Unprecedented adsorptive removal of $Cr_2O_7^{2-}$ and methyl orange by a low surface area organosilica

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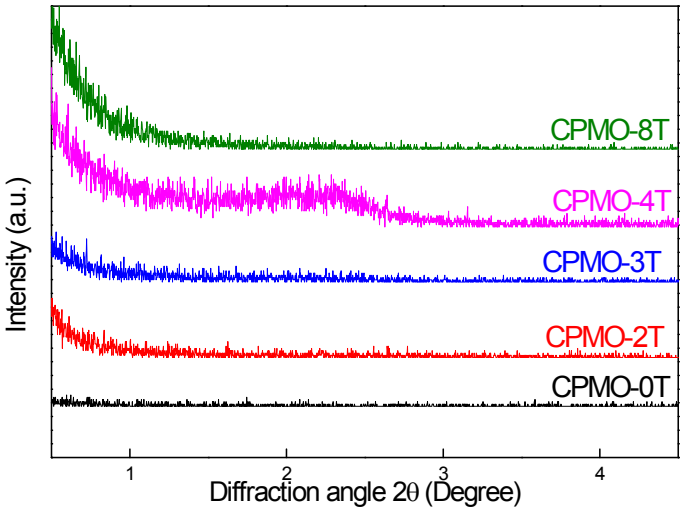

Fig. S1. Small angle X-ray scattering pattern of CPMOs

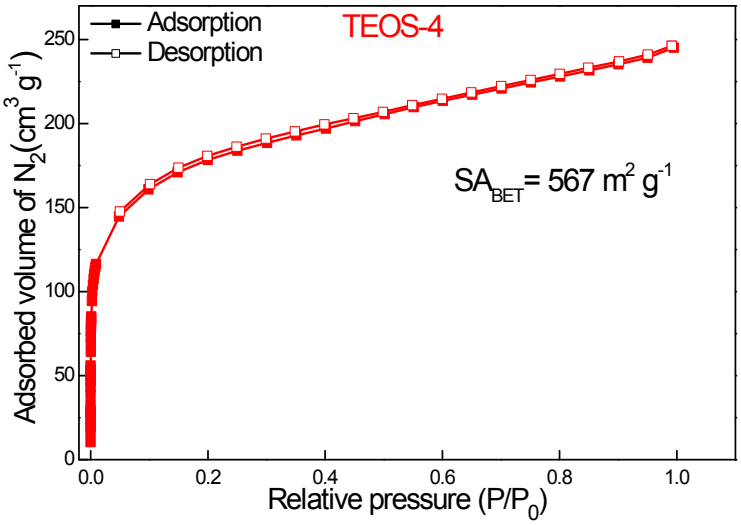

Fig. S2. N_2 sorption isotherms of TEOS-4 (without PNC and TMSPT) measured at 77 K

