

Supporting Information

Z-Scheme MoS₂/TiO₂/Graphene Nanohybrid Photocatalysts for Visible Light-Induced Degradation for highly efficient water disinfection and antibacterial activity

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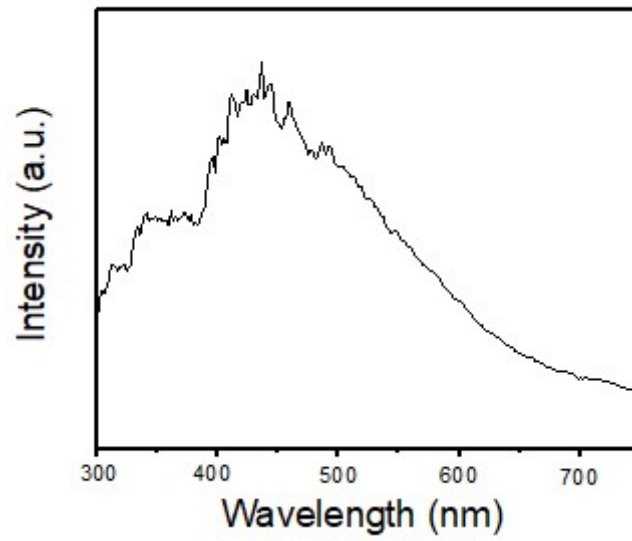


Fig. S1. Measured spectrum of a tungsten halogen lamp.

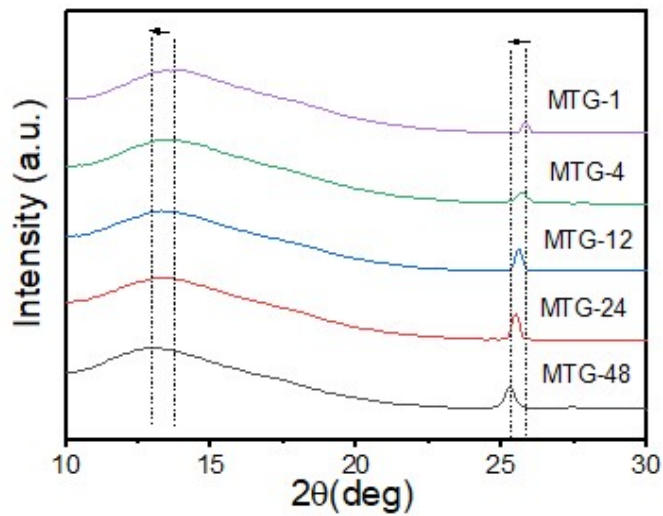


Fig. S2. (a) XRD spectra of the MoS₂/TiO₂/Graphene (MTG-1, MTG-4, MTG-12, MTG-24 and MTG-48) nanohybrids.

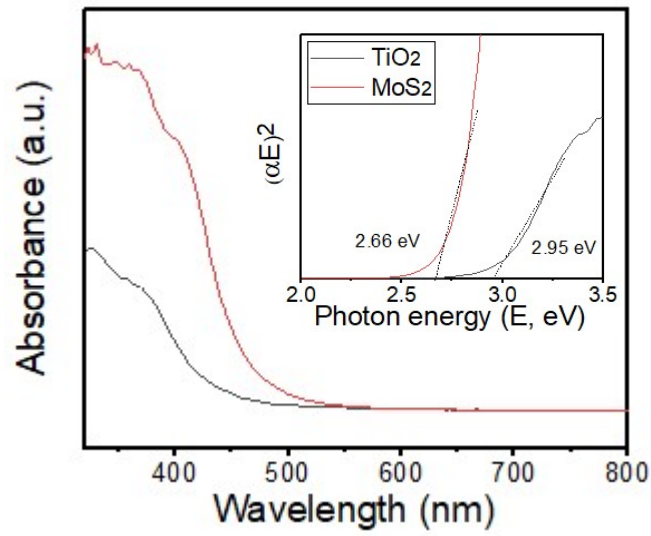


Fig. S3. UV-vis diffuse reflectance spectra of the as-prepared materials. Inset: Plots of $(\alpha h\nu)^{1/2}$ as a function of E_g photon energy.

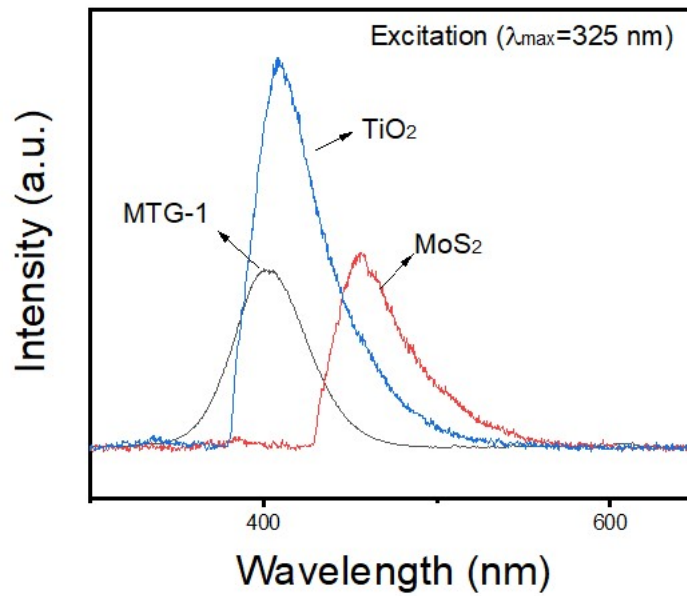


Fig. S4. Photoluminescence spectra of pure TiO₂, MoS₂ and MTG-1 samples.

