Supplementary Information

Efficient Photocatalytic and Photovoltaic Applications with Nanocomposites between CdTe QDs and NTU-9 MOF

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Table S1. BET surface area properties of various materials used in the study

Material	**Surface area (m^2/g)**	**Pore volume (cm^3/g)**
NTU-9	1205	0.58
CdTe QDs	214	0.18
CdTe/NTU-9	880	0.54

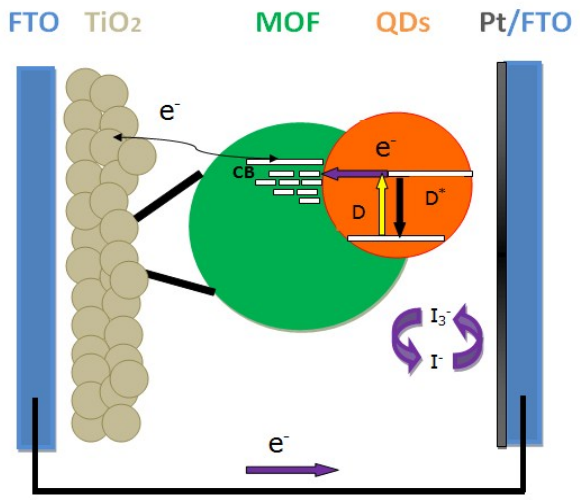

Figure S1. A representative schematic of the proposed CdTe/NTU-9-based solar DSSC.

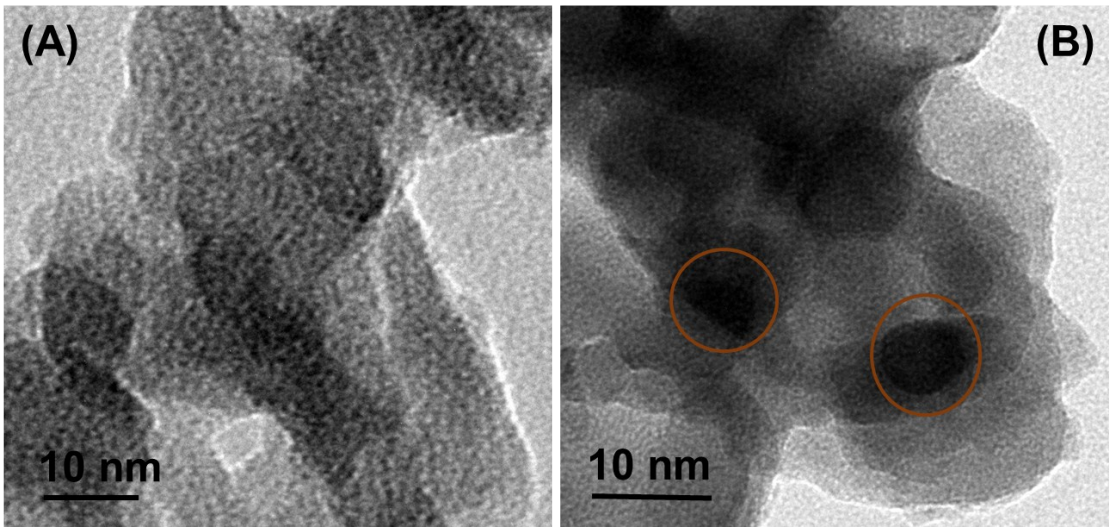

Figure S2. HR-TEM images of (A). NTU-9 MOF and (B). CdTe/NTU-9 composite

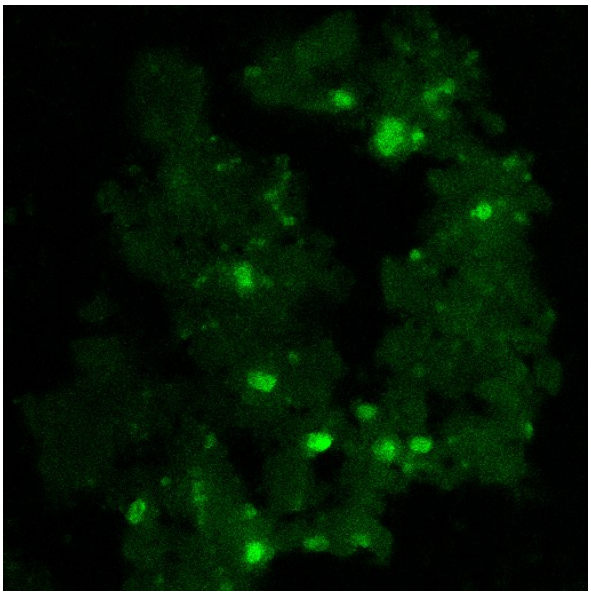

Figure S3: Confocal laser scanning image of CdTe/NTU-9 with distinct fluorescence signals from the embedded QDs.

