Supporting information for

Green synthesis of an ionic porous organic polymer for efficient capture of environmentally toxic MnO_4^- and I_3^- from water

Atikur Hassan[†§], Rishabh Kumar Pandey[⊥†], Arnab Chakraborty[⊥†], Sk Abdul Wahed[†], T. Rajagopala Rao[†], Neeladri Das[†]*

[†]Department of Chemistry, Indian Institute of Technology Patna, Patna 801106 Bihar, India.

[§]Functional Materials Group, Gulf University for Science and Technology, Mubarak Al-Abdullah 32093, Kuwait

[⊥] Contributed equally in this work

Corresponding author Email: neeladri@iitp.ac.in or neeladri2002@yahoo.co.in

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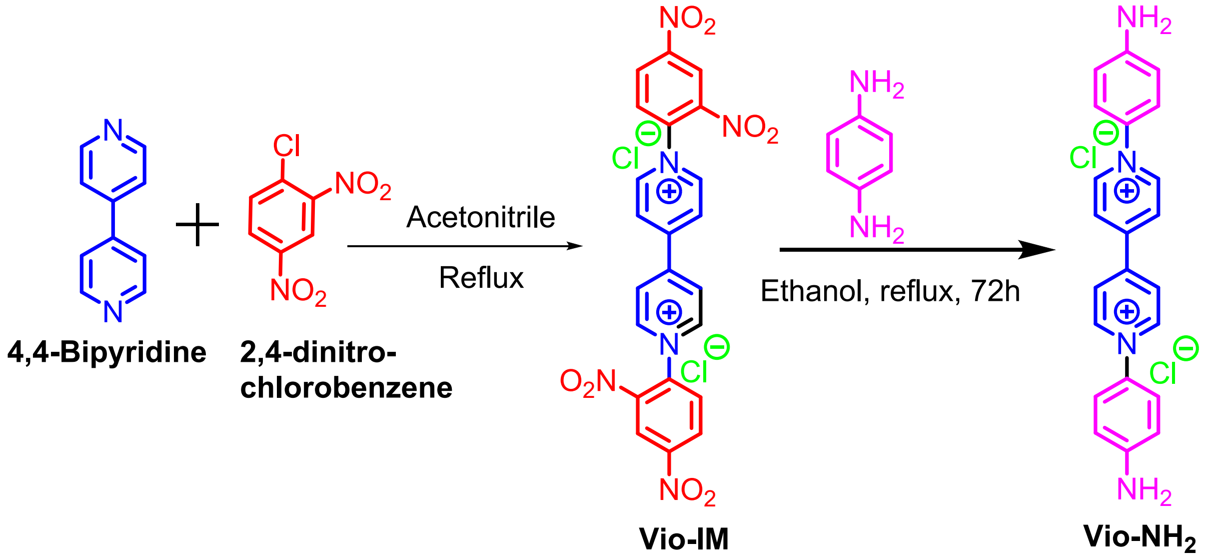
Procedure for the Synthesis of Monomer (Vio-NH_2)



Scheme-S1: Synthesis of the Vio-IM and Vio-NH_2

The monomer (**Vio-NH_2**) was synthesized in two steps. First, Vio-IM was obtained by reacting 4,4'-bipyridine (4 g, 25.60 mmol) and 1-chloro-2,4-dinitrobenzene (26 g, 89.60 mmol) in 150 mL of anhydrous acetonitrile under refluxing conditions and inert atmosphere for 72 hours (Scheme-S1). Subsequently, the mixture was filtered and the residue obtained was thoroughly washed with acetonitrile and diethyl ether. The solid thus obtained was air-dried to yield pure Vio-IM (75%). Next to synthesize Vio-NH_2, Vio-IM (500 mg, 0.89 mmol) and 1,4-diaminobenzene (289 mg, 2.67 mmol) were dissolved in 250 mL absolute ethanol and the resulting solution was refluxed for 72 h. The progress of the reaction was monitored by thin-layer chromatography (TLC). The solution was then concentrated to 50 mL using a rotary evaporator. Later, the reaction mixture was poured into 500 mL of tetrahydrofuran (THF). After 2.5 hours, a dark brown solid was formed which was collected by filtration (under reduced pressure) and washed with THF (10 mL × 5). The resulting solid was dried in a vacuum oven at 45 °C for 5 hours to yield Vio-NH_2 (68 %). The successful synthesis of Vio-NH_2 was indicated from its ^{1}H-NMR (Fig. S1).

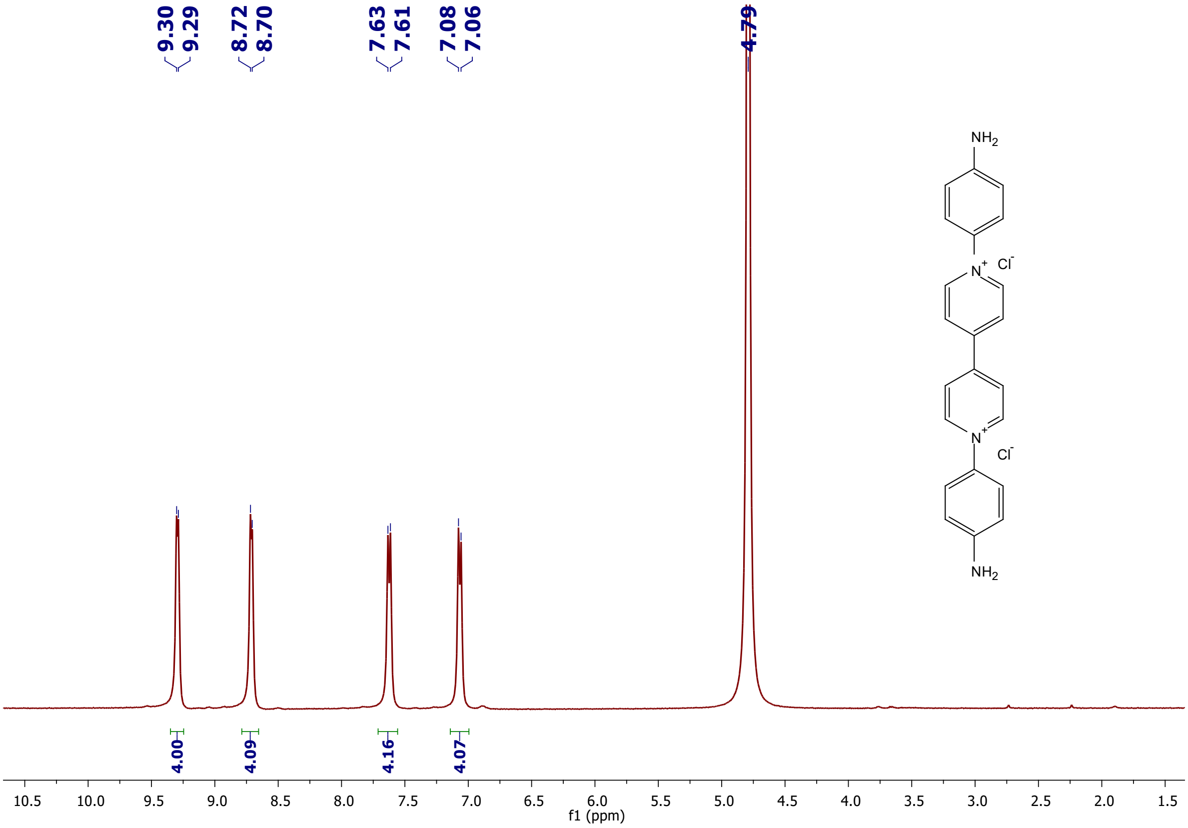
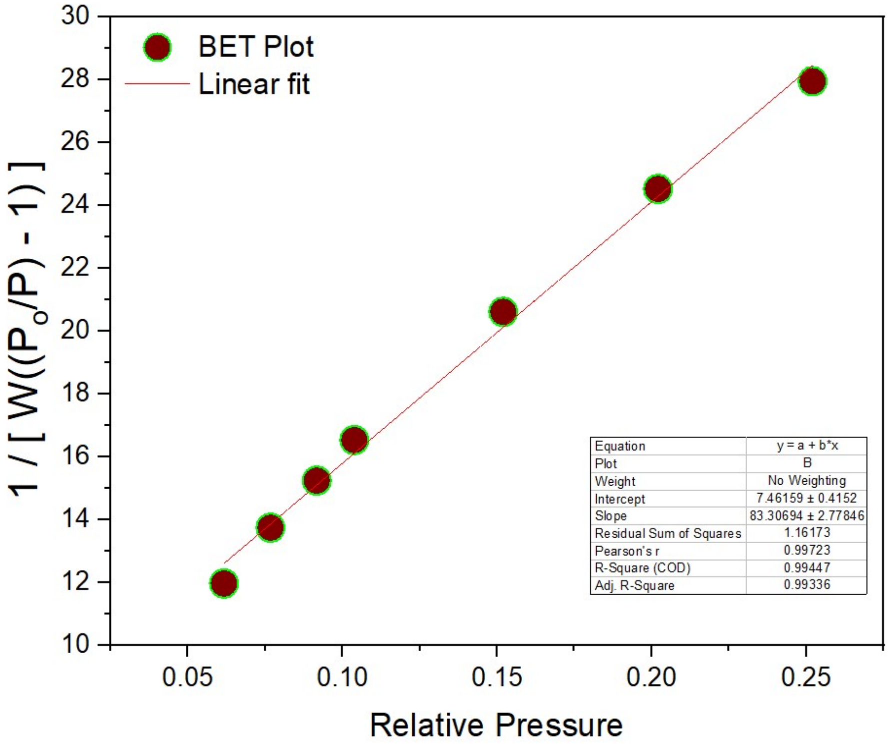


