Supplementary Materials

Synthesis methods

NH_2-MIL-88B(Fe) is synthesized by the hydrothermal method according to the reports[S1, 2]. First, 2.0 mmol of $FeCl_3 \cdot 6H_2O$ and 2.0 mmol of NH_2-BDC were added into 42 mL of DMF solution, and then the solution was stirred uniformly at room temperature. Subsequently, the mixture was transferred to a 100 mL Teflon-reactor for conducting solvothermal treatment at 383 K for 12.0 h. After the reaction kettle was cooled to room temperature, the suspension was centrifuged at 3,600×g for 5.0 min, giving brown products which were washed three times using EtOH. Finally, the product was dried at 343 K for 12.0 h in a vacuum oven.

The NH_2-MIL-101 (Fe) is synthesized according to the method described in the literature [S3]. 2.48 mmol $FeCl_3 \cdot 6H_2O$ and 1.24 mmol NH_2-BDC were added to 20.0 mL DMF, and the mixture was stirred by a magnetic stirrer. Heated at 383 K for 20 h in a Teflon reactor. The suspension was then centrifuged at 2,100×g and washed several times by washing hot DMF (343 K, 15 min). Finally, the product was dried in a vacuum oven at 343 K overnight.

Adsorption isotherm and kinetic models

The equation of the Langmuir isotherm [S4-6] is as follows:

$$\frac{C_e}{q_e} = \frac{1}{q_m k_L} + \frac{C_e}{q_m} \tag{S1}$$

This equation assumes that the adsorbent surface has a uniform adsorption capacity, there is no interaction between the adsorbed molecules, only forming monolayer adsorption on the t surface. In this equation, C_e is the equilibrium concentration of IMC in the solution, mg/L. q_e, q_m are the equilibrium and the maximum amount of IMC adsorbed on the two MOFs, mg/g. And k_L is the Langmuir constant, represents the strength of the adsorption capacity.

The Freundlich isotherm [S4-6] is an empirical formula without any assumptions. The equation is commonly expressed in logarithmic form:

$$\lg q = \frac{1}{n} \lg C + \lg k_f \tag{S2}$$

where k_f is the Freundlich adsorption constant which reflects the adsorption ability, 1/n is an index, indicating the degree of difficulty of adsorption.

The empirical kinetic models were calculated by the Eq. (S3) and (S4) [S4, 7, 8]:

$$\log(q_e - q_t) = \log q_e - k_1 t \qquad \text{(S3)}$$

$$\frac{t}{q_t} = \frac{1}{k_2 q_{e2}} + \frac{t}{q_e} \qquad \text{(S4)}$$

q_e and q_t are the amount of adsorption at the equilibrium time and the amount of adsorption at time t, k_1 is the pseudo first order kinetic constant and k_2 stands for the second order kinetic constant.

Table S1. Research on Catalytic Degradation of Pollutants Based on Fenton-like Principle

Pollutants	Catalyst	Approach	Experimental parameters	Time (min)	Removal rate (%)	Ref.
Methyl orange (MO)	nano-metallic particles (NMPs)	Fenton-like processes	0.05 g/L NMPs; 40 mg/L MO; 50 mM H_2O_2; pH 3.0	40	100	[S9]
Rhodamine B （Rh B）	Fe_3O_4 magnetic nanoparticles	Fenton-like processes	0.01 mM Rh B; 0.5 g/L Fe_3O_4 (S1); 40 mM H_2O_2; pH 6.4 and 55 ℃.	120	100	[S10]
IMC	$FeSO_4·7H_2O$	Fenton-like processes	0.4 mM IMC; 0.8 mM $FeSO_4·7H_2O$; 8.0 mM H_2O_2; pH 3	120	100	[S11]
IMC	CeO_2	photo Fenton-like processes	5×10-5 M IMC; 0.1 mL/mL H_2O_2; 1 mg/mL CeO_2	180	35	[S12]
IMC	Fe-ZSM5	photo Fenton-like processes	50 mg/L IMC; 2 g/L Fe-ZSM5; pH 7; 1 g/L H_2O_2	420	98	[S13]
IMC	NH_2-Fe-MILs	Adsorption and Fenton-like processes	40 mg/L IMC; 0.24 g/L NH_2-MIL-101(Fe) or 0.3 g/L NH_2-MIL-88B(Fe); 2.0 μL/mL H_2O_2; pH 6.4;	150 (Adsorption and Fenton-like processes)	97 (NH_2-MIL-101(Fe)); 93 (NH_2-MIL-88B(Fe))	This work

