Electronic Supplementary Information

for

A Durable Luminescent Ionic Polymer for Rapid Detection and Efficient Removal of Toxic $Cr_2O_7^{2-}$

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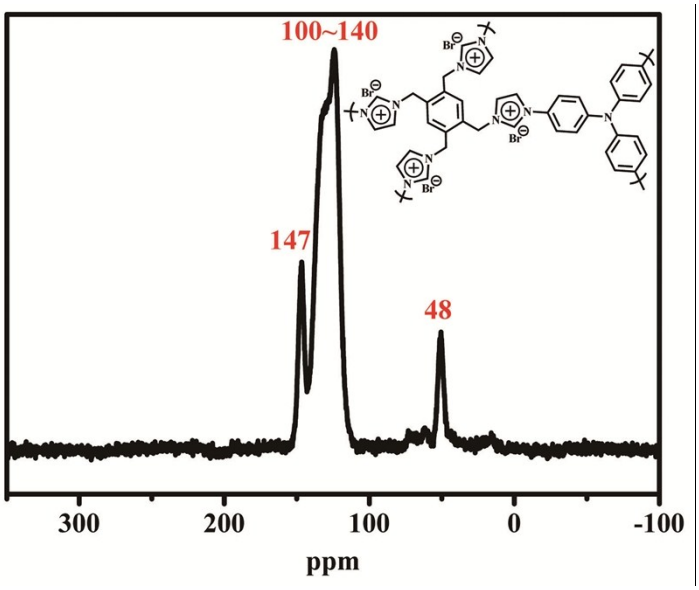

Fig. S1 Solid-state ^{13}C NMR spectrum of IMIP-Br.

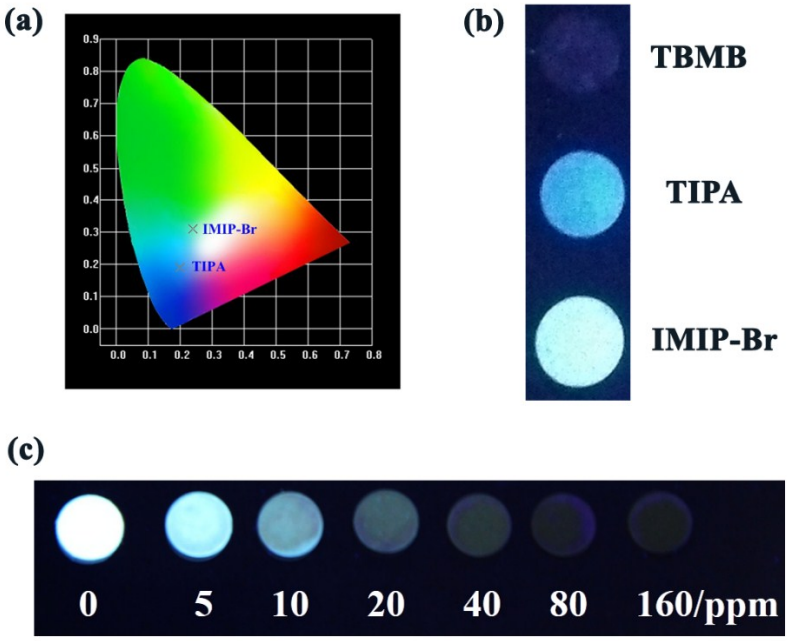

Fig. S2 (a) CIE chromaticity diagram for TIPA (x: 0.20, y: 0.19) and IMIP-Br (x: 0.24, y: 0.31); (b) luminescent photographs of TBMB, TIPA and IMIP-Br excited at 365 nm; (c) luminescent photographs of IMIP-Br (0.047 mmol, 15 mg) after immersion in different concentrations of aqueous $K_2Cr_2O_7$ solution (35 mL). The circular slices are prepared by pressing IMIP-Br (10 mg) under 10 MPa in a mould with a diameter of 6 mm.