Figure -S1: ^{1}H- NMR spectrum of Vio-NH_2

Procedure for the Synthesis of iPOP-6

In a 250 mL round-bottom flask, 1.5 mmol of Vio-NH_2 is suspended in 100 mL of water along with 0.2 mL of concentrated HCl, and the mixture is stirred for 15 minutes at a temperature of 0–5 °C. To this cooled solution, 30 mL of an aqueous solution of sodium nitrite (3.1 mmol) is added, and the reaction mixture is stirred for an additional 25 minutes to ensure the complete conversion of Vio-NH_2 to its corresponding diazonium salt. Following this, the mixture is neutralized using a dilute solution of Na_2CO_3. Subsequently, 30 mL of an aqueous solution containing phloroglucinol(PG) (1 mmol) and Na_2CO_3 (3 mmol) is added to the reaction mixture, which is maintained at 0–5 °C. The resultant mixture is stirred for 24 hours, leading to the precipitation of the desired product. The precipitate is collected using a glass frit, then washed sequentially with water, DMF, acetone, methanol, THF and Dil HCl. Further purification is achieved using a Soxhlet extractor with methanol and THF as solvents. Finally, the obtained material is dried in a vacuum oven at 120 °C for 20 hours, yielding iPOP-6 (76%) as a dark powder.



Equation	y = a + b*x
Plot	B
Weight	No Weighting
Intercept	7.46159 ± 0.4152
Slope	83.30694 ± 2.77846
Residual Sum of Squares	1.16173
Pearson's r	0.99723
R-Square (COD)	0.99447
Adj. R-Square	0.99336