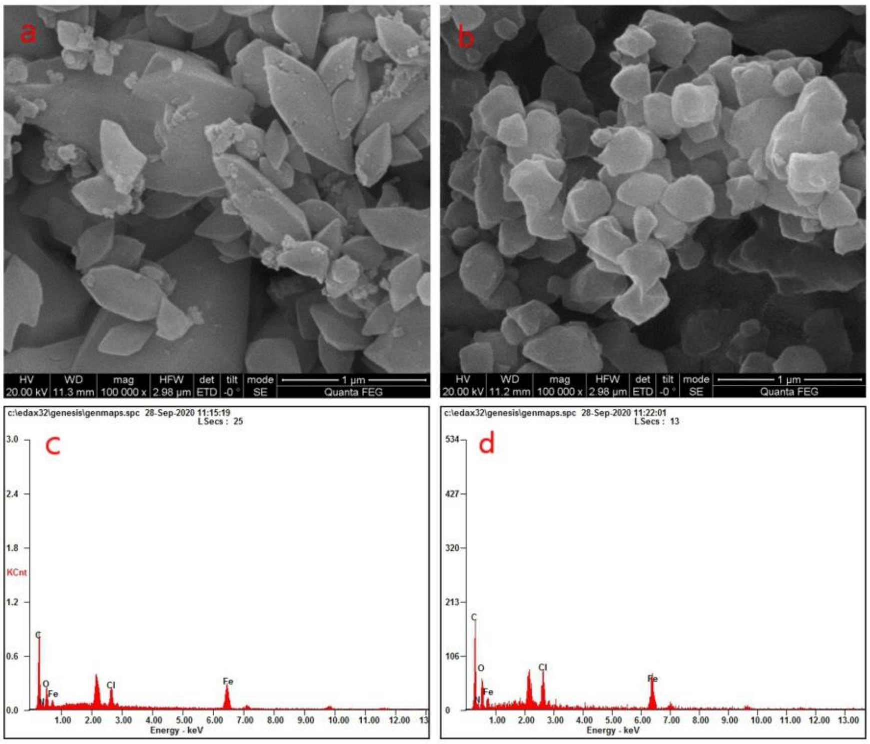

Fig. S1. SEM images of (a) NH_2-MIL-88B(Fe) (b) NH_2-MIL-101(Fe), EDS results of NH_2-MIL-88B (Fe) (c) and (d) NH_2-MIL-101(Fe).

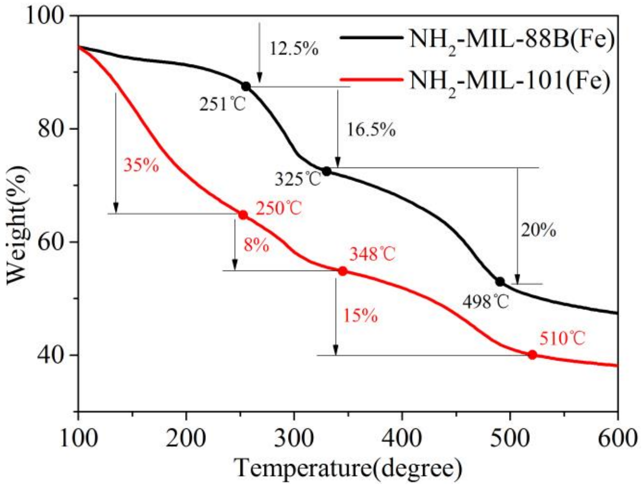

Fig. S2. TG curve of as-prepared NH_2-MIL-88B(Fe) and NH_2-MIL-101(Fe) crystals under N_2 atmosphere.

