Electronic Supplementary Information

The first ternary Nd-MOF/GO/Fe_3O_4 nanocomposite exhibiting excellent photocatalytic performance for dye degradation

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Table S1. Selected bond lengths (Å) and angles (°) for MOF-1.

Nd1—O6^{i}	2.328 (3)	Nd1—O9^{iv}	2.453 (3)	Nd1—O4	2.536 (3)
Nd1—O5^{ii}	2.382 (3)	Nd1—O10	2.458 (7)	Nd1—O11	2.537 (6)
Nd1—O7^{iii}	2.409 (3)	Nd1—O4^{v}	2.473 (3)	Nd1—O8^{iv}	2.646 (3)
O6^{i}—Nd1—O5^{ii}	165.26 (11)	O6^{i}—Nd1—O9^{iv}	121.43(12)	O6^{i}—Nd1—O10	106.01 (19)
O6^{i}—Nd1—O7^{iii}	89.86 (10)	O5^{ii}—Nd1—O9^{iv}	71.43 (11)	O5^{ii}—Nd1—O10	85.51 (18)
O5^{ii}—Nd1—O7^{iii}	85.25 (10)	O7^{iii}—Nd1—O9^{iv}	131.44 (15)	O7^{iii}—Nd1—O10	70.82 (17)
O9^{iv}—Nd1—O10	65.5 (2)	O7^{iii}—Nd1—O4^{v}	139.65 (9)	O5^{ii}—Nd1—O4	82.39 (9)
O6^{i}—Nd1—O4^{v}	84.42 (10)	O9^{iv}—Nd1—O4^{v}	83.84 (15)	O7^{iii}—Nd1—O4	73.92 (9)
O5^{ii}—Nd1—O4^{v}	90.32 (9)	O6^{i}—Nd1—O4	82.90 (10)	O9^{iv}—Nd1—O4	139.64 (14)
O10—Nd1—O4	143.48 (17)	O5ii—Nd1—O11	112.85 (19)	O4v—Nd1—O11	146.95 (17)
O4^{v}—Nd1—O4	65.75 (10)	O7^{iii}—Nd1—O11	68.59 (17)	O4—Nd1—O11	137.57 (17)
O6^{i}—Nd1—O11	77.95 (19)	O9^{iv}—Nd1—O11	81.9 (2)	O6^{i}—Nd1—O8^{iv}	71.63 (11)
O5^{ii}—Nd1—O8^{iv}	120.90 (10)	O9^{iv}—Nd1—O8^{i}v	49.81 (12)	O4—Nd1—O8^{iv}	138.21 (11)
O7^{iii}—Nd1—O8^{iv}	136.37 (11)	O4^{v}—Nd1—O8^{iv}	79.00 (11)	O11—Nd1—O8^{iv}	69.03 (18)

Symmetry codes: (i) −x+1, −y+1, −z+2; (ii) −x+1, −y+1, −z+1; (iii) −x, −y+1, −z+2; (iv) x+1, y+1, z−1; (v) −x+2, −y+1, −z+1; (vi) x−1, y−1, z+1.

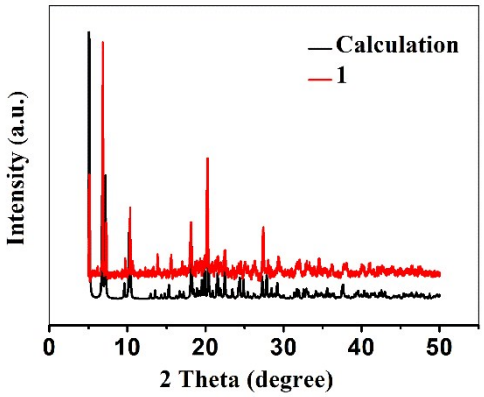


Fig. S1 The PXRD patterns of **MOF-1** (calculation and experiment) at room temperature.