Figure S2 : BET plot of iPOP-6

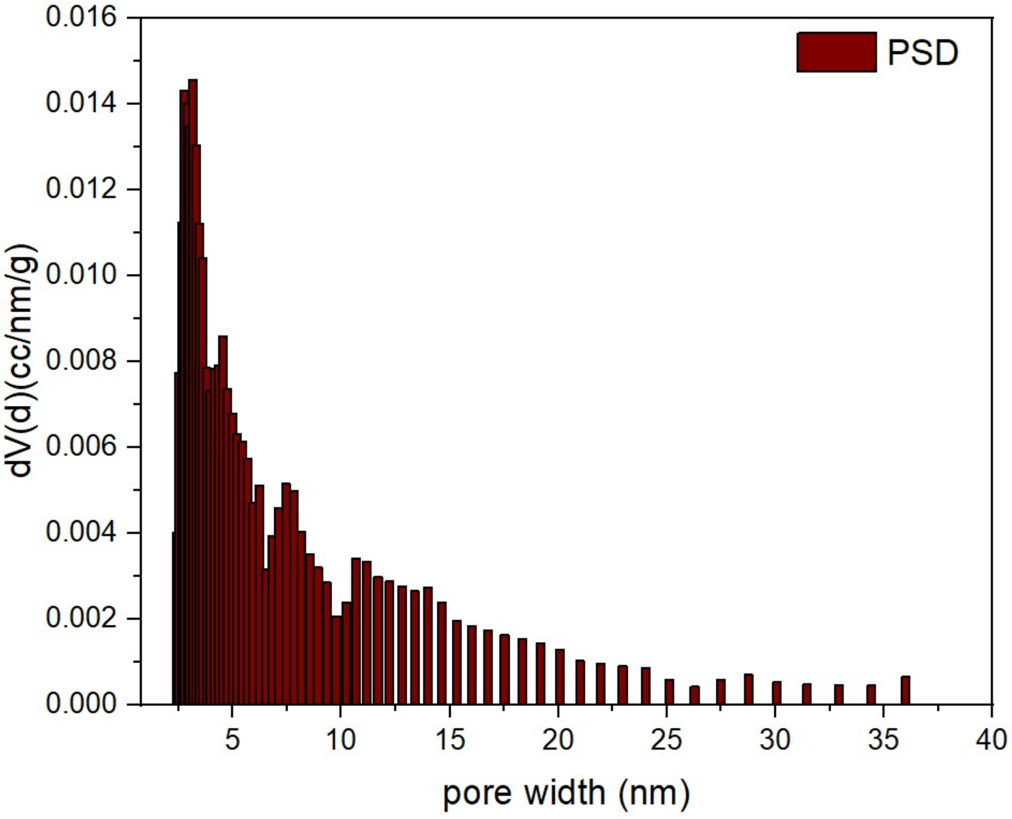


Figure S3: NLDFT pore size distribution plot of iPOP-6

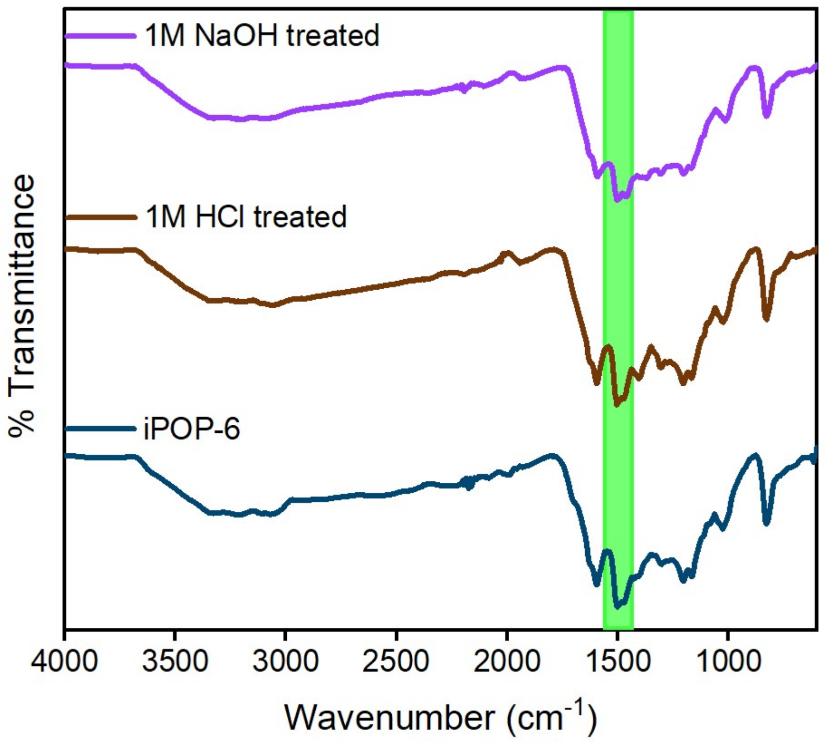


Figure S4: FTIR spectrum of the acid base treated iPOP-6 with pristine iPOP-6

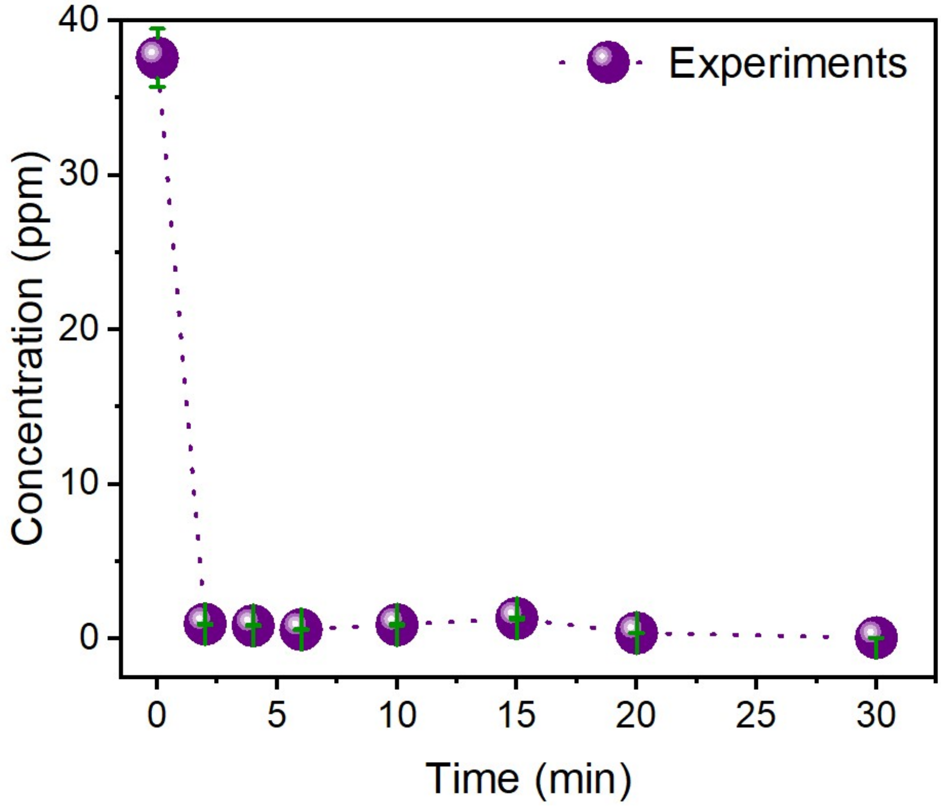


Figure S5: MnO_4^- kinetics plot of iPOP-6 (Conc. Vs Time curve)

