Supporting Information

Dot-matrix-initiated molecularly imprinted nanocomposite membranes for selective recognition: A high-efficiency separation system with anti-oil fouling layer

Jia Gao[a], Li Chen[a], Yongsheng Yan[a,*], Jian Lu[a], Wendong Xing[a], Jiangdong Dai[a], Minjia Meng[a], Yilin Wu[a,*]

[1] *Institute of Green Chemistry and Chemical Technology, School of Chemistry and Chemical Engineering, Jiangsu University, Zhenjiang, 212013, China*

*Corresponding authors

Email: wuyilin@ujs.edu.cn (Y. Wu); yys@mail.ujs.edu.cn (Y. Yan)

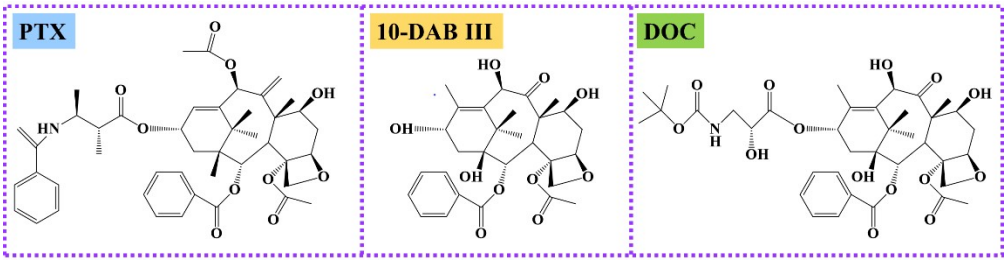

Fig. S1. The molecular structures of PTX, 10-DAB III and DOC.

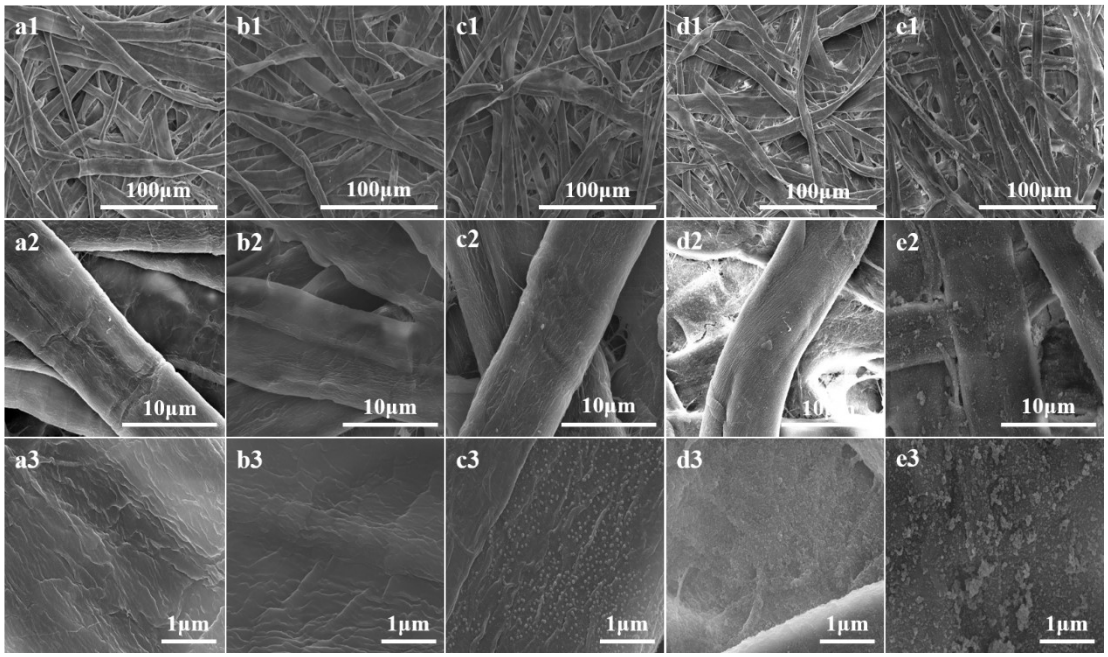

Fig. S2. The SEM imagines of different kinds of membranes top surface, P/A@FP-1 (a), P/A@FP-2 (b), P/A@FP-3 (c), P/A@FP-4 (d) and P/A@FP-5 (e).

Table S1

The porosity of the fabricated membranes.

Membranes	Porosity (%)
Filter paper	25.04
P/A@FP-4	44.53
P/A-PTX@MIMs	36.34

S1. The formulas and constants of fitting models

[a] Langmuir model was expressed as $Q_e=(Q_mK_LC_e)/(1+K_LC_e)$, where C_e (mg L^{-1}) and Q_e (mg g^{-1}) were concentration and adsorption amount at equilibrium, Q_m (mg g^{-1}) was the theoretical maximum adsorption amount, and K_L (L mg^{-1}) was the Langmuir constant.