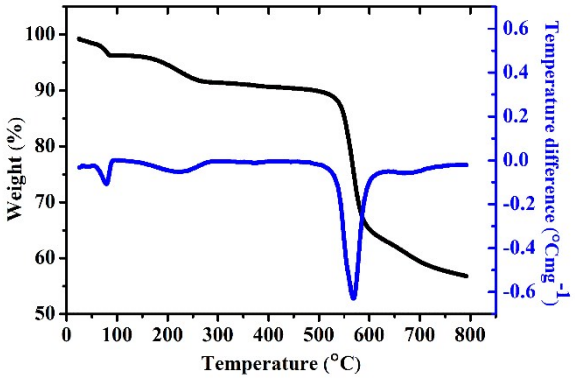


Fig. S2 TGA and DTA plots of **MOF-1.**

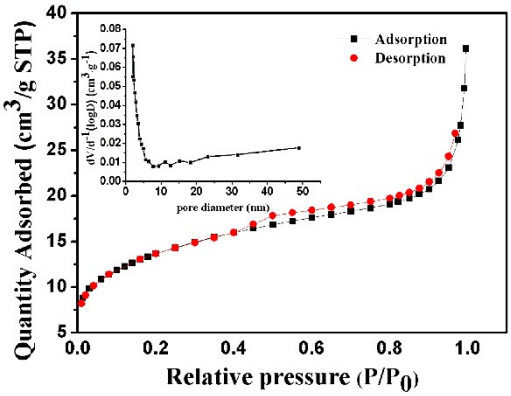


Fig. S3 N_2 adsorption-desorption isotherms and pore-size distribution curve (the inset) of **MOF-1**/GO/Fe_3O_4 nanocomposite.

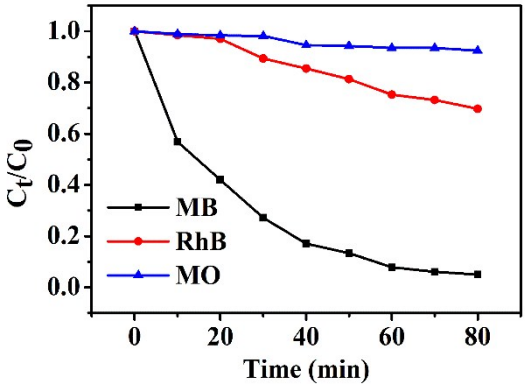


Fig. S4 Photocatalytic degradation of methylene blue (MB), Rhodamine B (RhB), Methyl orange (MO) as a function of irradiation time for**MOF-1**/GO/Fe_3O_4.

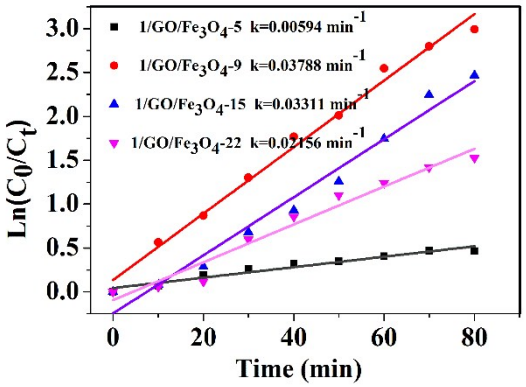


Fig. S5 First-order kinetics plot for the photodegradation of MB by **MOF-1**/GO/Fe_3O_4 under the irradiation of visible light.

Table S2. A summary of recent MOFs-based hybrid nanocomposite photocatalysts for dye degradation

Cataiysts	Dyes usage (mg)	Catalysts usage (mg)	Dyes usage/ catalysts usage	The rate constants (min^{-1})	Ref
$BiVO_4$/MIL-53(Fe)/GO	1.5 (RhB)	10	15/100	0.01811	[1]
M88/GO	0.5 (RhB)	20	2.5/100	0.0645	[2]
NH_2-MIL-53(Al)/RGO	2.1 (MB)	10	21/100	0.0039	[3]
Ag/rGO/MIL-125(Ti)	5 (RhB)	40	12.5/100	0.0644	[4]
GR/MIL-53(Fe)	0.5 (RhB)	10	5/100	0.07772	[5]
MIL-53(Fe)–rGO	3 (MB)	100	3/100	0.0285	[6]
MOF-1/GO/Fe_3O_4	0.15 (MB)	2	7.5/100	0.03788	This work