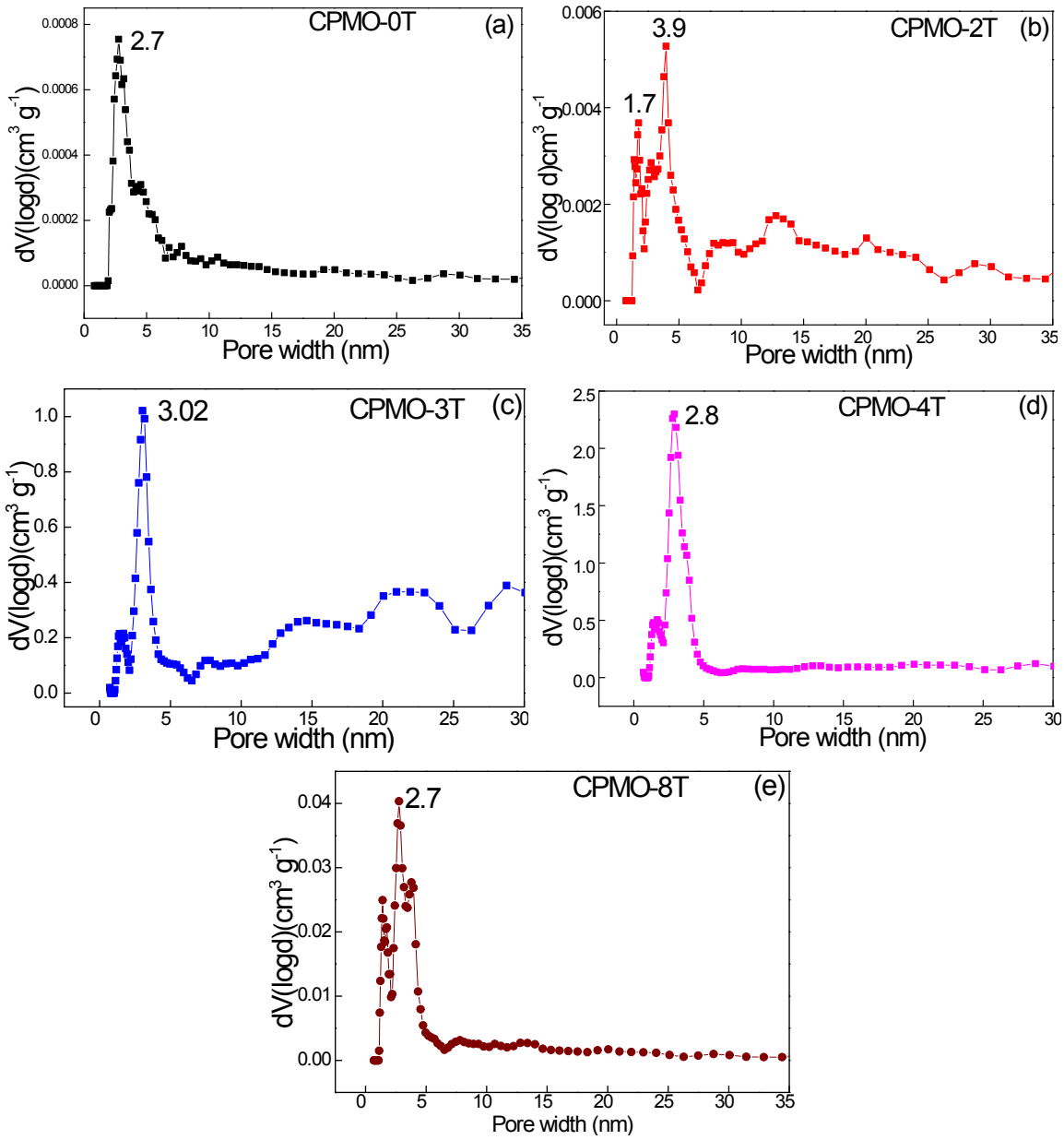

Fig. S3. Pore size distribution of (a) CPMO-0T, (b) CPMO-2T, (c) CPMO-3T, (d) CPMO-4T, and (e) CPMO-8T calculated by using density functional theory (DFT) model

