

Electronic Supplementary Information

Anion-assisted one-pot synthesis of 1D magnetic α - and β - MnO₂ nanostructures for recyclable water treatment application

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Series	Adsorbents	The first order Kinetic equation	$k(min^{-1})$	R^2
1	MB + H ₂ O ₂	$\ln(C_0/C_t) = 3.29e-5 t$	3.29e-5	0.1121
2	M2 (α -MnO ₂) + MB	$\ln(C_0/C_t) = 1.46e-4 t$	1.46e-4	0.7313
3	M1 (α -MnO ₂) + MB	$\ln(C_0/C_t) = 1.79e-4 t$	1.79e-4	0.6632
4	M3 (β -MnO ₂) + MB	$\ln(C_0/C_t) = 1.83e-4 t$	1.83e-4	0.5698
5	Commercial MnO ₂	$\ln(C_0/C_t) = 7.88e-4 t$	7.88e-4	0.5739
6	Active carbon	$\ln(C_0/C_t) = 0.0020 t$	0.0020	0.8012
7	M2 (α -MnO ₂)	$\ln(C_0/C_0) = 0.0044 t$	0.0044	0.9907
8	M1 (α -MnO ₂)	$\ln(C_0/C_t) = 0.0096 t$	0.0096	0.9951
9	M3 (β -MnO ₂)	$\ln(C_0/C_t) = 0.0174 t$	0.0174	0.9375

Table S1 Pseudo-first-order rate constant for MB degradation under different adsorbents

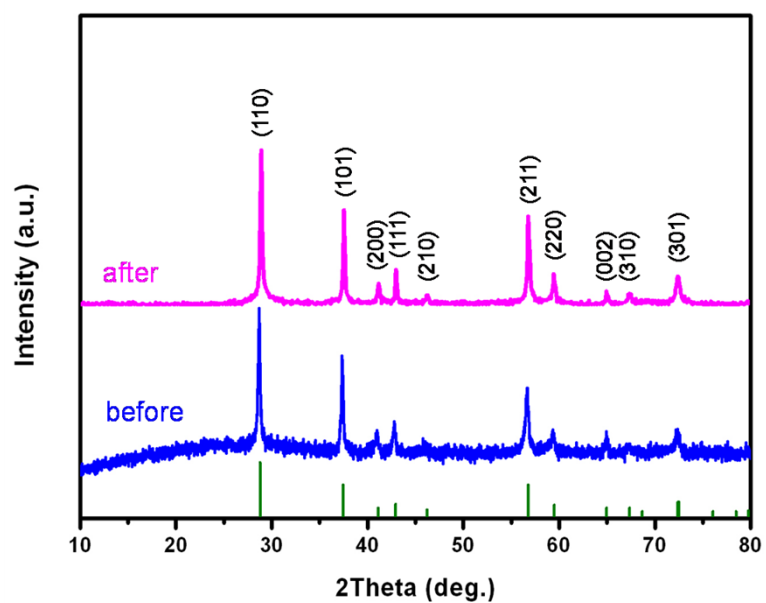


Fig. S1 The XRD patterns of β -MnO₂ (M3) before the degradation process and after the fourth circulation.