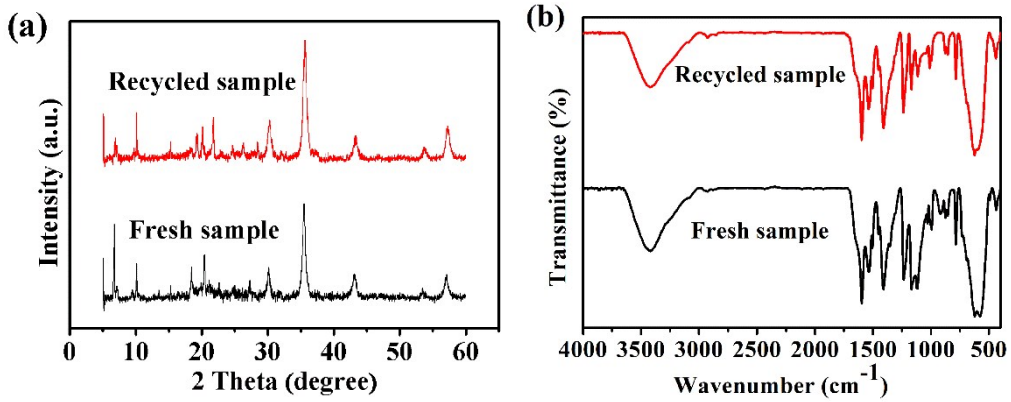
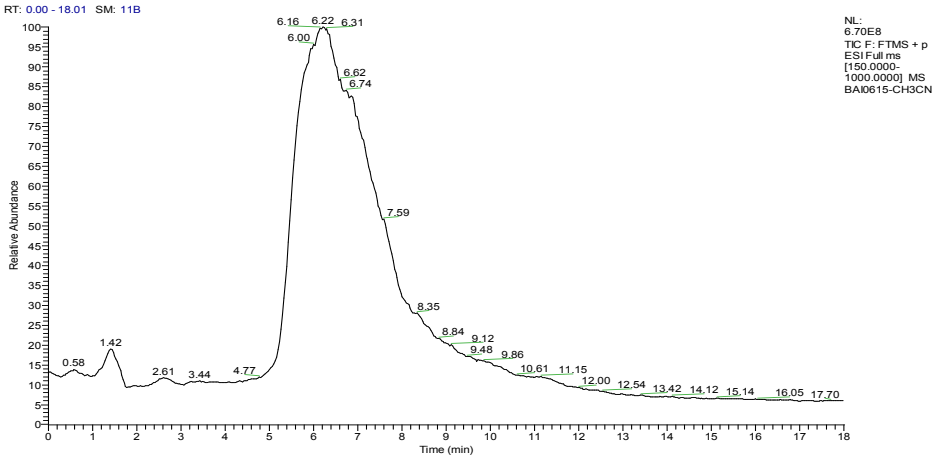


Fig. S6 PXRD patterns (a) and FTIR spectra (b) of **MOF-1**/GO/Fe_3O_4 before and after the photocatalytic reaction.

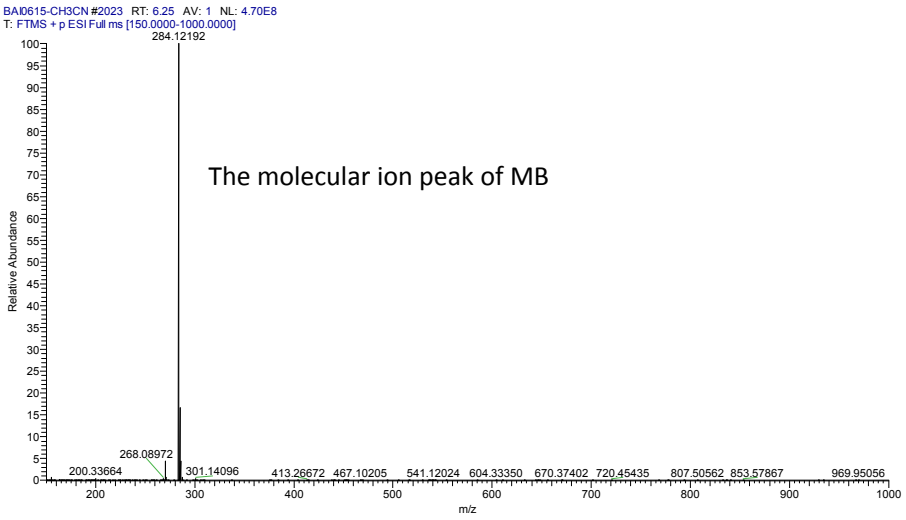
Table S3. The concentration of iron during the reaction

pH	iron concentration (mg/L)	**MOF-1**/GO/Fe_3O_4 concentration (mg/L)
3	2.166	133
5	0.221	133