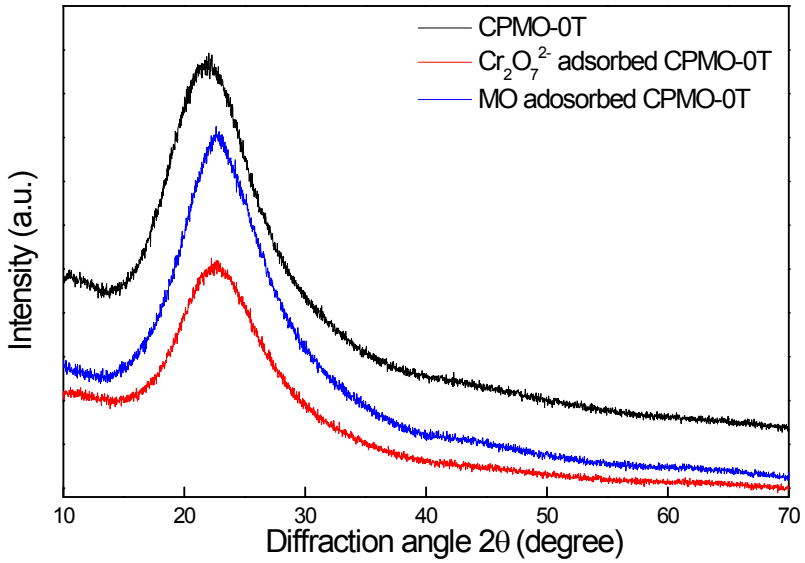

Fig. S4. XRD patterns of CPMO-0T, $Cr_2O_7^{2-}$ and MO adsorbed CPMO-0T

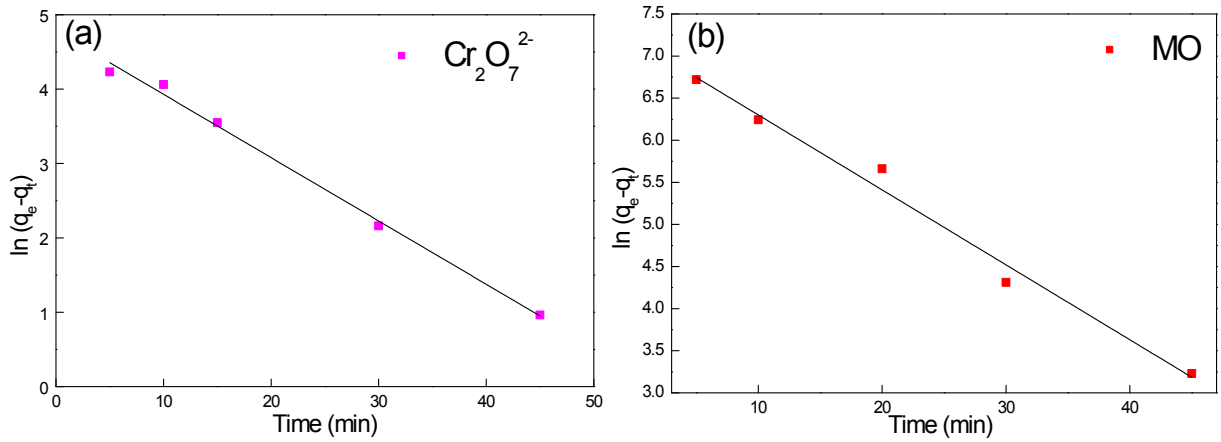

Fig. S5. Pseudo first order kinetics for the adsorption of (a) $Cr_2O_7^{2-}$ and (b) MO removal by CPMO-0T

Table S1. Comparison of adsorption capacities (q_{max}) of selected results from the literature for $Cr_2O_7^{2-}$ removal

Silica type	Adsorption conditions	q_{max} (mg g^{-1})	S_{BET} (m^2 g^{-1})	Pore volume (cm^3 g^{-1})	Ref.
3 Aminopropyl functionalized MCM-48		65	−−		S1
6-amino-4-azahexyl functionalized MCM−48		119	898		S1
9-amino-4,7-diazanonyl functionalized MCM-48		160	−−		S1
MSS-APw	C_0= 10-200 ppm Temp= 25 °C *pH*=2.2 adsorption time= 4 h	83	87	0.4	S2
AP-USG-41	C_0= 10-130 ppm Temp= 25 °C *pH*= 3 adsorption time= 2 h	111	760	0.99	S3
AP-MCM-41	C_0= 10-200 ppm Temp= 20 °C *pH*= 3 adsorption time= 2 h	101	425	0.60	S4
Magnetic functionalized MCM-48 mesoporous silica with melamine	C_0= 10-80 ppm Temp= 25 °C *pH*= 4 adsorption time= 1.5 h	116	511	0.44	S5
hierarchical porous carbon obtained from pig bone	C_0= 100 ppm Temp.= 27 °C *pH*= 2 adsorption time= 24 h	398	2157	2.26	S6
Zr-cluster based MOFs	C_0= 50 ppm Temp= 25 °C *pH*= 2 adsorption time=10 min	245	561	−−	S7
CPMO-0T	C_0= 200 ppm Temp= 25 °C *pH*= 5 adsorption time=1 h	359	10	0.018	Present work

Table S2. Comparison of adsorption capacities (q_{max}) of selected results from the literature for MO removal

Material type	Adsorption conditions	q_{max} (mg g^{-1})	S_{BET} (m^2 g^{-1})	Pore volume (cm^3 g^{-1})	Ref.
Ammonium-functionalized silica nanoparticle	C_0= 50 ppm Temp= 25 °C *pH*= 3.2-9.6 adsorption time=10 min	105	−−	−−	S8
Mesoporous carbon material	C_0= 50−1000 ppm Temp= 25 °C *pH*= 3-9 adsorption time= 1 h	294	940	0.96	S9
Alkali-activated multiwalled carbon nanotubes	C_0= 80-150 ppm Temp= 25 °C *pH*= 7 adsorption time= 3 h	149	535	1.61	S10
Poly HEMA-chitosan-MWCNT nano-composite	C_0= 20-35 ppm Temp= 35 °C *pH*= 4 adsorption time= 10 min	306	−−	−−	S11
Nanostructured proton containing δ MnO_2	C_0= 100-600 ppm Temp= 20 °C *pH*= 3 adsorption time= 2 h	427	166	0.371	S12
CPMO-0T	C_0= 1000 ppm Temp= 25 °C *pH*= 7 adsorption time= 1 h	1679	10	0.018	Present work

Table S3. Adsorption capacities of all CPMOs and TEOS-4 for (a) $Cr_2O_7^{2-}$ and (b) MO removal

Sample ID	**Adsorption capacity (mg g^{-1}) (MO)**	**Adsorption capacity (mg g^{-1}) ($Cr_2O_7^{2-}$)**
CPMO-0T	1679	359
CPMO-2T	1253.857	344
CPMO-3T	1123.216	323
CPMO-4T	1098.817	299
CPMO-8T	935.59	236
TEOS-4	27	8

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