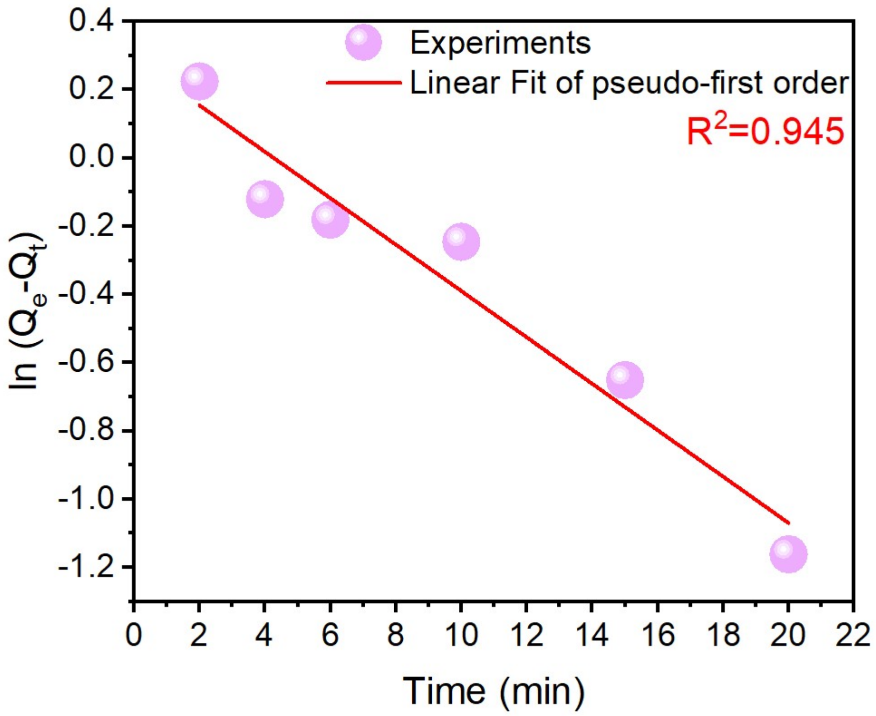


Figure S6: Pseudo-first order kinetics plot for MnO_4^- of iPOP-6

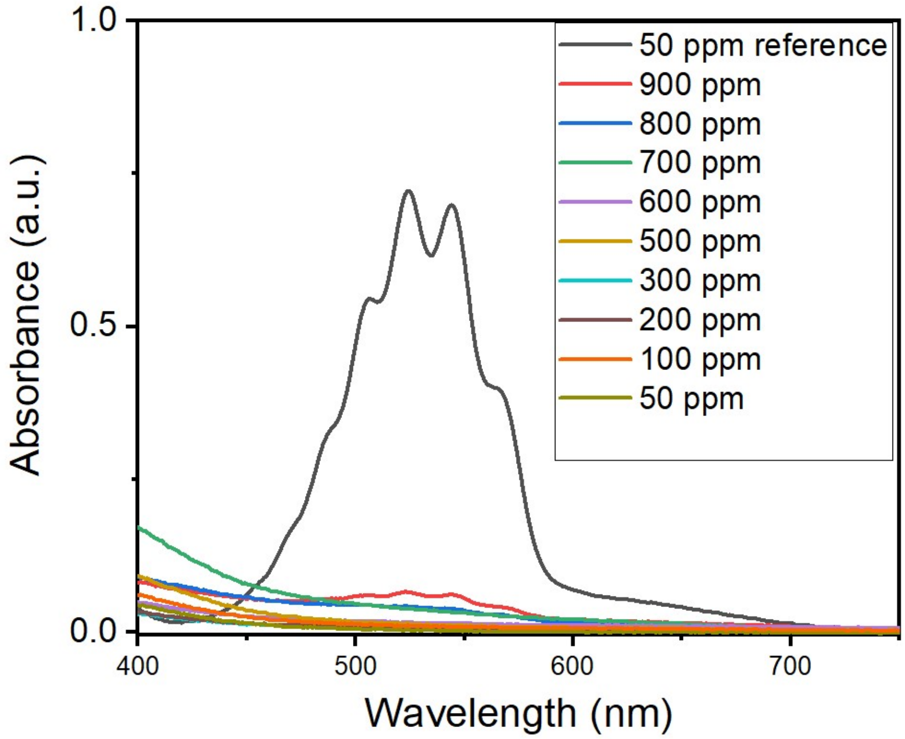


Figure S7: Residual absorbance of MnO_4^- after 6 hours with different concentration

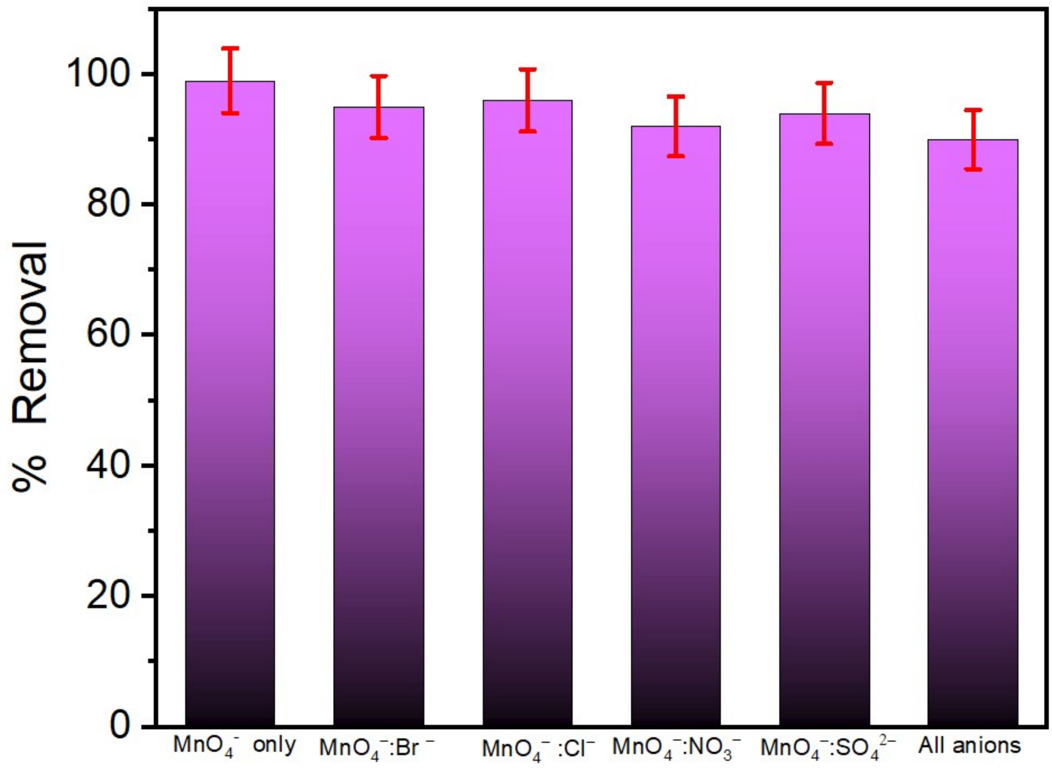


Figure S8: Removal of MnO_4^- in presence of interfering ions (1:1)

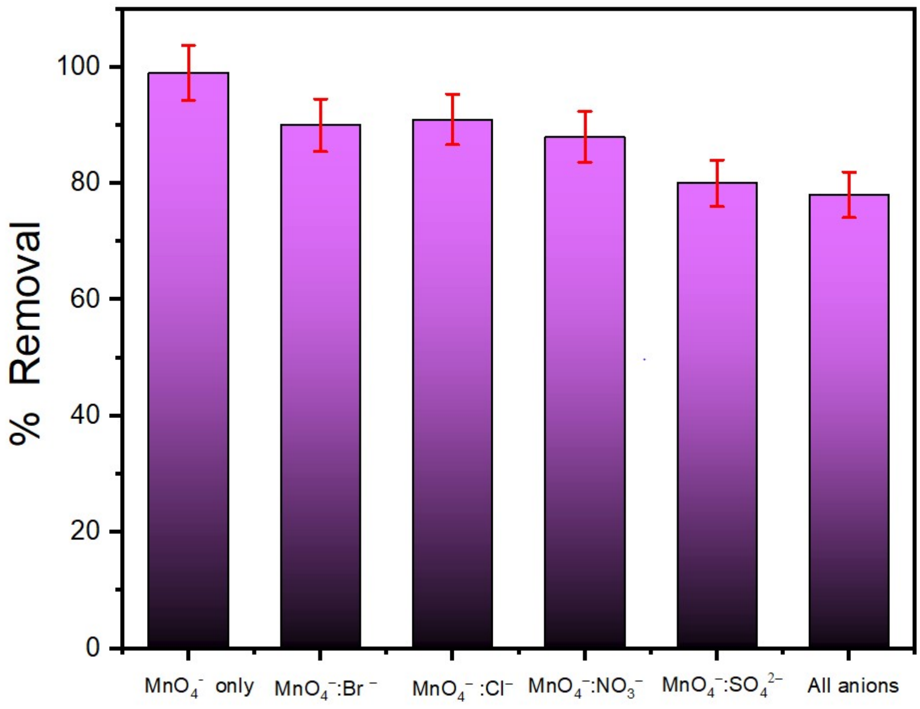


Figure S9: Removal of MnO_4^- in presence of interfering ions (1:10)

