Electronic Supplementary Material (ESI) for

Enhanced adsorption and synergistic photocatalytic degradation of tetracycline by MOF-801/GO composite via solvothermal synthesis

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EXPERIMENTAL SECTION

Synthesis of GO. GO was prepared according to the modified Hummers method.[1] In short, 5 g $NaNO_3$ and 5 g 200 mesh natural phosphorus flake graphite powder were successively added into a three-necked flask, then slowly poured into 200 mL of concentrated H_2SO_4, and after stirring in an ice-water bath for 1 h. A total of 20 g of potassium permanganate was slowly added in batches, and the temperature during this process was kept below 10 °C. Then, it was stirred continuously for 26 h in a 38 °C water bath, 200 mL of deionized water was slowly added, and finally the temperature was raised to 84 °C for 15 min. The reaction was stopped and cooled to room temperature. Slowly add H_2O_2 (30 %) until there is no foam in the solution; Finally, the resulted solution was washed with 1mol/L HCl and ultrapure water until it was close to neutral. After dialysis for 1 week, the solution was removed for use.

RESULTS AND DISCUSSION

Subsequently, we performed Raman spectroscopy analysis on GO, MOF-801 and MOF-801/GO composites, as shown in Fig. S1†, where the characteristic signal peak of GO near 1600 cm^{-1} represents the intrinsic Raman signal peak of G-band graphite, located at the peak near 1350 cm^{-1} in the D band is induced by the disordered structure caused by the breathing vibration of sp3 carbon atoms on the aromatic ring, and the signal peak near 2943 cm^{-1} is caused by the disordered lattice of the material. The MOF-801/GO composite has narrower peak shapes in the D and G bands than single GO, which indicates that the disorder of the overall composite is slightly reduced after GO is compounded with MOF-801, which is consistent with MOF-801. The results of partial aggregation of 801/GO were consistent.

To confirm the thermal stability of the materials, we performed thermogravimetric analysis of GO, MOF-801, and MOF-801/GO, whose TGA curves are shown in Fig. S2† With the increase of temperature, MOF-801 showed three obvious weight loss peaks. The first weight loss stage is mainly around 25~100 ℃, we believe that the weight loss peak at this stage is caused by the release of water molecules from the outer cage of MOF-801/GO; the second weight loss stage is around 160~280 ℃, we speculate This is due to the evaporation of some water molecules remaining in the internal pores of MOF-801; while the weight loss peak at 280~400 °C is due to the mass loss caused by the decomposition of the MOF material. Therefore, the thermal stability was enhanced when GO was incorporated into MOF-801.

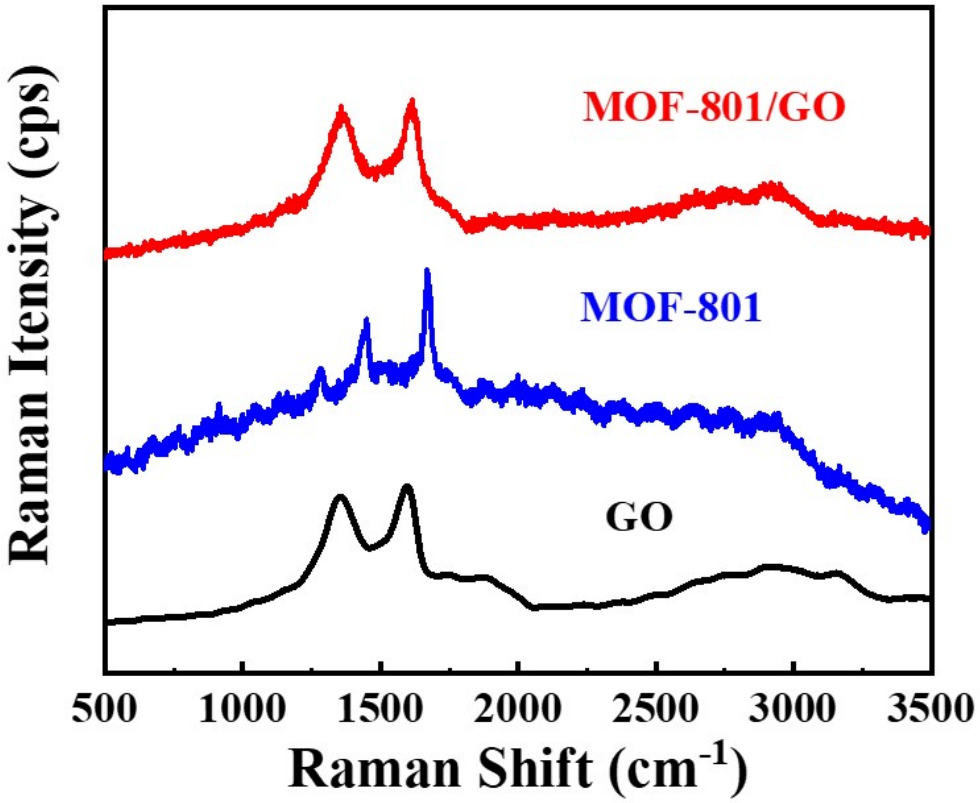

Fig. S1 Raman spectrum of GO, MOF-801 and MOF-801/GO.

