Supplementary Information

In-situ synthesis of hierarchical MIL-100(Fe) modified nanofiber membrane for efficient removal of levofloxacin

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Materials

Polyacrylonitrile (PAN, M_w = 8,000) was obtained from Jilin Carbon Group. Chemical. N, N-dimethylformamide (DMF) (analytically pure), Ferric nitrate ($Fe(NO_3)_3 \cdot 9H_2O$) (98.5% purity) and anhydrous ethanol were purchased from Tiantai Chemical Corporation. 1,3,5-Benzenetricarboxylic acid (BTC) (98% purity), Tris (hydroxymethyl) aminomethane hydrochloride (Tris) (>99% purity), Dopamine hydrochloride (DA) (98% purity) and Levofloxacin (LVX) (>98% purity) were purchased from Shanghai Aladdin Chemical Technology Co., Ltd.

Characterization

The morphology and EDS of the fibers were observed with field emission scanning electron microscopy (SEM Shimadzu SSX-550) and transmission electron microscope (TEM; JEOL JEM-3010). The pH of the solution was measured by a pH meter (STARTER2100). X-ray diffraction (XRD) was measured by Rigaku D/Max 2500 diffractometer, Cu Kα radiation (λ = 1.54 Å), generator voltage 40 kV, generator current 40 mA. Thermogravimetric analysis (TGA) was performed by TGA Instruments Q50, and the heating rate was 5°C/min. The existence of different functional groups was studied by Fourier transform infrared spectroscopy (FT-IR), and the spectrum was obtained on the Nicolet iS50 FT-IR spectrophotometer equipped with ATR. The absorbance of the solution was measured by UV-visible spectrophotometer (SHIMADZU UV-2501) at 290 nm, and the adsorption capacity was calculated. XPS spectra were recorded with high-resolution X-ray photoelectron spectroscopy (XPS,

ESCALAB250, Thermo Scientific). Zeta potential were characterized with zeta potential detecting instrument (Anton Paar, SurPASS).

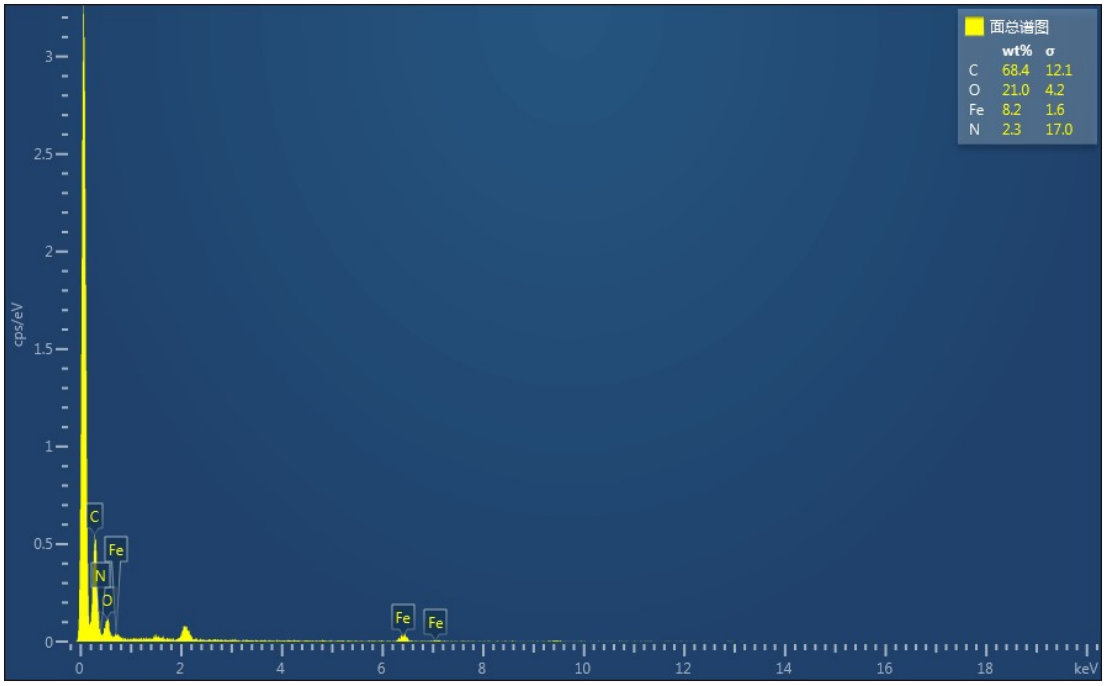

Fig.S1. EDS spectrum of MIL-100(Fe)-PNFM.

Table S1. The BET surface area and Pore size of different samples.

Samples	BET surface	Pore size (nm)
BTC-PNFM	5.24	4.98
PDA-PNFM	13.44	4.94
MIL-100(Fe)-PNFM	129.24	3.90

Equations:

$$q\ (mg/g) = \frac{\left(C_0 - C_e\right)V}{W} \tag{1}$$

where C_0 and C_e (mg/L) are the initial concentration and the equilibrium concentration of adsorbate in the measured solution respectively, V (L) is the volume of the measured solution, while W (g) is the weight of the added adsorbent.

Pseudo-first-order model:

$$log\left(q_e - q_t\right) = logq_e - \frac{k_1 t}{2.303} \tag{2}$$

Pseudo-second-order model:

$$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{t}{q_e} \tag{3}$$

Elovich model:

$$q_t = \frac{1}{\beta}\ln\left(\alpha\beta\right) + \frac{1}{\beta}\ln t \tag{4}$$

Where q_t (mg/g) and q_e represents the adsorption capacity at time t (h) and the equilibrium adsorption capacity, k_1 (h^{-1}) and k_2 (g/mg/h) represents the pseudo-first-order rate constant, and the pseudo-second-order rate constant, while α is the initial adsorption rate constant and β is the Elovich adsorption constant.

Langmuir isotherm:

$$\frac{1}{q_e} = \frac{1}{q_m} + \frac{1}{bq_m C_e} \tag{5}$$

Freundlich isotherm:

$$logq_e = logK_F + \frac{1}{n} logC_e \tag{6}$$

Temkin isotherm:

$$q_e = K_T lnC_e + K_T lnf \tag{7}$$

where q_e is the equilibrium adsorption capacity (mg/g), C_e is the equilibrium concentration (mg/L), q_m and b are the maximum adsorption capacity and binding energy which related to the Langmuir constants, respectively; K_F and n respectively represent the empirical constants (L/mg) and Freundlich constant that related to the heterogeneity factor; K_T represents the Temkin constant (L/mg) related to the heat of adsorption, and f represents the maximum binding energy constant.