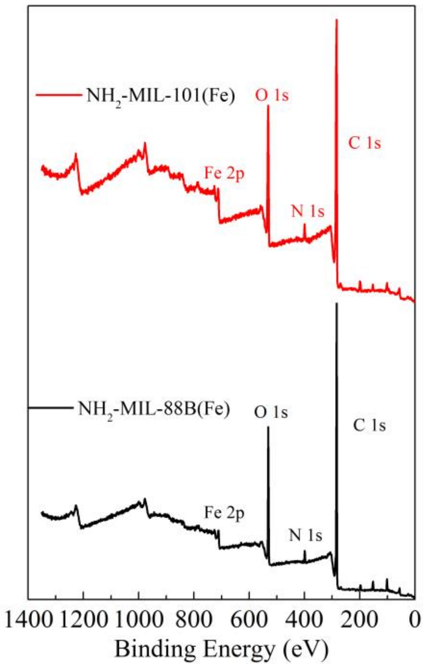

Fig. S3. Survey XPS of NH_2-MIL-88B(Fe) and NH_2-MIL-101(Fe).

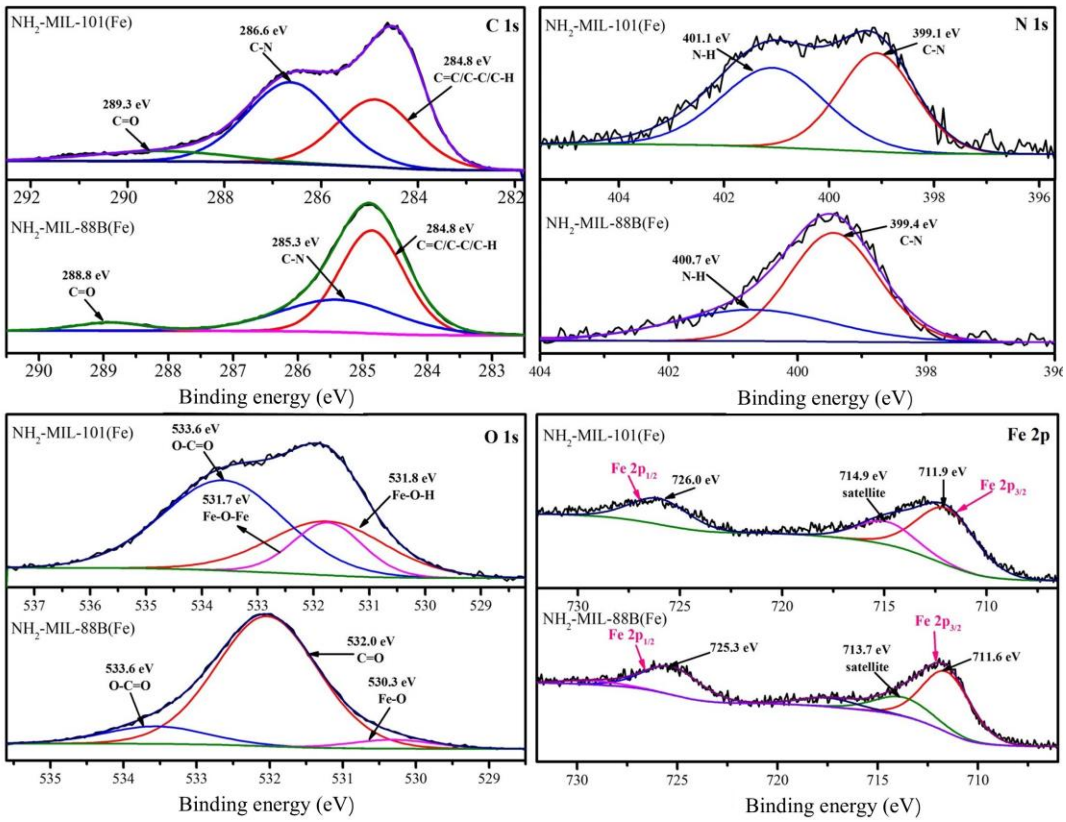

Fig. S4. XPS spectra of catalysts of NH_2-MIL-88B(Fe) and NH_2-MIL-101(Fe).