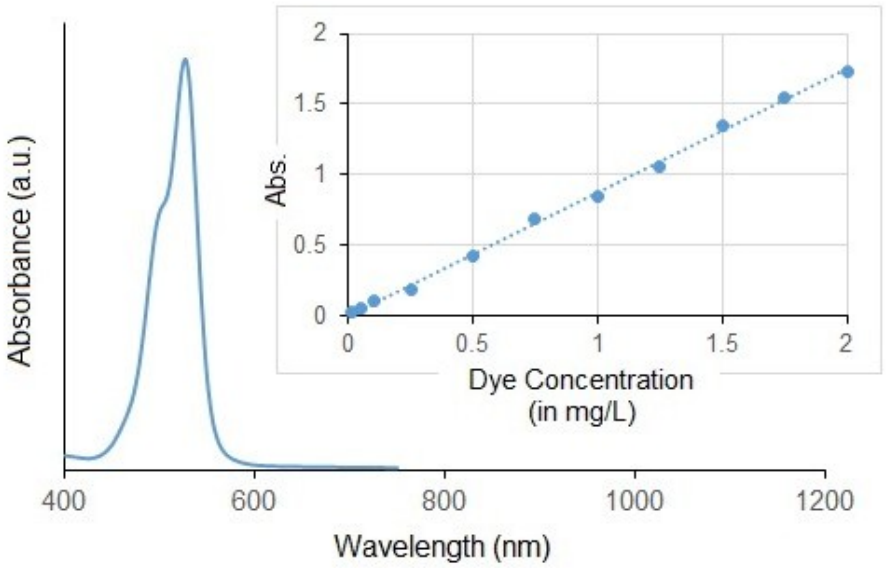

Figure S4. UV-vis spectrum of Rh 6G and its calibration curve.

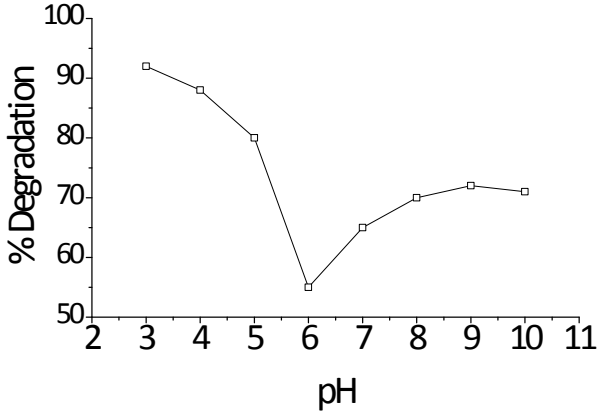

Figure S5. Photodegradation of 5 mg/L Rh 6G under varying conditions of pH; concentration of photocatalyst = 5 mg/L, reaction time = 30 min, and excitation wavelength = 500 nm.

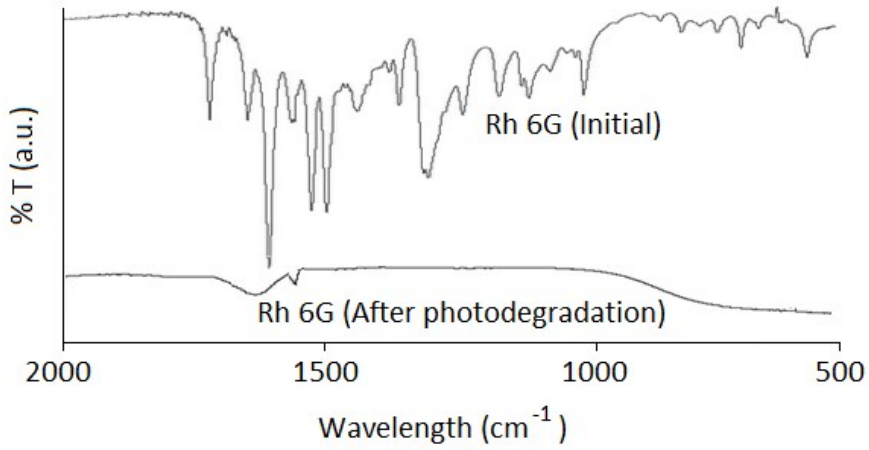

Figure S6. FTIR spectra of Rh 6G dye: comparison between before and after photodegradation.