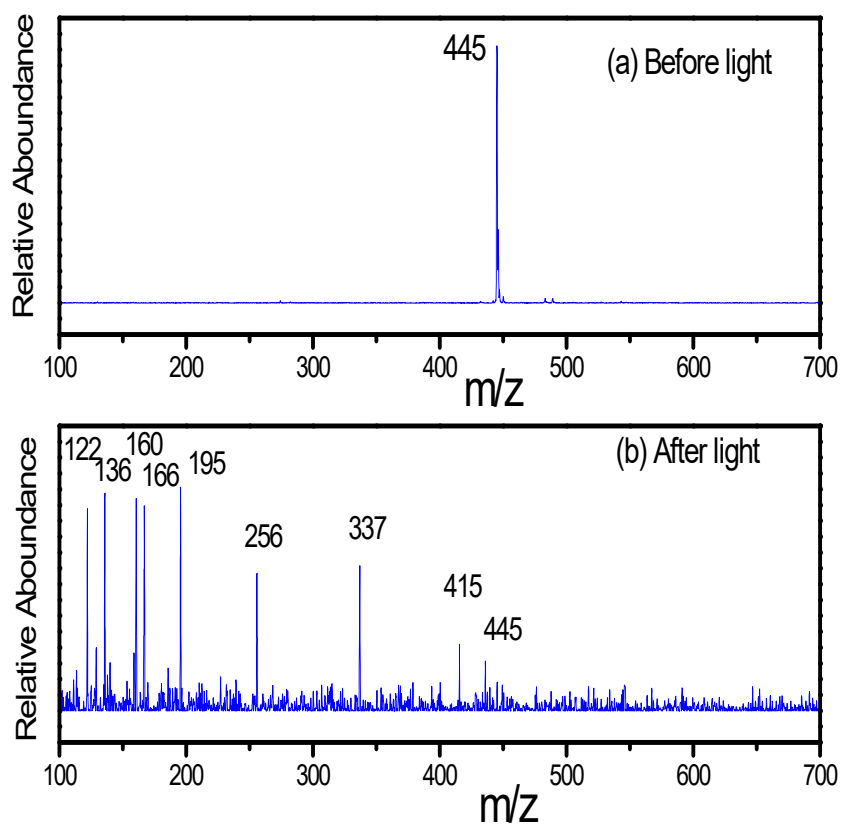


Fig. S5. Mass spectra (m/z values) of TC by Z-scheme nanohybrids: TC solution (a) before and (b) after photodegradation under visible light at 60 min, respectively.

Table S1. Comparison of photocatalytic efficiency of different MoS₂/TiO₂-based hybrid photocatalysts with respect to pollutant degradation.

Samples	C ^a (g·L ⁻¹)	C _{TC} ^b (mg·L ⁻¹)	Targeted pollutant	Reaction Time (min)	Degradation Efficiency	k _{app} (min ⁻¹) × 10 ⁻³	References
TiO ₂ /MoS ₂	0.2	40	MB	60	70.4%	10	[3]
MoS ₂ /TiO ₂ /Si NW	0.5	5	RhB	180	90.2%	12	[11]
MoS ₂ -TiO ₂ nanocomposite	0.03	10	RhB	60	90.5%	30	[12]
MoS ₂ /TNT@CNTs	0.5	30	RhB	50	94.2%	18	[16]
MoS ₂ /TiO ₂	0.025	10	TC	100	84.2%	18	[25]
MoS ₂ /Ag/g-C ₃ N ₄	0.01	10	TC	50	79.7 %	42	[31]
MoS ₂ /TiO ₂ /graphene ^c	0.01	10	TC	60	95%	48	This work

a: C = concentration of photocatalyst; b: C_{TC} = TC concentration; [TC] = 10 mg/L; pH = 6.8; Temperature=25°C; Photocatalysts =10 mg/L; Method: hydrothermal process.

Table S2. Results of BET analysis (The error bars in the figures are the result of three repeated experiments).

Samples	Specific surface area (m ² /g, BET)	Total pore volume (cm ³ /g, BET)	Average pore diameter (nm, BJH)
TiO ₂	25.6±5	0.114±0.02	35.2±5
MoS ₂	29.3±5	0.132±0.02	28.4±5
MTG-48	58.6±5	0.256±0.02	6.8±3