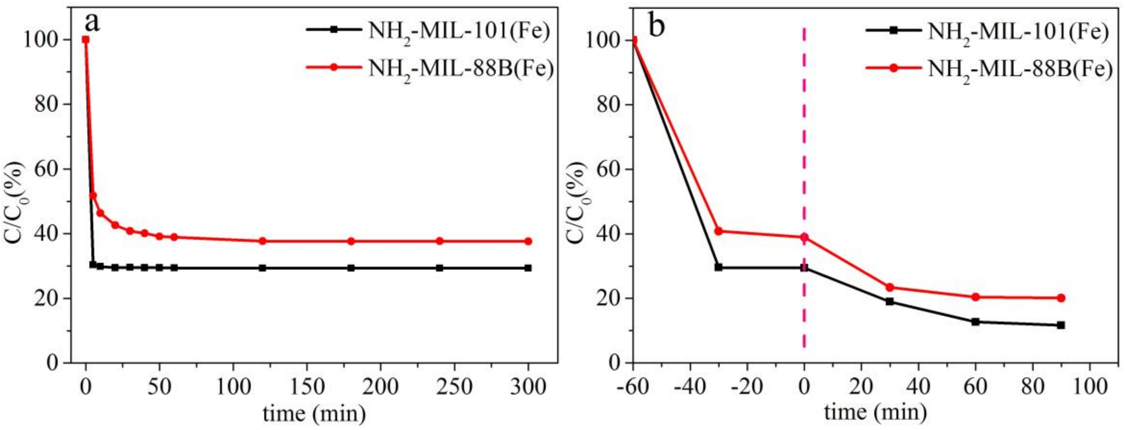

Fig. S5. (a) Adsorption capacity abilities of NH_2-Fe-MILs; (b) Fenton-like catalytic degradation abilities of NH_2-Fe-MILs. Reaction conditions: IMC (50 mg/L); catalyst (0.2 g/L); initial pH 6.4.