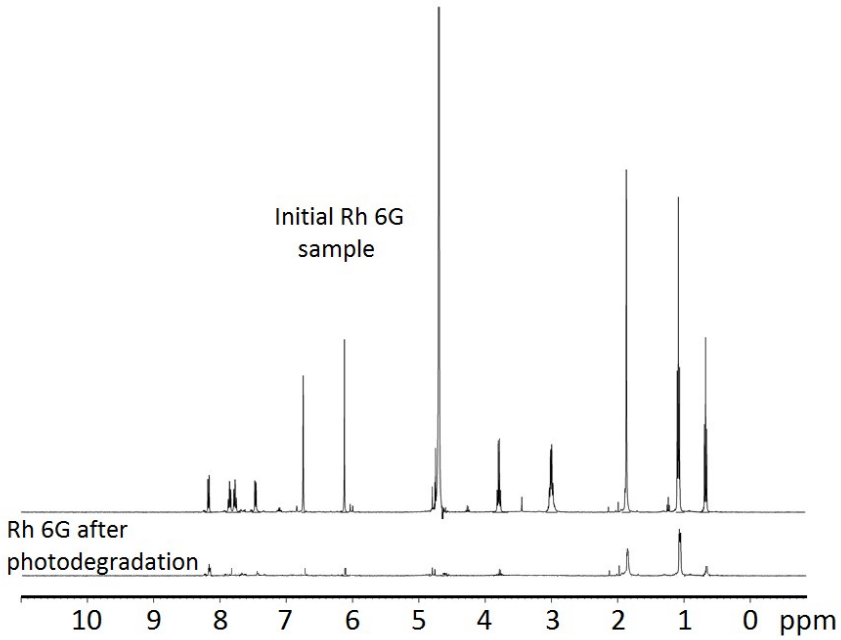

Figure S7. NMR of Rh 6G dye: comparison between before and after photodegradation. *(Procedure: A 1 L solution of 1 mg/L Rh 6G mixed with 5 mg/mL of CdTe/NTU-9 was irradiated under solar light for 30 minutes. The contents were than centrifuged at 10,000 rpm. The remaining solvent was further evacuated using a rotary evaporator. The remaining residue was dissolved in 1 mL of D_2O for analysis.)*

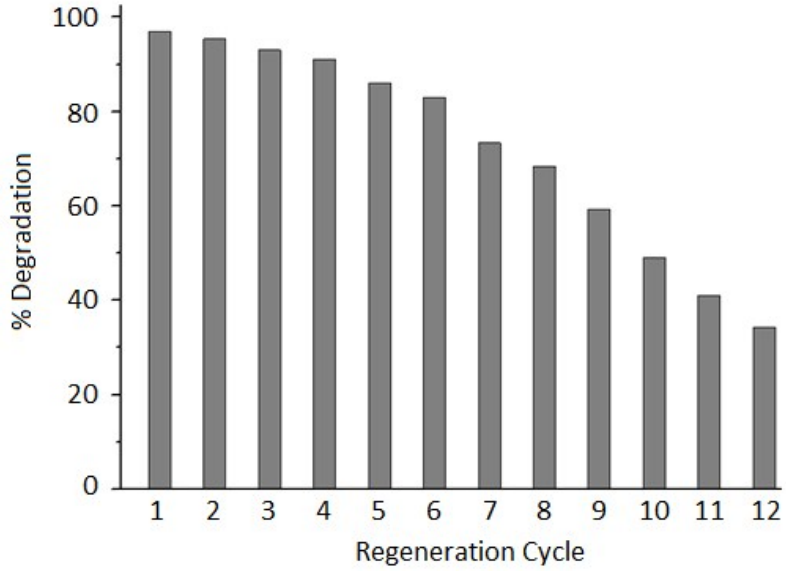

Figure S8. Photodegradation of 1 mg/L Rh 6G with 5 mg/mL CdTe/NTU-9 photocatalyst during successive regeneration cycles (reaction time = 30 min and excitation wavelength = 500 nm).

