Aminated EVOH nanofiber membranes for Cr(VI) adsorption from aqueous solution

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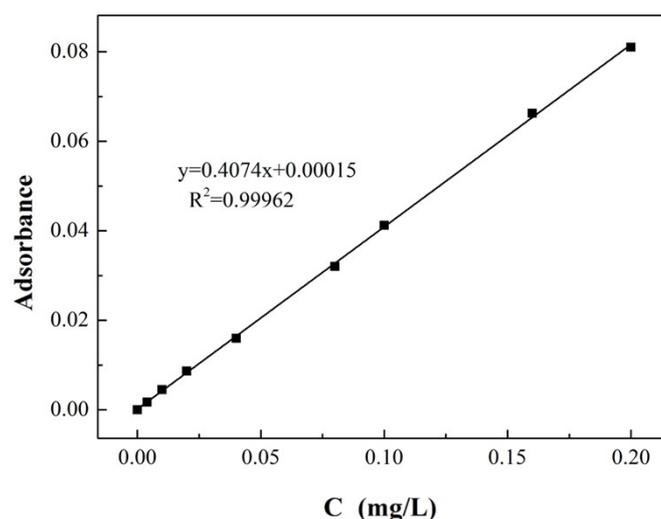## 1. 1,5-diphenyl-carbohydrazide spectrophotometric method

Fig. S1 The UV absorbance-concentration curve of DPCI-Cr(VI) solution

1,5-diphenyl-carbohydrazide (DPCI) was set as the chromogenic agent to test the absorbance of the Cr(VI) solution. 12.5 mL concentrated sulfuric acid and hydrochloric acid were added into 100 ml 2 g/L DPCI solution to prepare DPCI chromogenic solutions. Then 3.0 mL DPCI chromogenic solutions were dropped into 50 mL Cr(VI) solutions (0, 0.004, 0.01, 0.02, 0.04, 0.08, 0.16, and 0.2 mg/L) to fit the standard curve of C (concentration of Cr(VI), mg/L) and absorbance though ultraviolet-visible spectrum at a wavelength of 540 nm, the result was shown in Fig. S1. The fitted equation as follows:

$$y=0.4074x+0.00015 \tag{S-1}$$

y in the fitted equation was the absorbance of Cr(VI) solutions, x was the concentration of Cr(VI). After the absorbance of Cr(VI) solutions was tested by ultraviolet-visible spectrum, x can be calculated from the equation.

2. XPS analysis

Fig. S2 shows the XPS wide scan and N 1s core level spectra of EVOH and aminated-EVOH nanofiber membranes. The element content of EVOH and aminated EVOH nanofiber membranes were listed in Table S1.It can be seen that aminated

EVOH nanofiber membranes surface contained amino functional groups with N elements, which confirmed that EVOH nanofiber membranes were modified with amino successfully.
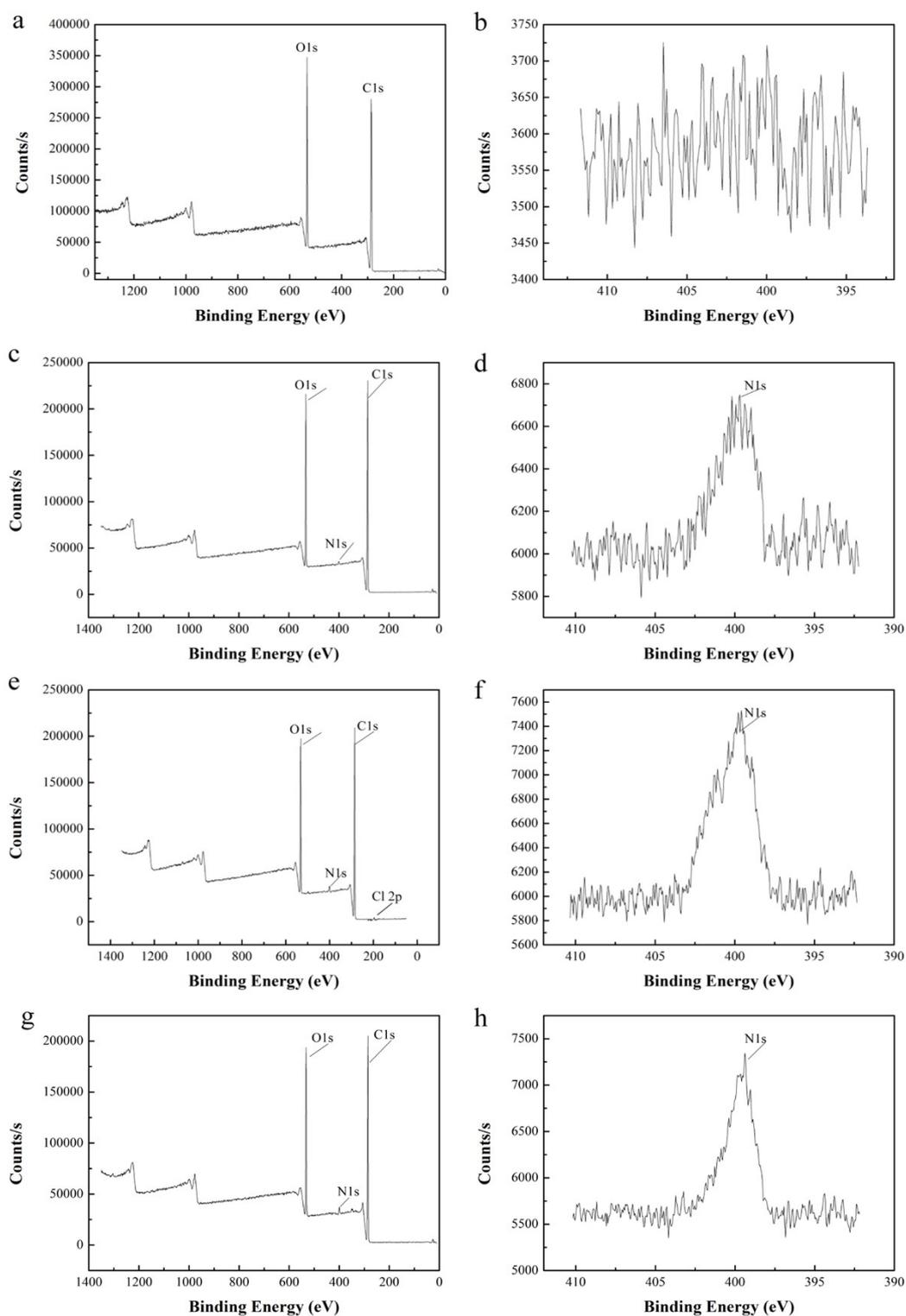