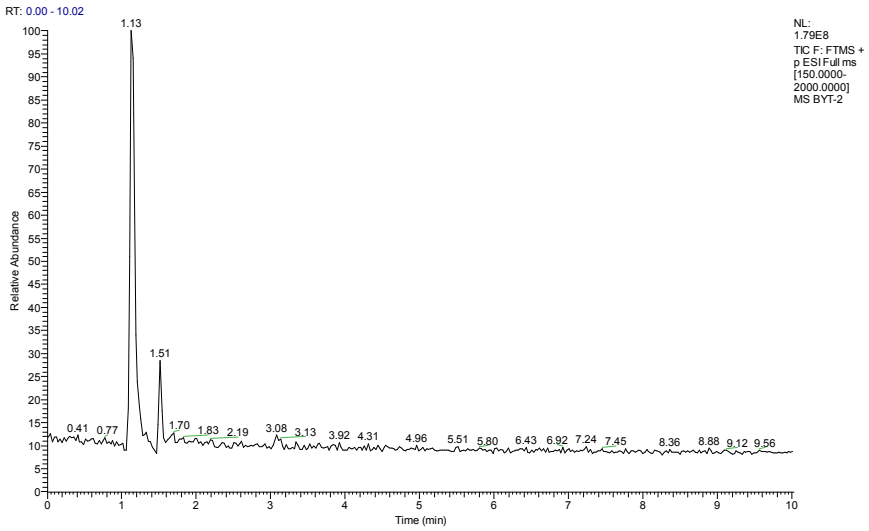
(a)



(b)



(c)



(d)

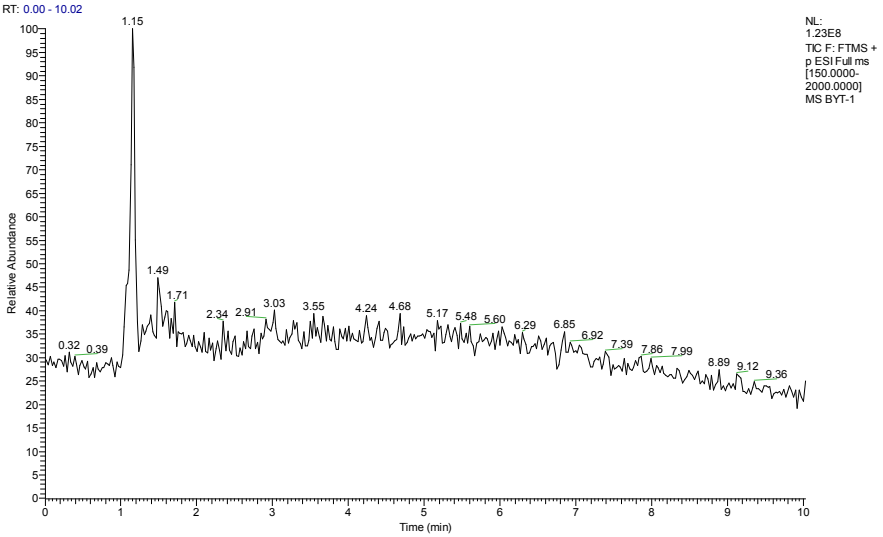


Fig. S7 Liquid chromatography of MB aqueous solution without the catalyst (a). Mass spectrum corresponding to the MB aqueous solution without the catalyst at a retention time of 6.25 min in liquid chromatography (b). Liquid chromatography after photocatalytic degradation of MB aqueous solution by MOF-1/GO/Fe_3O_4 (c). Liquid chromatography of distilled water (d).

References

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