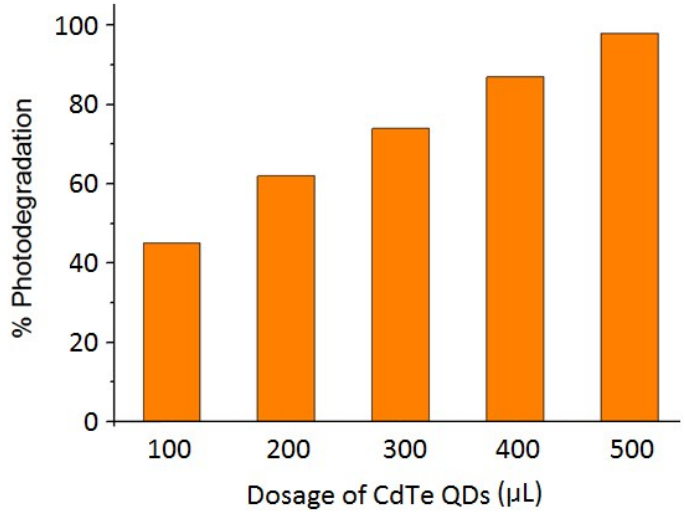

Figure S9. Photodegradation of 1 mg/L Rh 6G with varying contents of CdTe in CdTe/NTU-9 composites (duration of the photodegradation experiment = 30 min and excitation wavelength = 500 nm).

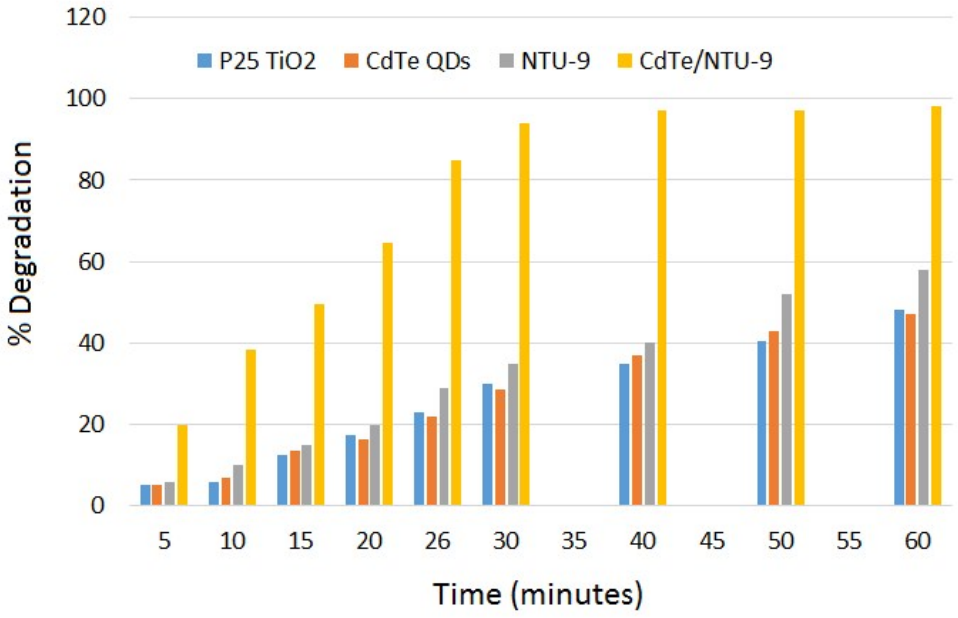

Figure S10. Photodegradation of 1 mg/L Rh 6G with CdTe/NTU-9, CdTe QDs, NTU-9, and P-25 TiO_2 (concentration of photocatalyst = 5 mg/L and excitation wavelength = 500 nm).

Table S2. Comparison of different photocatalyst systems for Rhodamine 6G

S. No.	Photocatalyst composition	Degradation time	Reference
1.	Cu-FeZSM-5 zeolite catalyst	45 minutes	1
2.	Iron(III)-based metal-organic frameworks	60 minutes	2
3.	Graphene-metal oxide composite	200 minutes	4
4.	Molybdophosphate-based Fe-MOF	120 minutes	3
5.	ZnO@Graphene composite	120 minutes	5
6.	p-BiOI@n-$ZnTiO_3$ heterojunction	150 minutes	6
7.	CdTe@Eu-MOF	60 minutes	7

References:

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