Supporting Information

NH_2-MIL-88B ($Fe_\alpha In_{1-\alpha}$) mixed-MOFs designed for enhancing photocatalytic Cr (VI) reduction and tetracycline elimination

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Chemicals

2-aminoterephthalic acid (NH_2-BDC), iron nitrate nonahydrate ($Fe(NO_3)_3 \cdot 9H_2O$), indium nitrate hydrate ($In(NO_3)_3 \cdot xH_2O$), tetracycline hydrochloride (TC-HCl), potassium dichromate ($K_2Cr_2O_7$), diphenylcarbazide (DPC), N,N-dimethylformamide (DMF), acetonitrile ($CNCH_3$), and methanol (CH_3OH), hydrochloric acid (HCl) were supplied by Sinopharm Chemical Reagents Limited Company and used as original form without further purification.

Characterization

The X-ray diffraction (XRD, Germany) was recorded with a LabX-6000 X-ray diffractometer. The infrared spectra were obtained by Nicolets50 Fourier transform infrared spectrometer (FT-IR, America). The morphology and microstructures of samples were analyzed via the scanning electron microscope (SEM, S-4800, Japan) with an energy-dispersive X-ray (EDX) spectrometer. The transmission electron microscopy (TEM) and the high-resolution TEM (HR-TEM) were characterized with a JEM2100 transmission electron microscopy (TEM, JEOL) operated at 200 kV. The X-ray photoelectron spectroscopy measurements were investigated, using an ESCALAB250 X-ray electron spectrometer with Al Kα (1486.6 eV) and Mg Kα (1253.6 eV) (XPS, America). The UV-vis absorption spectra of samples were recorded by the Lambda35 UV-visible spectrophotometer (DRS, America). The N_2 adsorption-desorption isotherm and Brunauer-Emmett-Teller (BET, America) method were used to test the porous nature and surface area with Autosorb-IQ-XR. The photocatalytic experiments were carried out under 300 W Xe lamps (Xenon light source, CEL-HXF300, Beijing China Education Au-light Co., Ltd) with a cutoff filter of 420nm.

Tab. S1. Doped amounts of In on NH_2-MIL-88B (Fe) by the ICP-AES analysis.

Samples	$n_{(Fe)}$:$n_{(In)}$
NH_2-MIL-88B	—
NH_2-MIL-88B ($Fe_{0.8}$ $In_{0.2}$)	8.5:1.5
NH_2-MIL-88B ($Fe_{0.6}$ $In_{0.4}$)	6.3:3.7
NH_2-MIL-88B ($Fe_{0.4}$ $In_{0.6}$)	4.7:5.3
NH_2-MIL-88B ($Fe_{0.2}$ $In_{0.8}$)	2.6:7.4

Tab. S2. Surface areas of NH_2-MIL-88B (Fe) and NH_2-MIL-88B ($Fe_{0.6}In_{0.4}$) samples

Samples	Surface area ($m^2\ g^{-1}$)
NH_2-MIL-88B (Fe)	366
NH_2-MIL-88B ($Fe_{0.6}In_{0.4}$)	162

Tab. S3. Comparison with the atomic percentage of C, N, In, O, and Fe of NH_2-MIL-88B ($Fe_{0.6}In_{0.4}$) between EDX and XPS.

Elt.	EDX At%	XPS At. %
C	45.16	66.95
N	5.56	5.44
O	42.14	23.77
Fe	4.28	2.39
In	2.86	1.45

Tab. S4. Reaction rate constants (k) and the correlation coefficient value (R^2) of Cr (VI) photocatalytic reduction under the different catalysts

Samples	k/ min^{-1}	R^2
NH_2-MIL-88B ($Fe_{0.6}In_{0.4}$)	0.0138	0.978
NH_2-MIL-88B (Fe)	0.0035	0.961

Tab. S5. Reaction rate constants (k) and the correlation coefficient value (R^2) of Cr (VI) photocatalytic reduction under the NH_2-MIL-88B ($Fe_\alpha In_{1-\alpha}$)

Samples	k/ min^{-1}	R^2
NH_2-MIL-88B ($Fe_{0.8}$ $In_{0.2}$)	0.0075	0.999
NH_2-MIL-88B ($Fe_{0.6}$ $In_{0.4}$)	0.0138	0.978
NH_2-MIL-88B ($Fe_{0.4}$ $In_{0.6}$)	0.0094	0.989
NH_2-MIL-88B ($Fe_{0.2}$ $In_{0.8}$)	0.0087	0.993

Tab. S6. Reaction rate constants (k) and the correlation coefficient value (R^2) of TC-HCl photocatalytic degradation under the different catalysts

Samples	k/ min^{-1}	R^2
NH_2-MIL-88B ($Fe_{0.6}$ $In_{0.4}$)	0.0096	0.990
NH_2-MIL-88B (Fe)	0.0032	0.990

Tab. S7. Reaction rate constants (k) and the correlation coefficient value (R^2) of TC-HCl photocatalytic degradation under the NH_2-MIL-88B ($Fe_\alpha In_{1-\alpha}$)

Samples	k/ min^{-1}	R^2
NH_2-MIL-88B ($Fe_{0.8}$ $In_{0.2}$)	0.0044	0.997
NH_2-MIL-88B ($Fe_{0.6}$ $In_{0.4}$)	0.0096	0.990
NH_2-MIL-88B ($Fe_{0.4}$ $In_{0.6}$)	0.0069	0.999
NH_2-MIL-88B ($Fe_{0.2}$ $In_{0.8}$)	0.0053	0.998

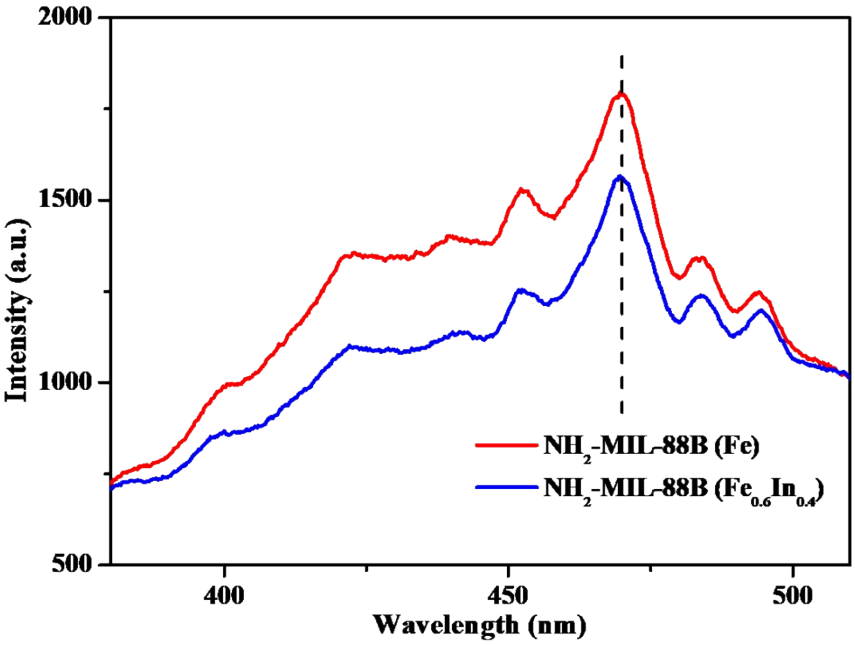

Fig. S1. PL spectra of NH_2-MIL-88B (Fe) and NH_2-MIL-88B ($Fe_{0.6}In_{0.4}$)