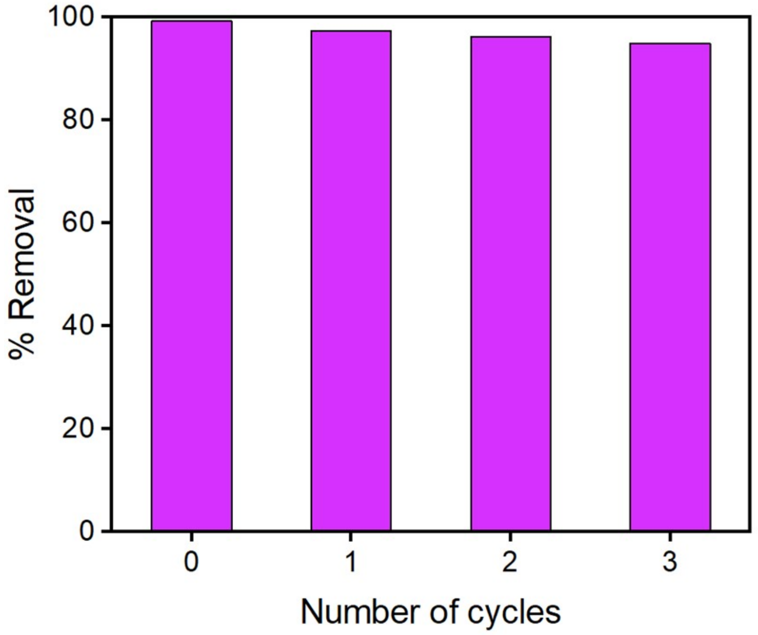


Figure S10: Recyclability experiments for MnO_4^-

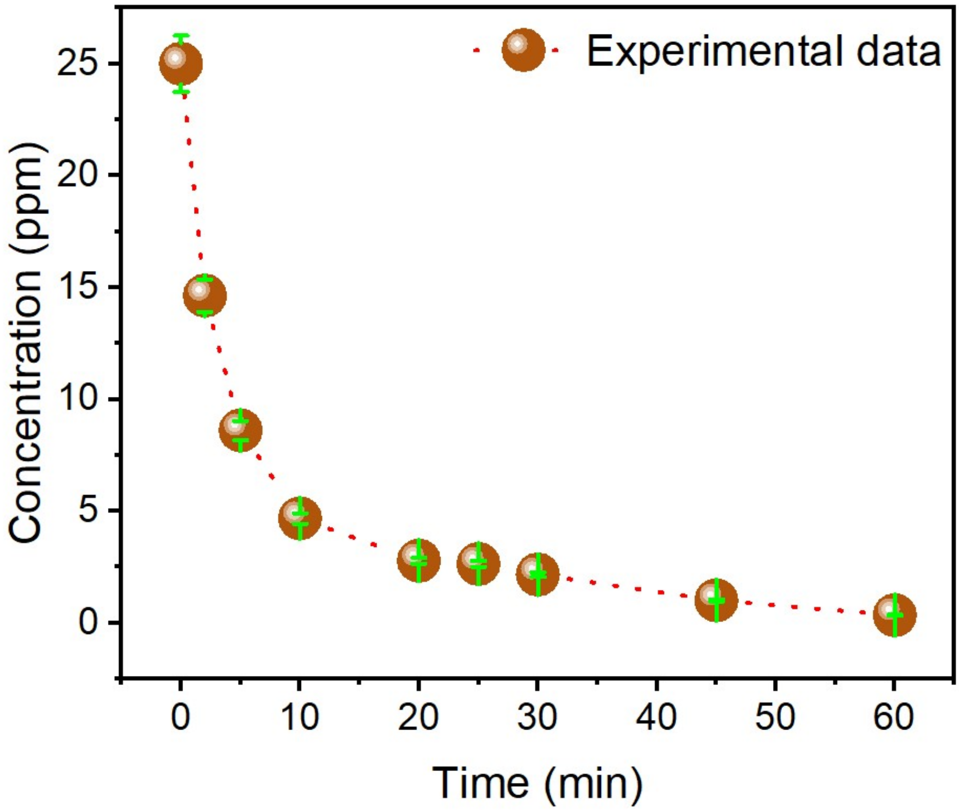


Figure S11: I_3^- kinetics plot of iPOP-6 (Conc. Vs Time curve)

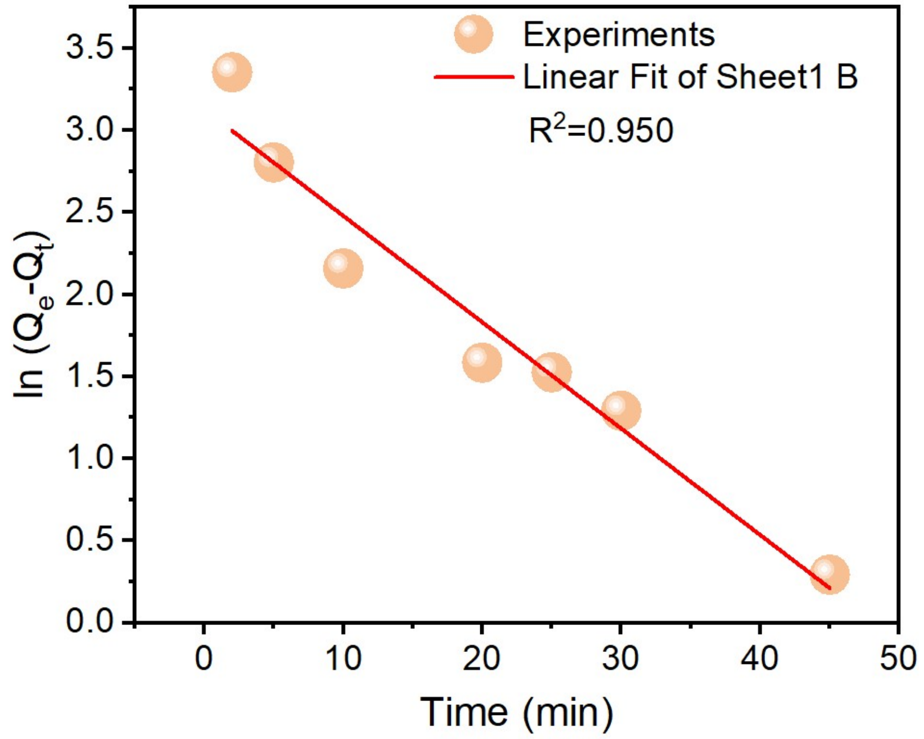


Figure S12: Pseudo-first order kinetics plot for I_3^- of iPOP-6.

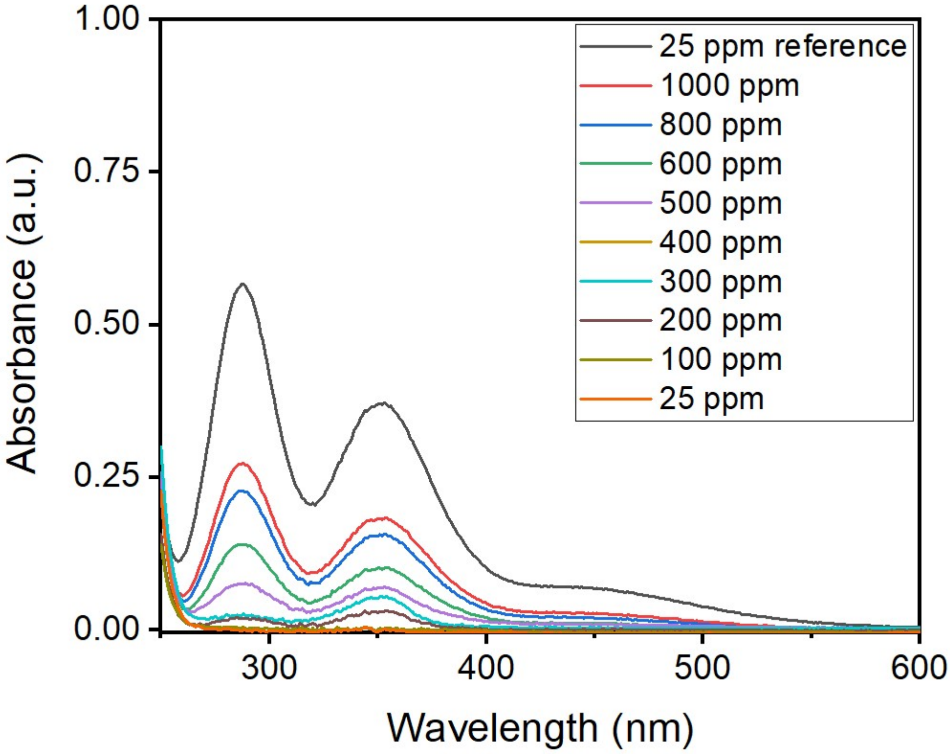


Figure S13: Residual absorbance of I_3^- after 6 hours with different concentration