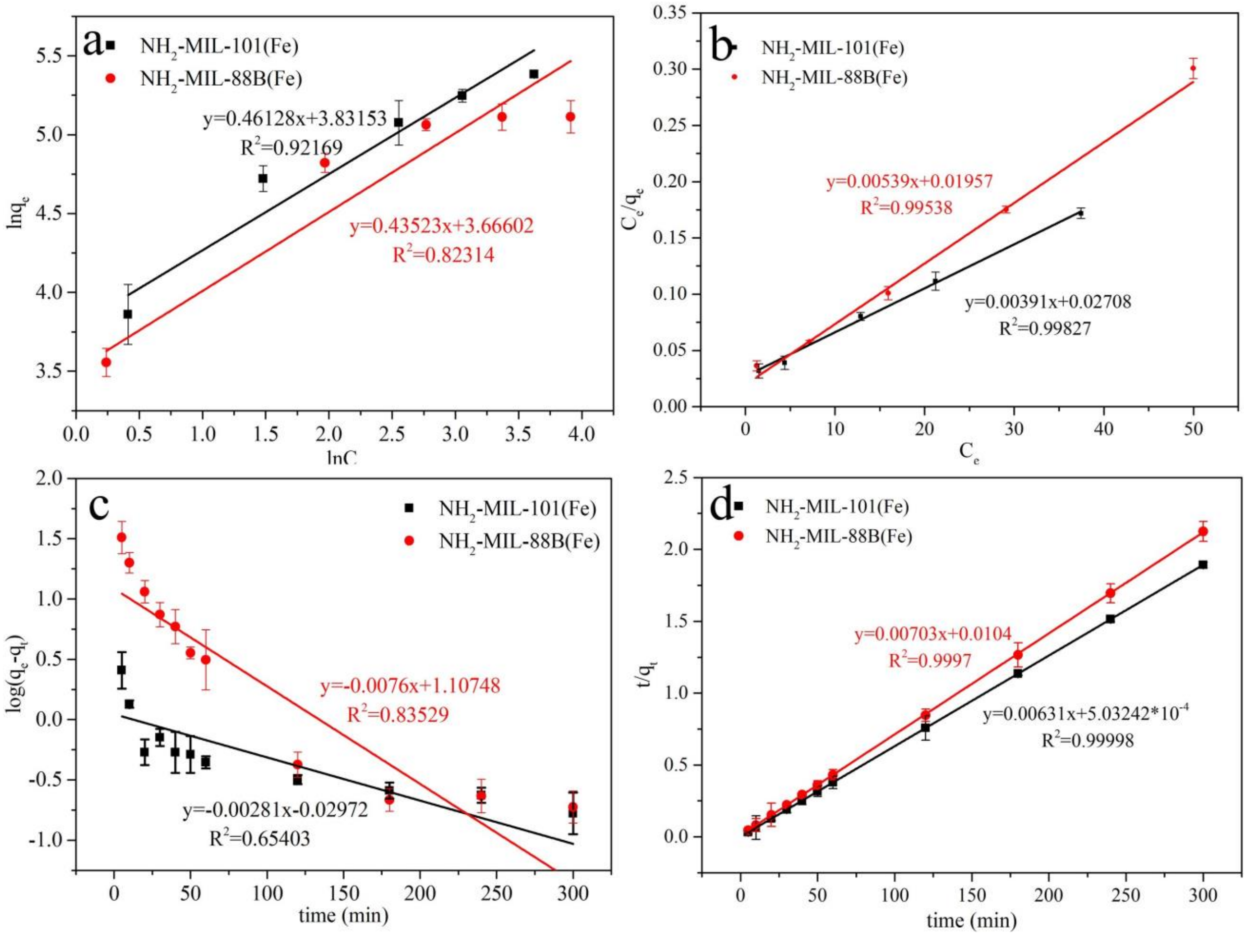

Fig. S6. (a) Langmuir isotherm plots; (b) Freundlich isotherm plots; (c) Pseudo-first-order and (d) Pseudo-second-order. Reaction conditions: IMC (50 mg/L); catalyst (0.2 g/L); initial pH 6.4.