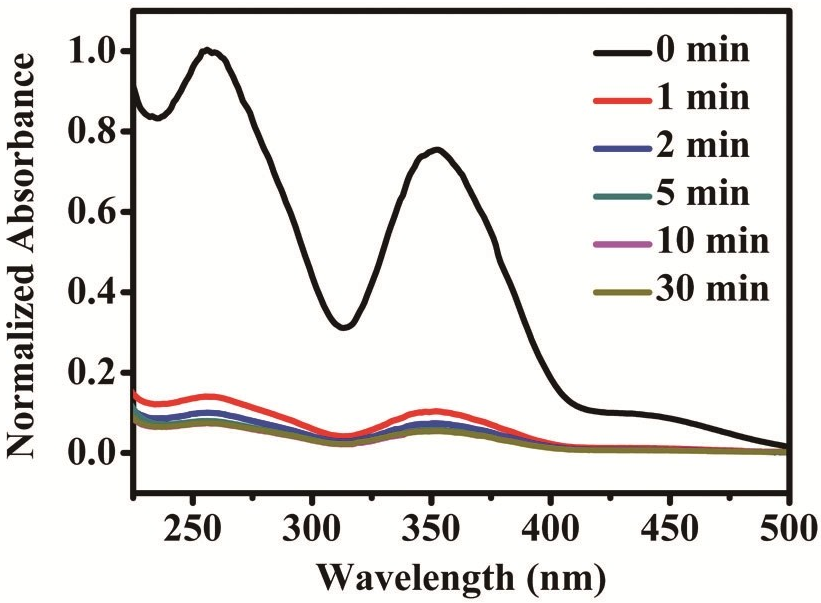

Fig. S3 (a) UV-Vis spectra of aqueous $K_2Cr_2O_7$ solution (0.55 mmol L^{-1}, 20 mL) before and after anion exchanging with IMIP-Br (0.022 mmol, 6.9 mg); (b) colour of IMIP-Br and IMIP-Cr.

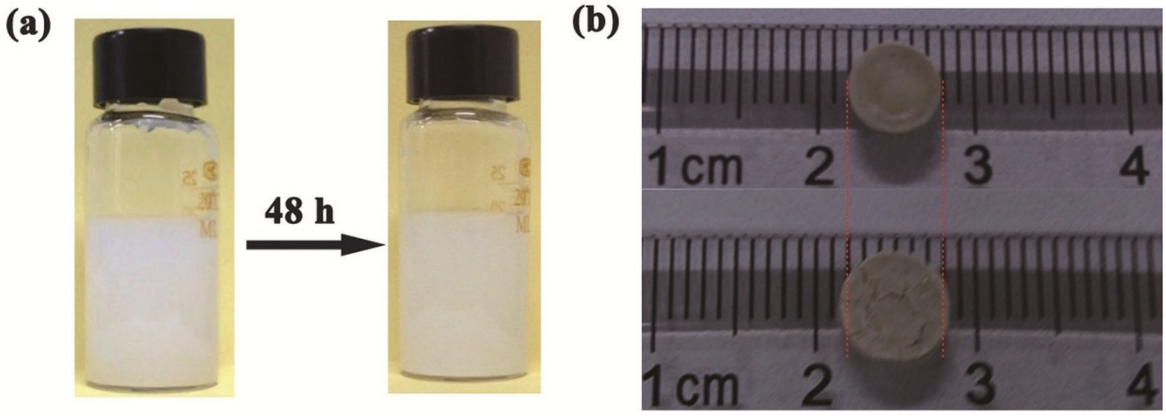

Fig. S4 (a) Photographs of IMIP-Br in water by sonication (left) and after standing for 48 h (right); (b) adsorption-swelling experiment of IMIP-Br (upper: the original slice; bottom: the slice after one drop of water was added). The circular slices are prepared by pressing IMIP-Br (10 mg) under 10 MPa in a mould with a diameter of 6 mm.