[b] Freundlich model was expressed as $Q_e=K_FC_e^{1/n}$, where C_e (mg L^{-1}) and Q_e (mg g^{-1}) were concentration and adsorption amount at equilibrium, as well as K_F ($mg^{1-1/n}$ $L^{1/n}$ g^{-1}) and n were Freundlich constants.

[c] The pseudo-first-order model was expressed by $Q_t=Q_e-Q_ee^{-k_1t}$, where Q_e and Q_t (mg g^{-1}) were rebinding capacities at the equilibrium and time t (min), and k_1 (min^{-1}) was the equilibrium rate constants of the pseudo-first-order model.

[d] The pseudo-second-order model is expressed as $Q_t=(k_2Q_e^2t)/(1+k_2Q_et)$, where Q_e and Q_t (mg g^{-1}) are rebinding capacities at the equilibrium and time t (min), as well as k_2(g mg^{-1} min^{-1}) is the equilibrium rate constants of the pseudo-second-order model.

S2. The competitive adsorption experiment of different membranes

The competitive adsorption experiment was carried out that one piece of pristine filter paper, NIMs and P/A-PTX@MIMs were immersed at 0.15 mg ml^{-1} of PTX and competitive molecules mixture for 3.0 h. As shown in Fig. S3 and Table S2, the adsorption capacity of P/A-PTX@MIMs for PTX was more than 9.0 times and 3.0 times of pristine filter paper and NIMs. In other words, we could consider the adsorption amount of pure filter pater as the amount of non-specific adsorption amount. We could regard the specific adsorption amount of PTX were 16.32 mg g^{-1}, the non-specific adsorption amounts of 10-DBA III and DOC were 1.48 mg g^{-1} and 1.61 mg g^{-1}. Therefore, it can be proved that the as-prepared P/A-PTX@MIMs with remarkable selective recognition ability of PTX presented a potential "application strategy" for chemical separation industry and biological medicine.

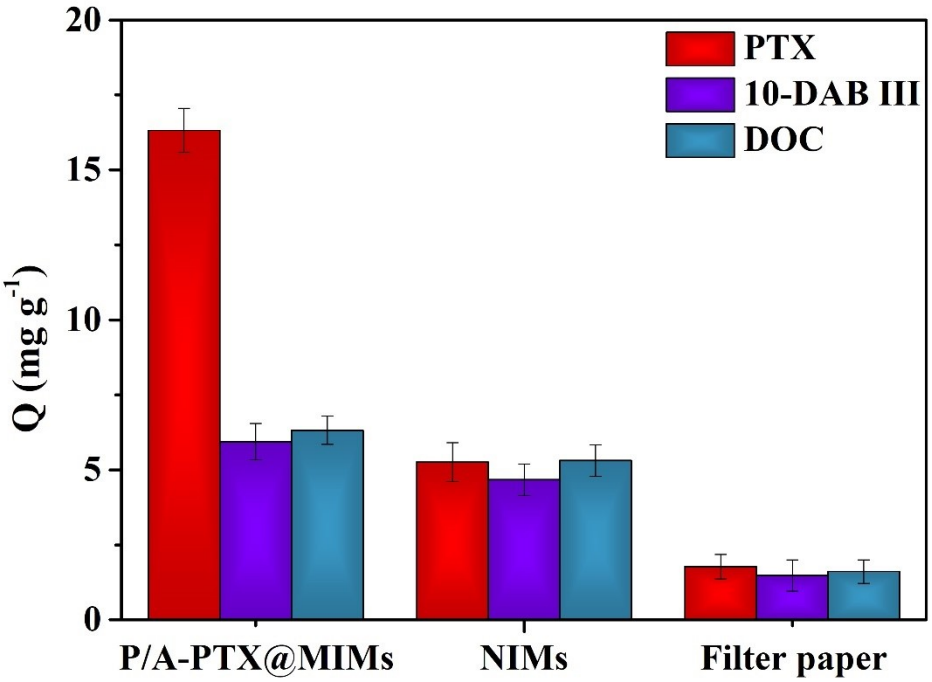

Fig. S3. The isothermal competitive adsorption capacities of pristine filter, non-imprinted membrane (NIMs) and PTX-imprinted membrane (P/A-PTX@MIMs).

Table S2

The isothermal competitive adsorption capacities of pristine filter, non-imprinted membrane (NIMs) and PTX-imprinted membrane (P/A-PTX@MIMs).

Membranes/Molecules	PTX (mg g^{-1})	10-DBA III (mg g^{-1})	DOC (mg g^{-1})
Filter paper	1.77	1.48	1.61
NIMs	5.26	4.67	5.31
P/A-PTX@MIMs	16.32	5.94	6.32