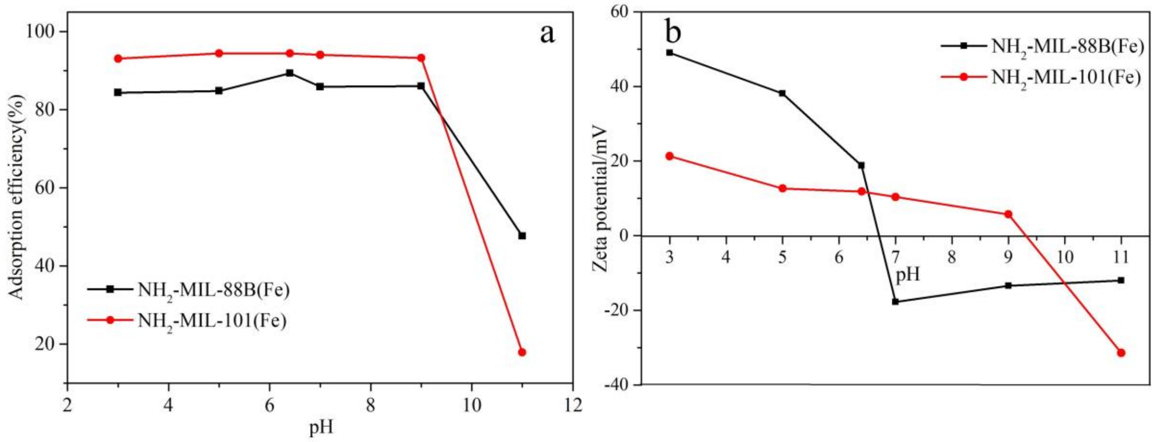

Fig. S7. (a) Effect of pH values on the adsorption of IMC onto NH_2-MIL-88B (Fe) and NH_2-MIL-101 (Fe). Reaction conditions: 60 mg/L of IMC concentration, 0.3 g/L catalyst (b)Zeta potential of NH_2-MIL-88B (Fe) and NH_2-MIL-101 (Fe) as a function of pH value (1 mg/mL water dispersion solution).

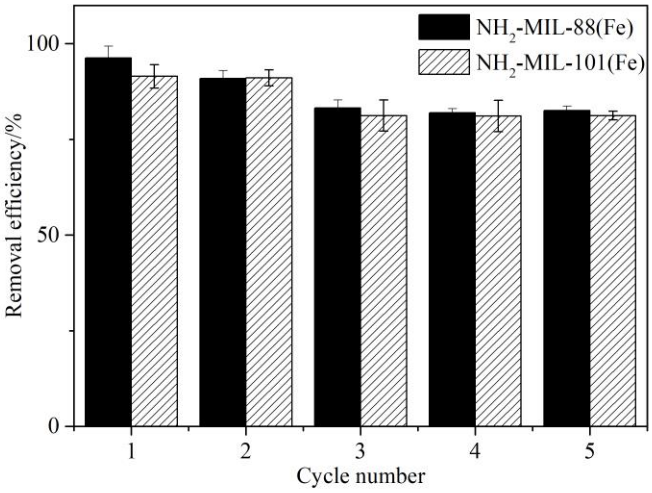

Fig. S8. The cycling runs of the NH_2-MIL-88B(Fe) and NH_2-MIL-101(Fe) materials for the IMC removal efficiency.

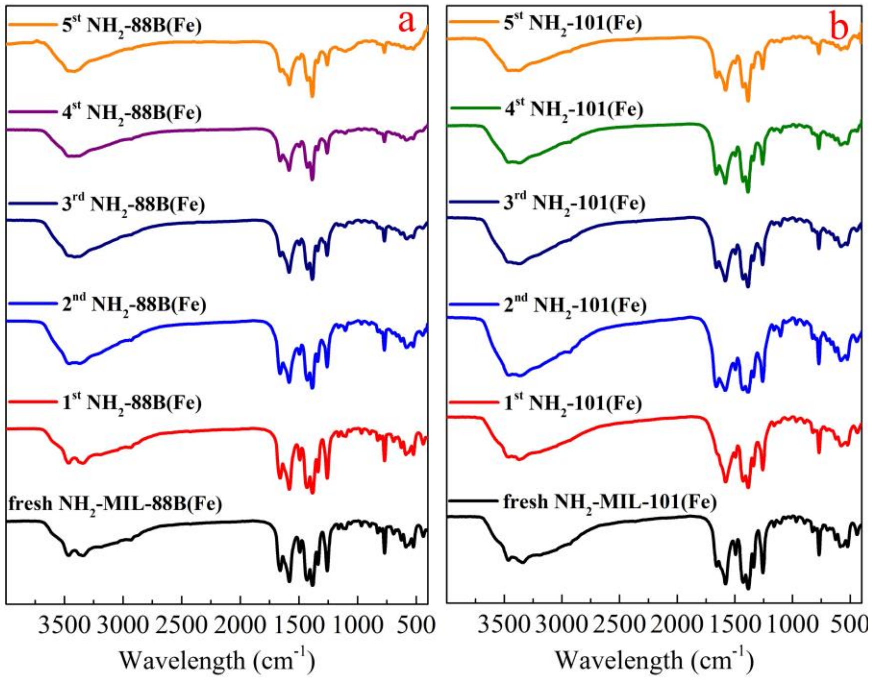

Fig. S9. FT-IR spectra of NH_2-MIL-88B(Fe) and NH_2-MIL-101(Fe) materials before and after the reaction.