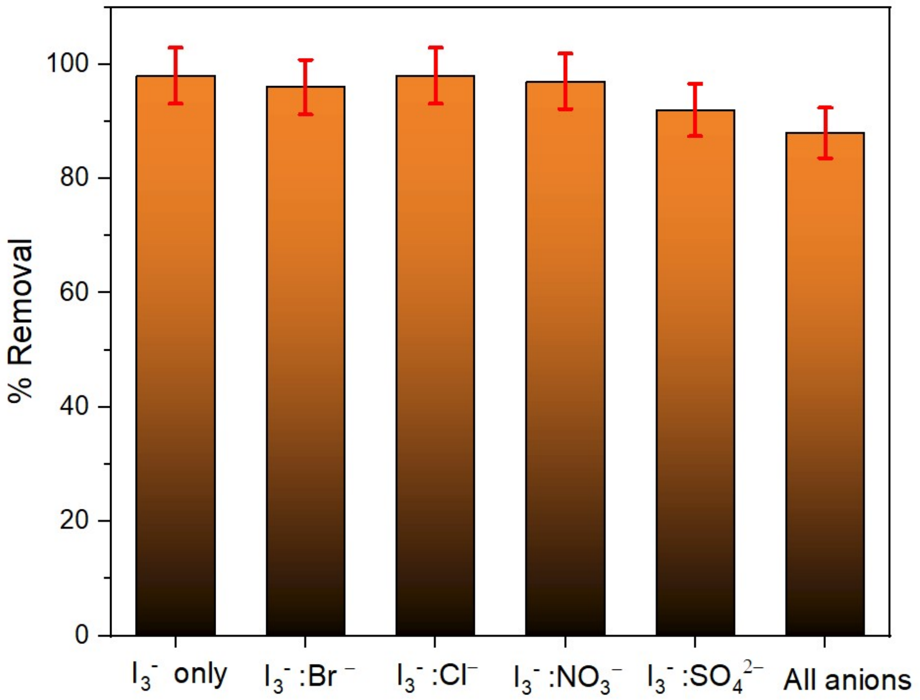


Figure S14: Removal of I_3^- in presence of interfering ions (1:1)

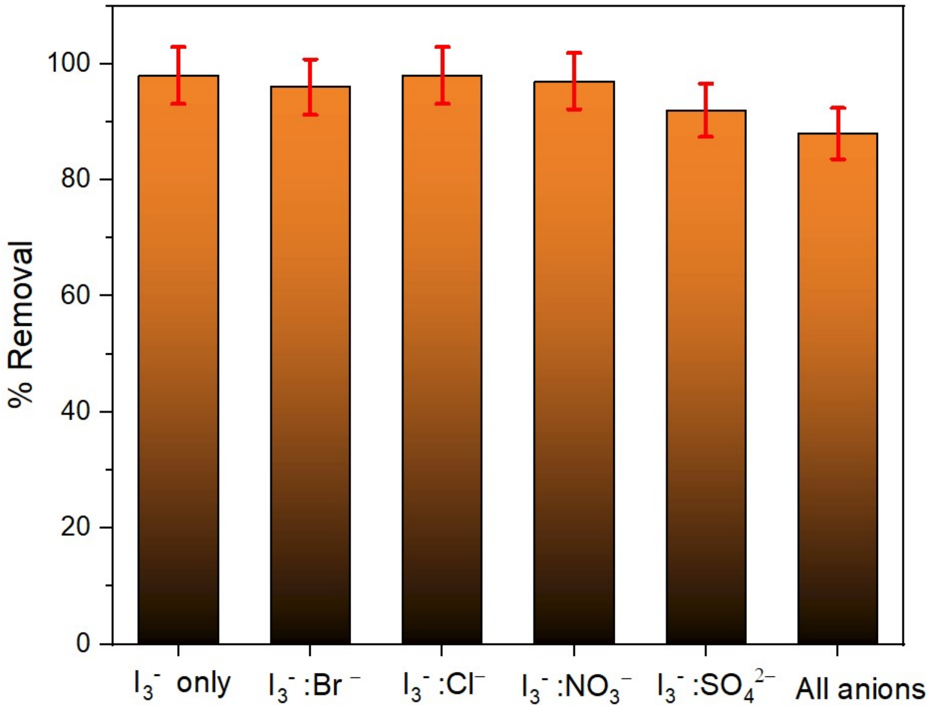


Figure S15: Removal of I_3^- in presence of interfering ions (1:10)