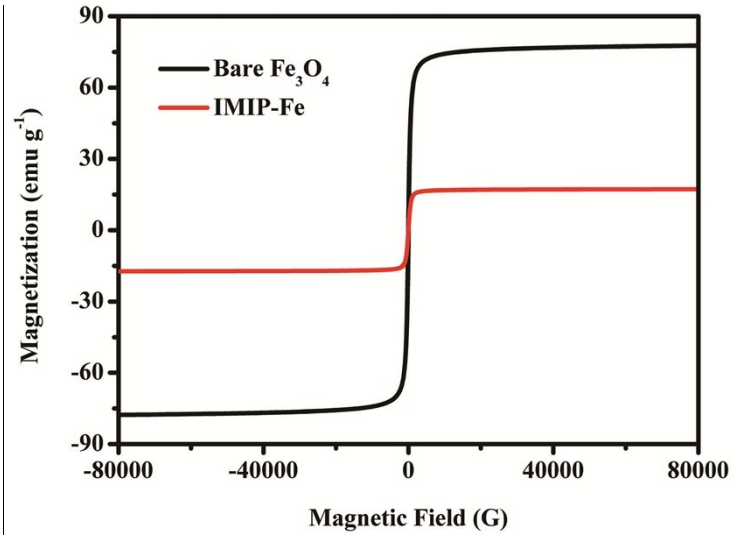

Fig. S5 Field-dependent magnetization curves at 300 K for bare Fe_3O_4 and IMIP-Fe.

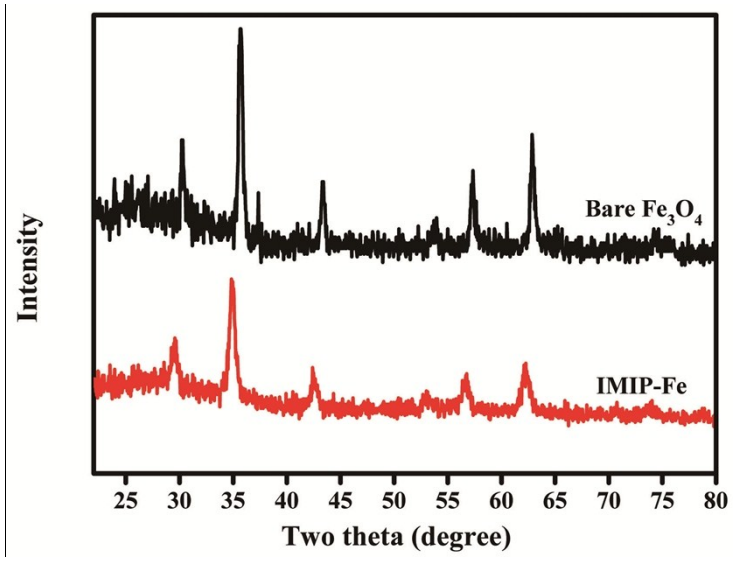

Fig. S6 PXRD patterns for bare Fe_3O_4 and IMIP-Fe.

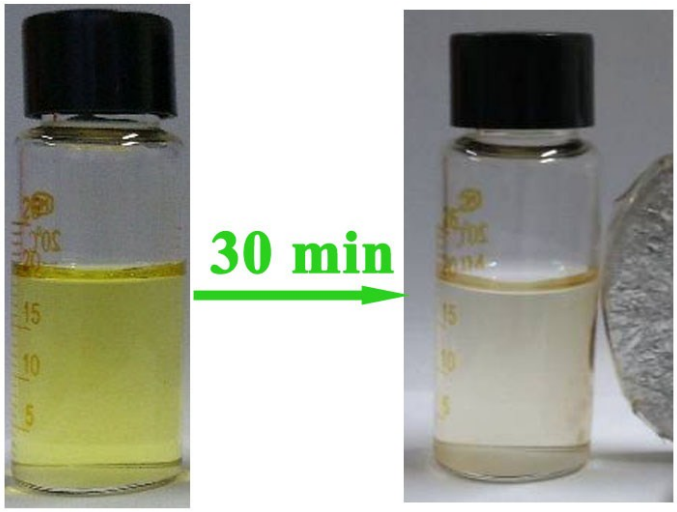

Fig. S7 Photographs of colour change of aqueous $K_2Cr_2O_7$ solution (0.55 mmol L^{-1}, 20 mL) and magnetic separation of IMIP-Fe after anion exchange.