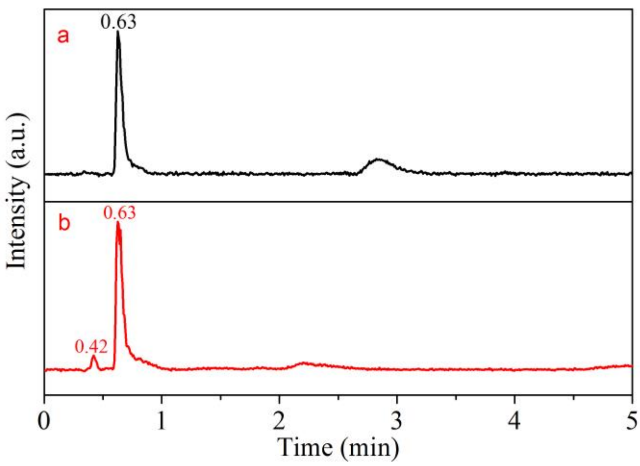

Fig. S10. (a) The total ion current of IMC untreateobtained, (b)Fenton-like samples after degradation.

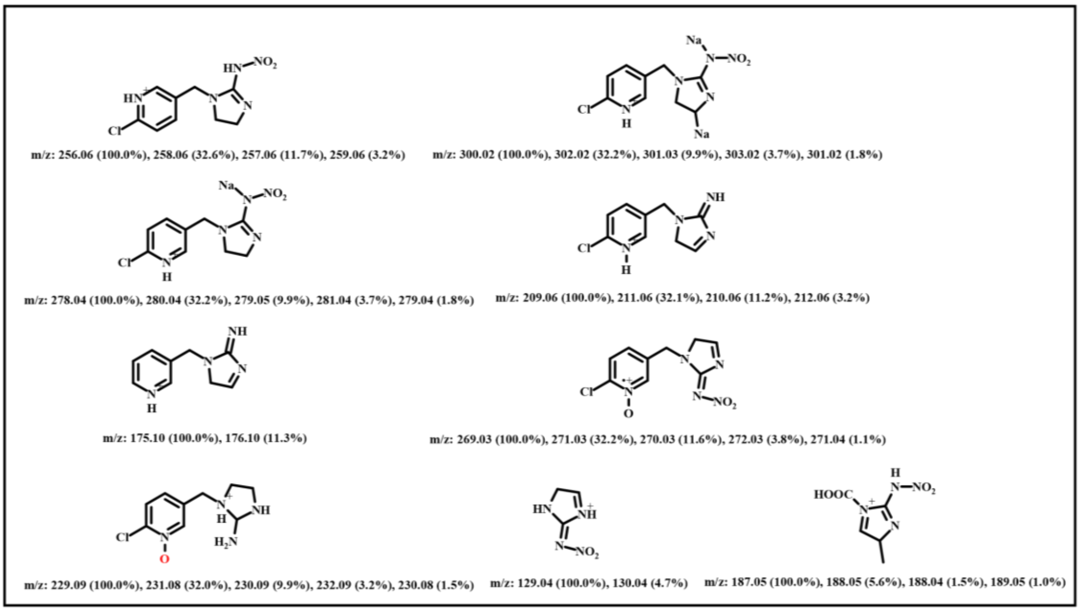

Fig. S11. Proposed fragment ions.

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