and Pt nanoparticles. The contents of deposited MnOx and Pt are 8 wt.% and 3 wt.%, respectively. The inset in (a) is the corresponding SAED pattern.

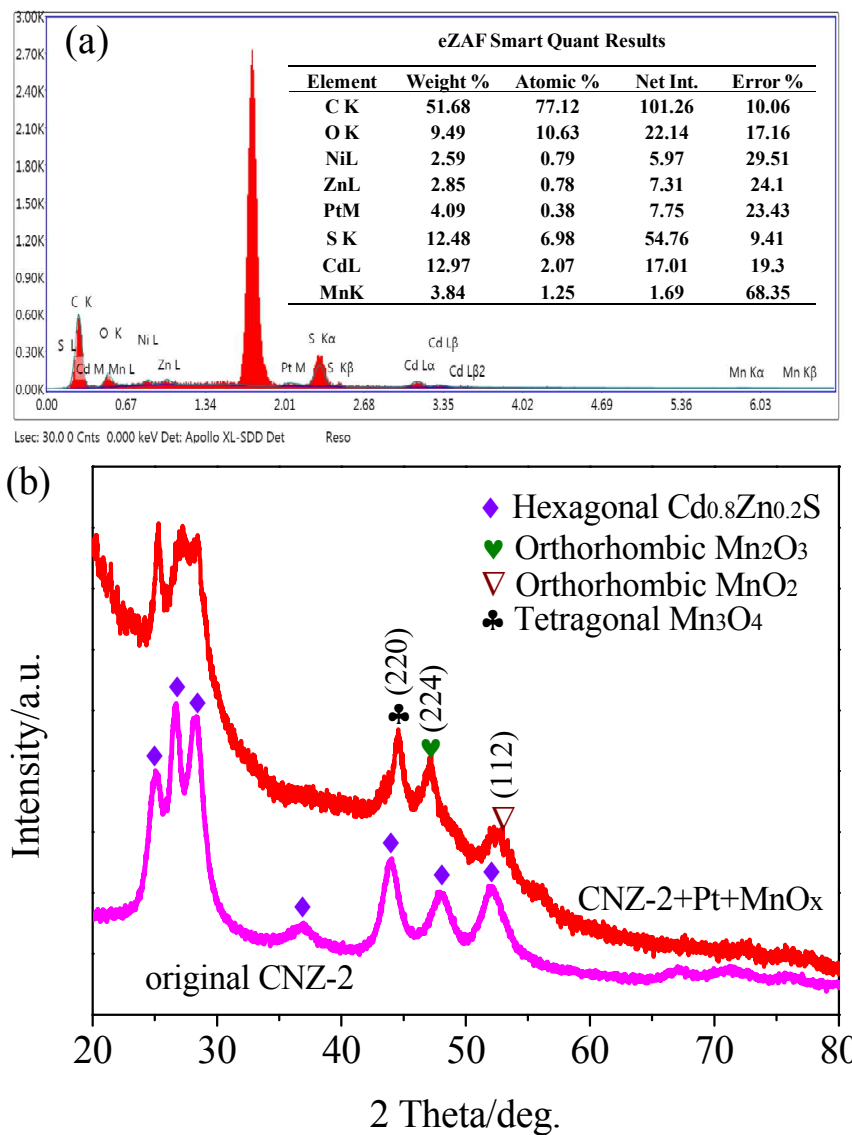


Figure S9. (a) The corresponding EDX spectrum of CNZ-2 nanocomposite with simultaneously photo-deposited MnO_x and Pt nanoparticles; (b) XRD patterns of original CNZ-2 nanocomposite and CNZ-2 nanocomposite with simultaneously photo-deposited MnO_x and Pt nanoparticles.

Table S1. Summary of the apparent QEs at different incident light wavelengths over the pure $\text{Cd}_{0.8}\text{Zn}_{0.2}\text{S}$, CZ and CNZ-2 nanocomposites.

QE(%) Sample	Incident light wavelengths (nm)			
	365	435	475	700
$\text{Cd}_{0.8}\text{Zn}_{0.2}\text{S}$	11.15	10.70	5.29	4.15
CZ	5.38	5.37	4.63	3.89
CNZ-2	22.40	20.88	7.86	4.13

Table S2. Summary of BET surface areas (S_{BET}), Pore volume (V_{p}) and Average pore diameters (D_{p}) of the as-synthesized photocatalysts.

Sample	S_{BET} ($\text{m}^2 \cdot \text{g}^{-1}$)	V_{p} ($\text{cm}^3 \cdot \text{g}^{-1}$)	D_{p} (nm)
$\text{Cd}_{0.8}\text{Zn}_{0.2}\text{S}$	23.76	5.46	5.47
CZ	25.32	5.82	14.61
CNZ-2	18.93	4.35	14.91