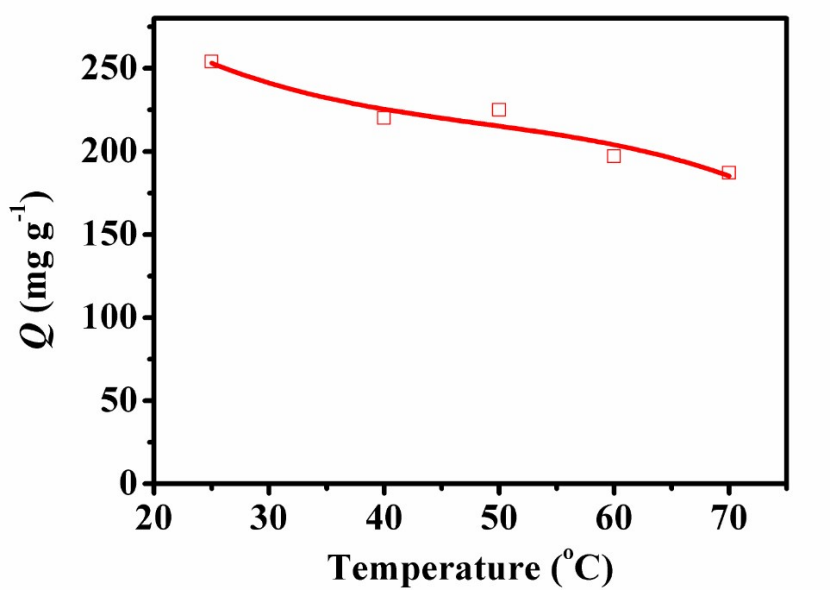

Fig. S8 Capture capacity of IMIP-Fe for $Cr_2O_7^{2-}$ within 5 min at different temperatures.

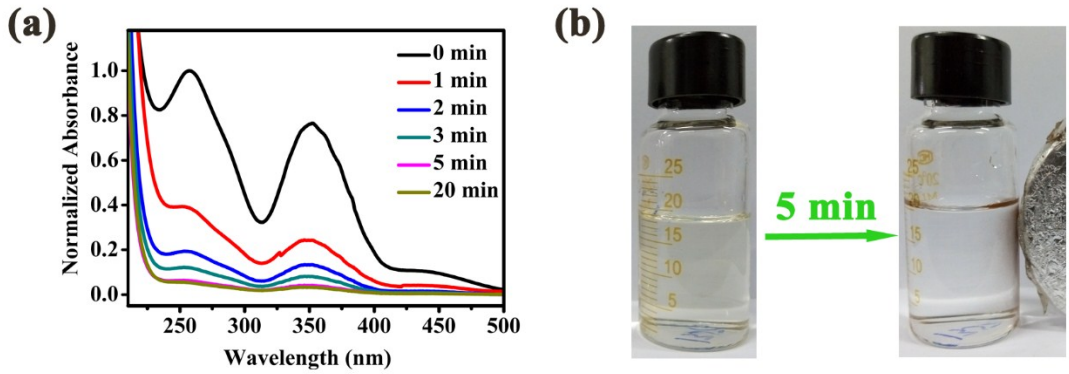

Fig. S9 (a) UV-Vis spectra of aqueous $K_2Cr_2O_7$ solution (0.055 mmol L^{-1}, 20 mL) during exchange with IMIP-Fe (4.4×10^{-3} mmol, 1.8 mg); (b) photographs of colour change of the aqueous $K_2Cr_2O_7$ solution and the magnetic separation of IMIP-Fe after exchange.

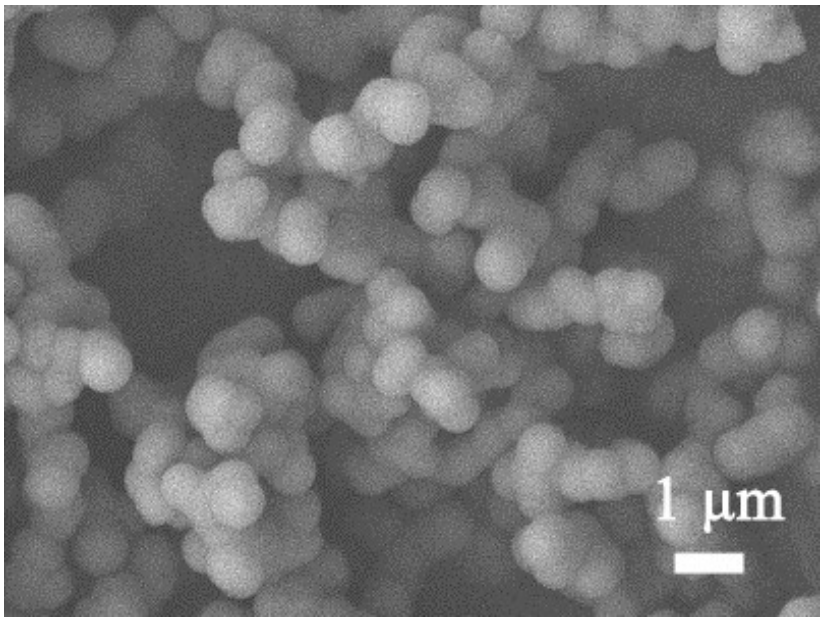

Fig. S10 SEM image of IMIP-Fe after using for consecutive six cycles.