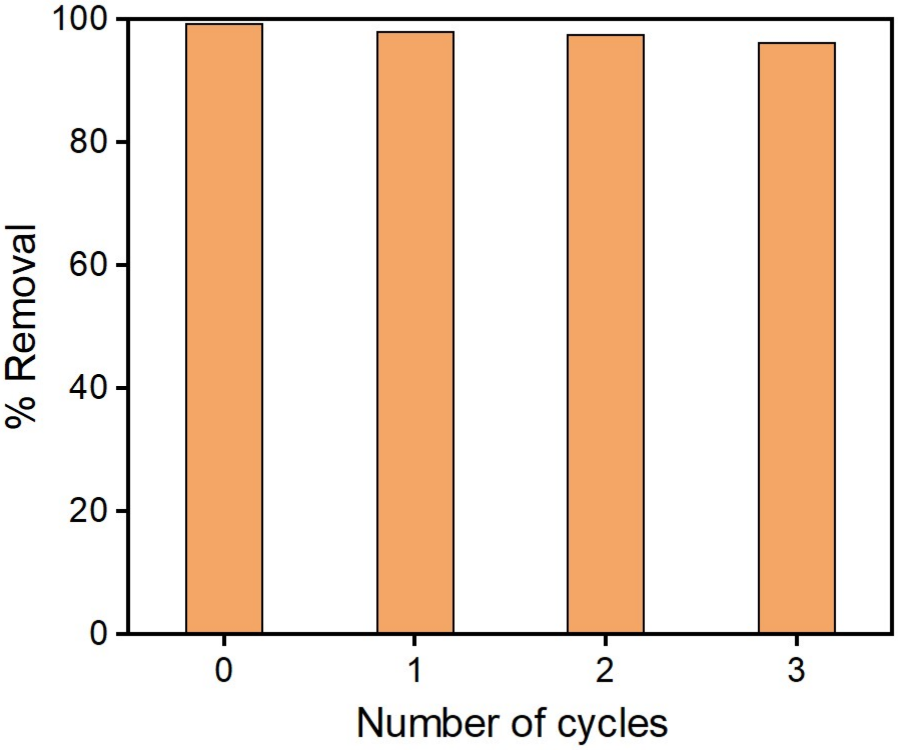


Figure S16: Recyclability experiments for I_3^-

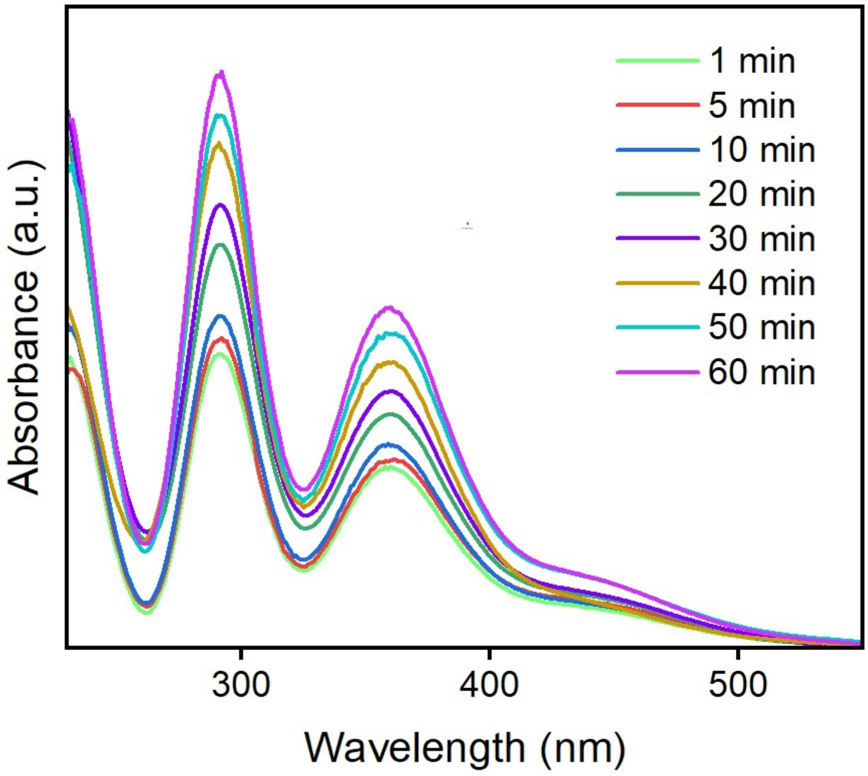


Figure S17: Iodine release in methanol from I_3^-@iPOP-6

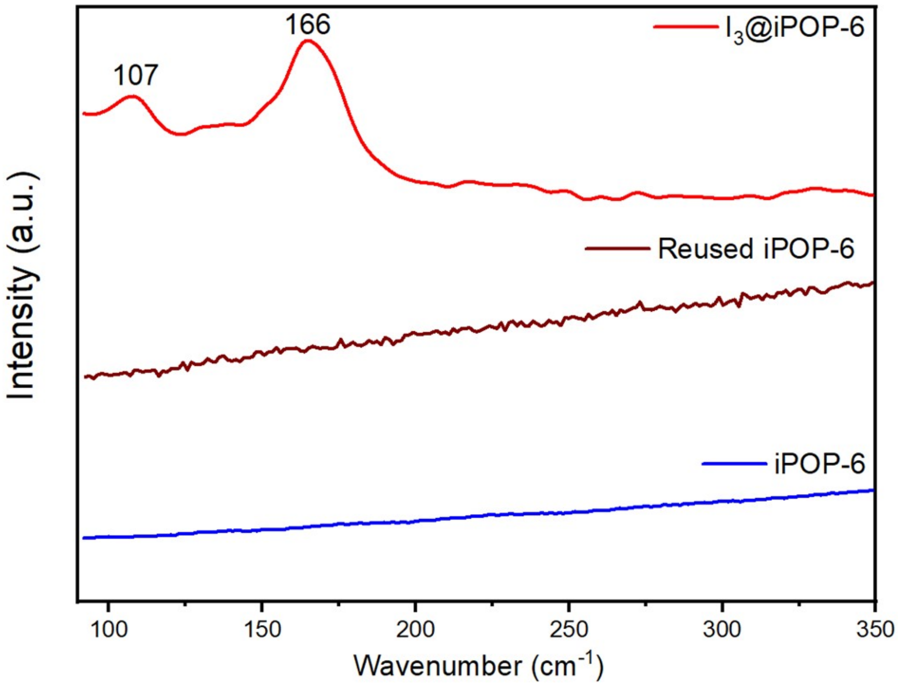


Figure S18: Post capture Raman spectra of I_3^-@iPOP-6

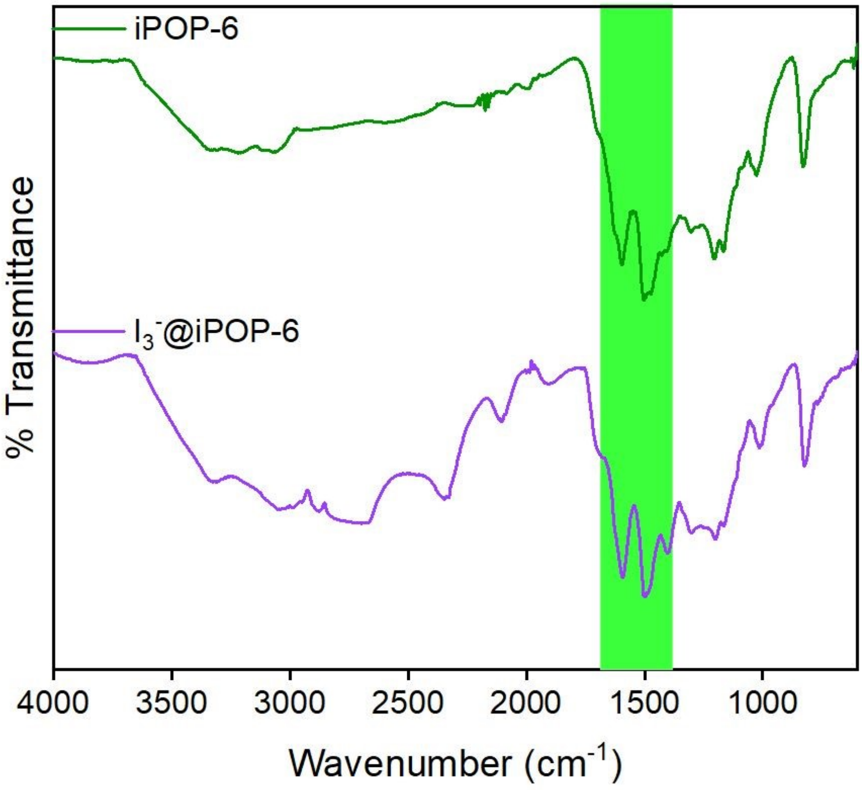


Figure S19: Post capture FT-IR spectra of I_3^-@iPOP-6

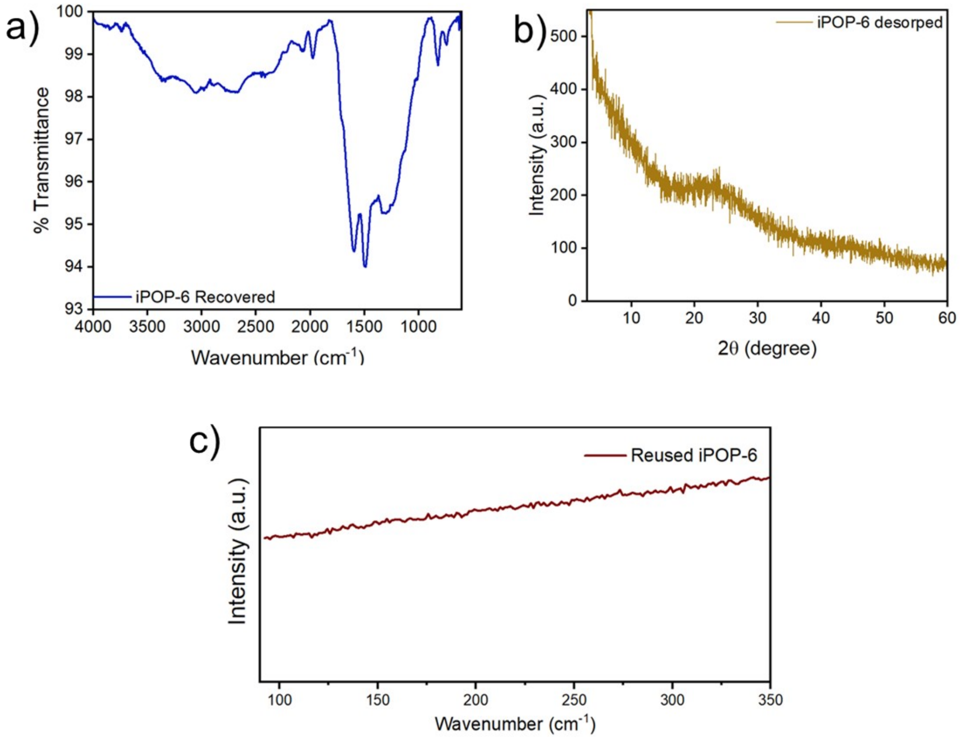


Figure S20: (a) FT-IR spectrum of the recovered iPOP-6; (b) PXRD patterns of the recovered iPOP-6 (c) Raman spectrum of the recovered iPOP-6.

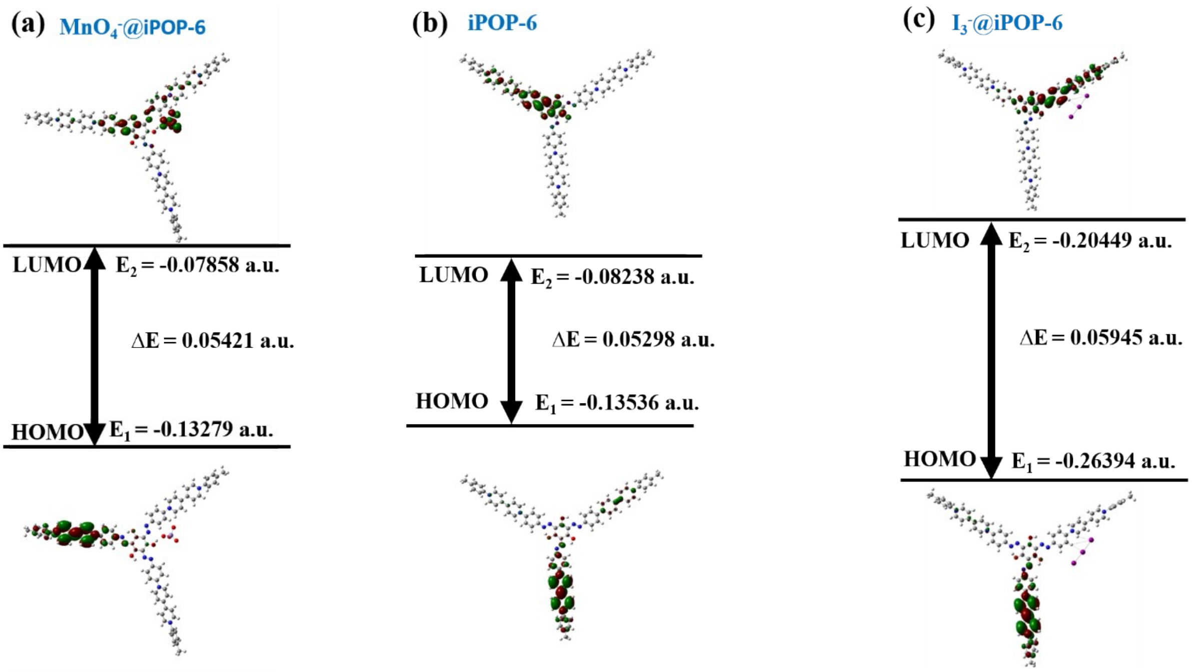


Figure S21: HOMO and LUMO of the adsorbate and complexes

Table S1: Comparison table [N.D.-Not Done]

Analyte	Name of the Adsorbate	Capacity(mg/g)	Selectivity	Reference
MnO_4^-	**iPOP-6**	**854**	**Cl^-, NO_3^-, Br^-, SO_4^{2-}**	**This work**
I_3^-	**iPOP-6**	**1021**	**Cl^-, NO_3^-, Br^-, SO_4^{2-}**	**This work**
MnO_4^-	SLUG-21	283	NO_3^-, CO_3^{2-}	*J. Am. Chem. Soc.*, **2010**, 132, 7202-7209.
MnO_4^-	SCNU-Z1-Cl	313.5	N.D.	*Inorg. Chem.* **2019,** 58, 4, 2899–2909