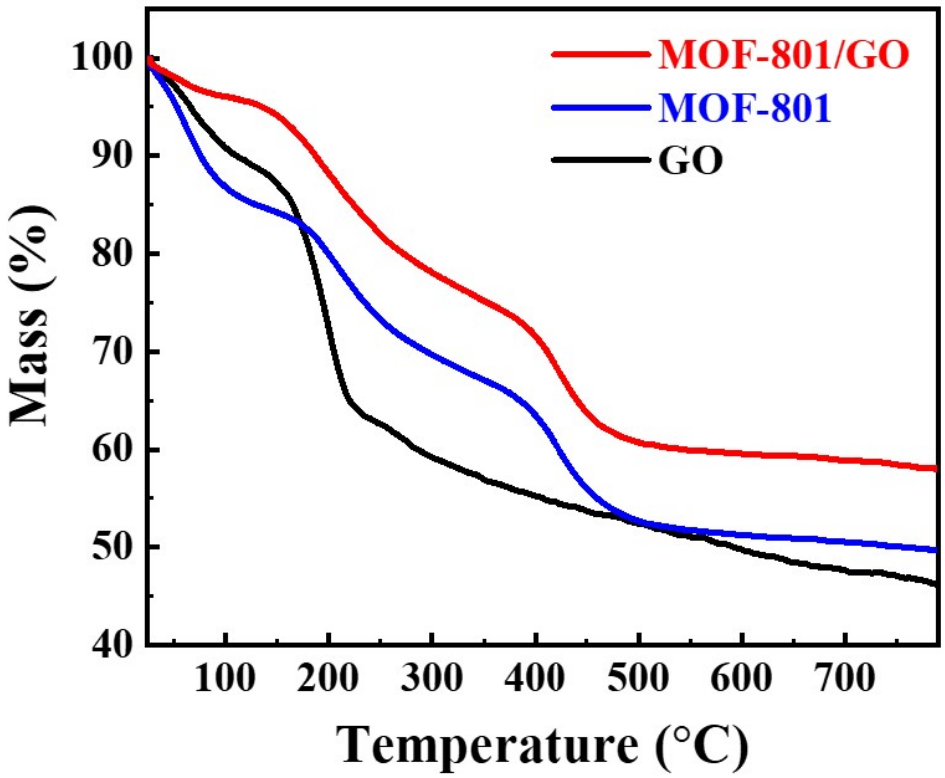

Fig. S2 Thermogravimetric spectrum of GO, MOF-801 and MOF-801/GO.

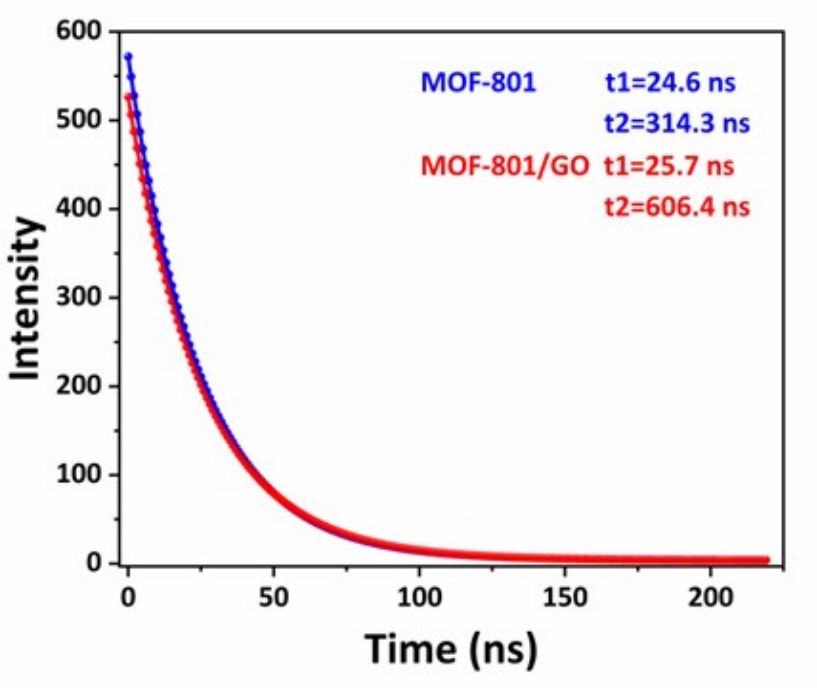

Fig. S3 Fluorescence lifetime diagram of MOF-801 and MOF-801/GO.

Table S1 Comparison of TC removal efficiency between this work and various photocatalysts.

Photocatalysts	Catalyst concentration ($g\ L^{-1}$)	TC concentration ($mg\ L^{-1}$)	Removal efficiency (react time)	Reference
g-C_3N_4/Fe_2N	1	20	95.7 % (30 min)	[2]
g-C_3N_4/MnO_2/GO	0.5	10	91.4 % (60 min)	[3]
Nb-RGO-0.5	0.4	30	74.69 % (9 min)	[4]
MoS_2@Z-5	0.2	20	87.23 % (210 min)	[5]
CdS/Bi	0.1	20	90 % (60 min)	[6]
RGO@BT	0.2	40	94.7 % (120 min)	[7]
rGO/Ag_2CO_3	0.3	10	91.64 % (60 min)	[8]
Fe_3O_4@GO-CoPc	0.4	40	99 % (120 min)	[9]
BiOI/MIL-121	1	20	68 % (120 min)	[10]
Cu-TiO_2/GO	1	20	98 % (90 min)	[11]
CdS/rGO/ZFO	0.2	50	80 % (60 min)	[12]
GO/Bi_2WO_6	0.4	20	84 % (60 min)	[13]
g-C_3N_4/GO/BiOBr	0.5	10	96 % (120 min)	[14]
CdS-TNs/rGO	0.75	30	84 % (180 min)	[15]
MOF-801/GO	0.6	20	97 % (60 min)	This work

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