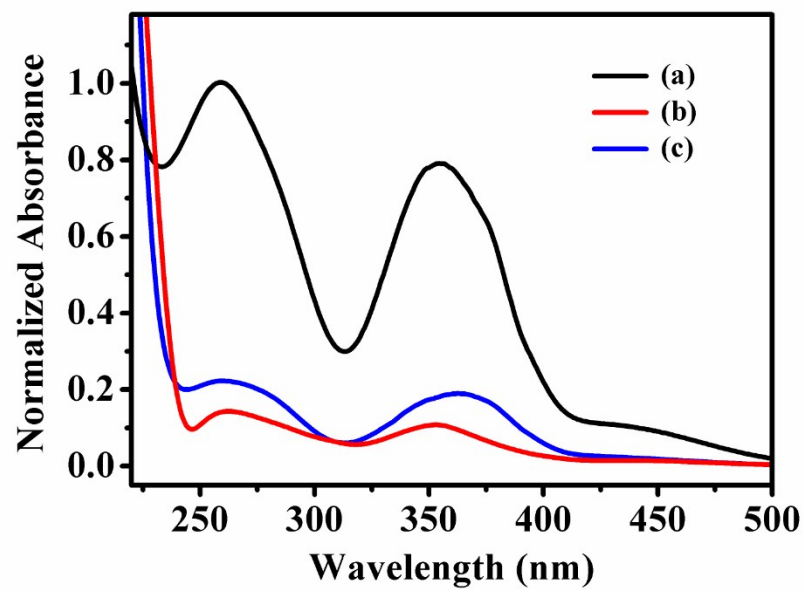

Fig. S11 UV-Vis spectra of $K_2Cr_2O_7$ aqueous solution (20 mL) during exchange with IMIP-Fe in selective adsorption experiment. (a) Initial $K_2Cr_2O_7$ aqueous solution ($Cr_2O_7^{2-}$ 0.011 mmol); (b) aqueous solution contains $Cr_2O_7^{2-}$ 0.011 mmol, NO_3^- 0.022 mmol, Cl^- 0.022 mmol and BF_4^- 0.022 mmol; (c) aqueous solution contains $Cr_2O_7^{2-}$ 0.011 mmol, NO_3^- 0.022 mmol, Cl^- 0.022 mmol, BF_4^- 0.022 mmol, and SO_4^{2-} 0.011 mmol.

Table S1. Capture capacities for $Cr_2O_7^{2-}$ of IMIP-Br, IMIP-Fe and reported cationic MOFs.

Cationic materials	Maximum capacities (mg g^{-1})	References
$Ag_2(btr)_2 \cdot 2ClO_4 \cdot 3H_2O$	212.8	S1
FIR-53	74.2	S2
FIR-54	103.1	S2
ZJU-101	245	S3
MOR-1-HA	242±17	S4
MOR-1-HA	280±19	S5
1-SO_4^{2-}	166	S6
IMIP-Br	318	this work
IMIP-Fe	251	this work

References:

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S2. H. R. Fu, Z. X. Xu and J. Zhang, *Chem. Mater.*, 2015, **27**, 205-210.

S3. Q. Zhang, J. Yu, J. Cai, L. Zhang, Y. Cui, Y. Yang, B. Chen and G. Qian, *Chem. Commun.*, 2015, **51**, 14732-14734.

S4. S. Rapti, A. Pournara, D. Sarma, I. T. Papadas, G. S. Armatas, A. C. Tsipis, T. Lazarides, M. G. Kanatzidis and M. J. Manos, *Chem. Sci.*, 2016, **7**, 2427-2436.

S5. S. Rapti, A. Pournara, D. Sarma, I. T. Papadas, G. S. Armatas, Y. S. Hassan, M. H. Alkordi, M. G. Kanatzidis and M. J. Manos, *Inorg. Chem. Front.*, 2016, **3**, 635-644.

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