Fig. S2 XPS wide scan of EVOH (a), L-Lys/EVOH (c), Cy/L-Lys/EVOH(e) and DETA/EVOH(g) nanofiber membranes; N 1s core level spectra of EVOH(b), L-

Lys/EVOH (d), Cy/L-Lys/EVOH (f) and DETA/EVOH (h) nanofiber membranes

Table S1 Element content of EVOH and aminated EVOH nanofiber membranes

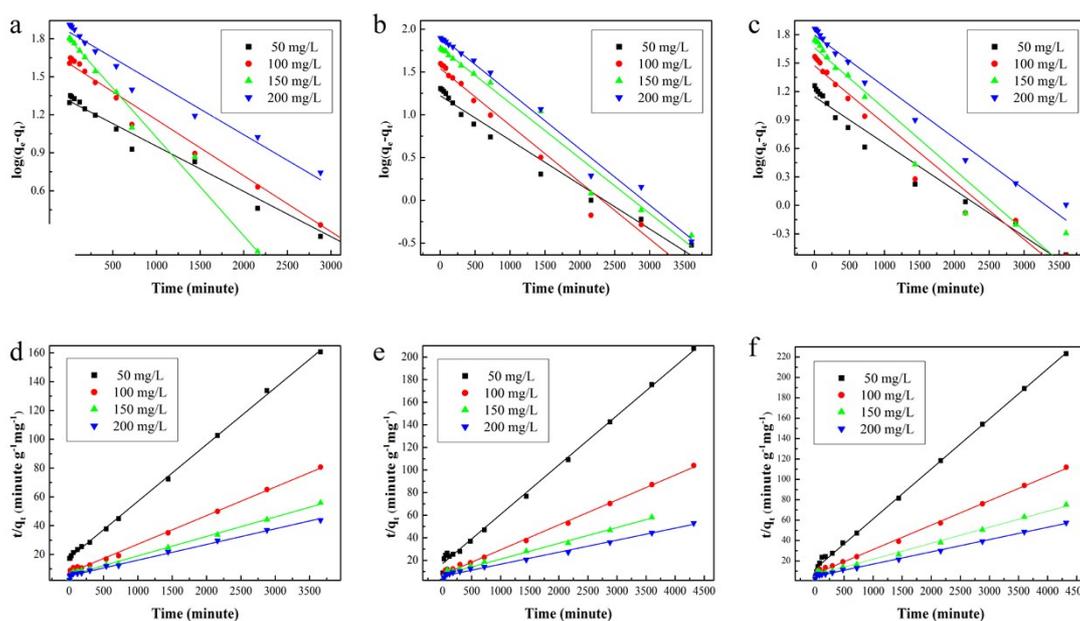| Membrane	C 1s (Atomic %)	O 1s (Atomic %)	N 1s (Atomic %)	Cl 2p (Atomic %)
EVOH	75.48	24.52	/	/
L-Lys/EVOH	74.78	23.49	1.73	/
Cy/L-Lys/EVOH	76.29	20.54	2.38	0.78
DETA/EVOH	76.32	22.06	1.62	/

Fig. S3 Pseudo-first-order kinetic model and pseudo-second-order kinetic model for Cr(VI) adsorption on Cy/L-Lys/EVOH (a and d), L-Lys/EVOH (b and e) and DETA/EVOH (c and f) nanofiber membranes
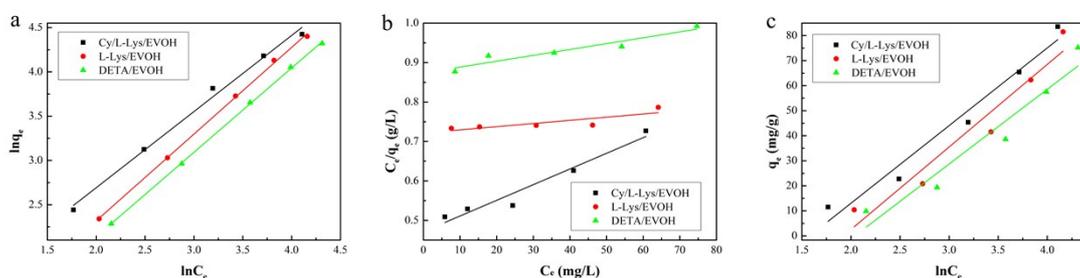

Fig. S4 (a) Freundlich isotherm model, (b) Langmuir isotherm model and (c) Temkin isotherm model for Cr(VI) adsorption on aminated-EVOH nanofiber membranes.