MnO_4^-	QUST-iPOP-1	517.7	Cl^-, NO_3^-, Br^-, SO_4^{2-}	*ACS Appl. Mater. Interfaces **2021**, 13, 33, 39404–39413*
MnO_4^-	Compound-1	297.3	Cl^-, NO_3^-, Br^-, SO_4^{2-}	*Chem.Sci.* **2018,** 9, 7874-7881
MnO_4^-	$Ag(btr)\cdot PF_6\cdot 0.5CH_3CN$	163	NO_3^-, BF_4^-, ClO_4^-	*Inorg. Chem.* **2014**, 53, 12127-12134
MnO_4^-	IPcomp-6	281	Cl^-, Br^- NO_3^-, ClO_4^-	*Angew. Chem. Int. Ed.* **2022**, 61, e2022033
MnO_4^-	Amberlite IR-120	4.9	N.D.	*Egypt. J. Aquat. Res.* **2015** 41, 2, 155–164
I_3^-	H_COF-7	1390	N.D.	*Angew. Chem. Int. Ed.* **2022**,61, e2022141
I_3^-	Cadmium(II)-triazole MOF	180	N.D.	*Chem. Commun.* **2011**, 47, 7185-7187
I_3^-	MBM - MOF	880	N.D.	*Angew. Chem. Int. Ed.* **2018**, 57, 10148-10152.
I_3^-	THPS-C	926	N.D.	*Adv. Mater. Inter.*, **2019**, 6, 1900249
I_3^-	TNHCP2	850	N.D.	*Sep. Purif. Technol.* **2021***, 257, 117923*
I_3^-	TAPB-BPDA COF	988.17	N.D.	*React. Funct. Polym.*, **159** (2021) 104806
I_3^-	PVDF/ZIF-8	73.33	N.D.	*Sep. Purif. Technol.*, **238** (2020) 116488
I_3^-	NTP	429	N.D.	*ACS Macro Lett.*, **2016**, **5**, 1039