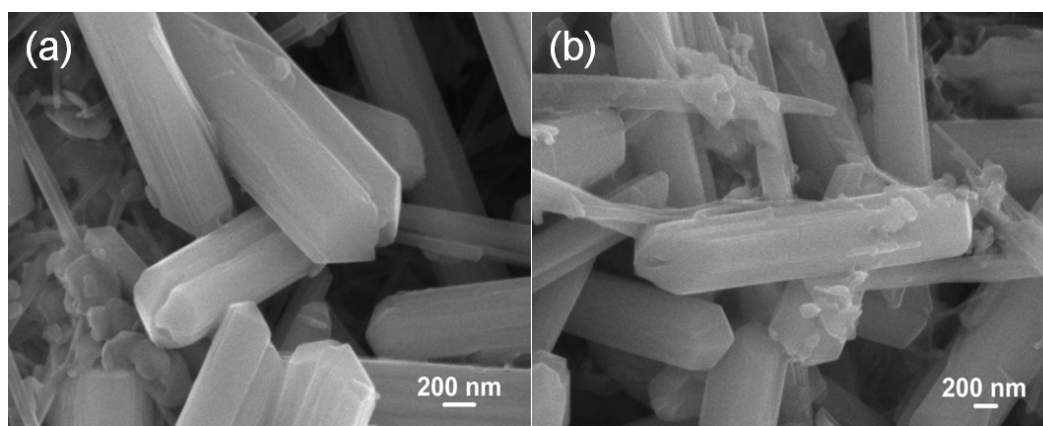


Fig. S2 SEM images of β -MnO₂ (M3) (a) before the degradation process and (b) after the fourth circulation.

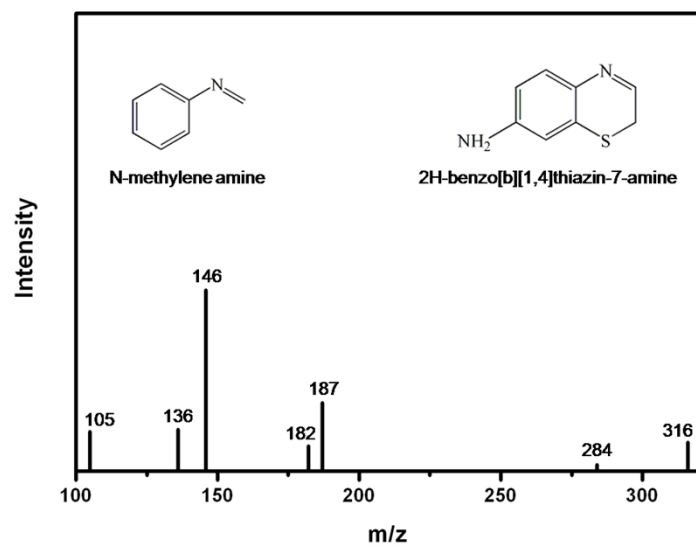


Fig. S3 ESI-MS spectrum of the solution in the degradation system using as-prepared M3 (β -MnO₂) after 2.5 h.

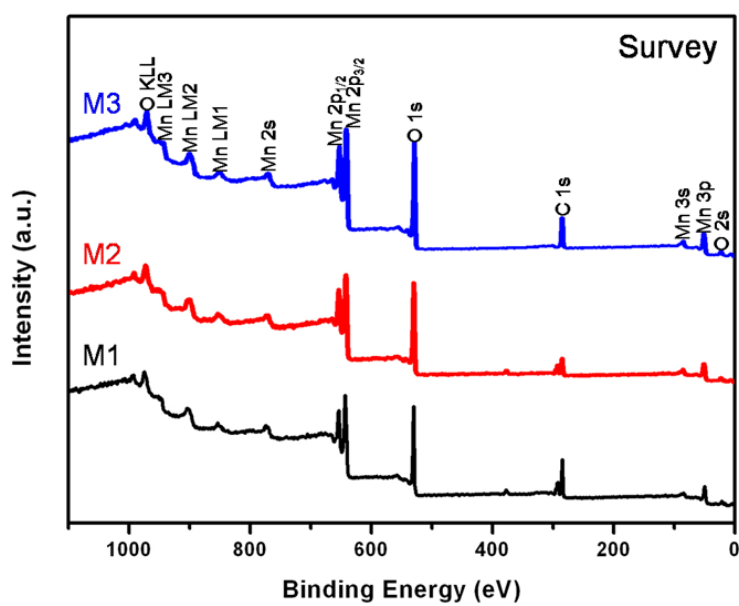


Fig. S4 XPS survey spectra of the as-prepared M1 (α -MnO₂), M2 (α -MnO₂) and M3 (β -MnO₂), respectively.

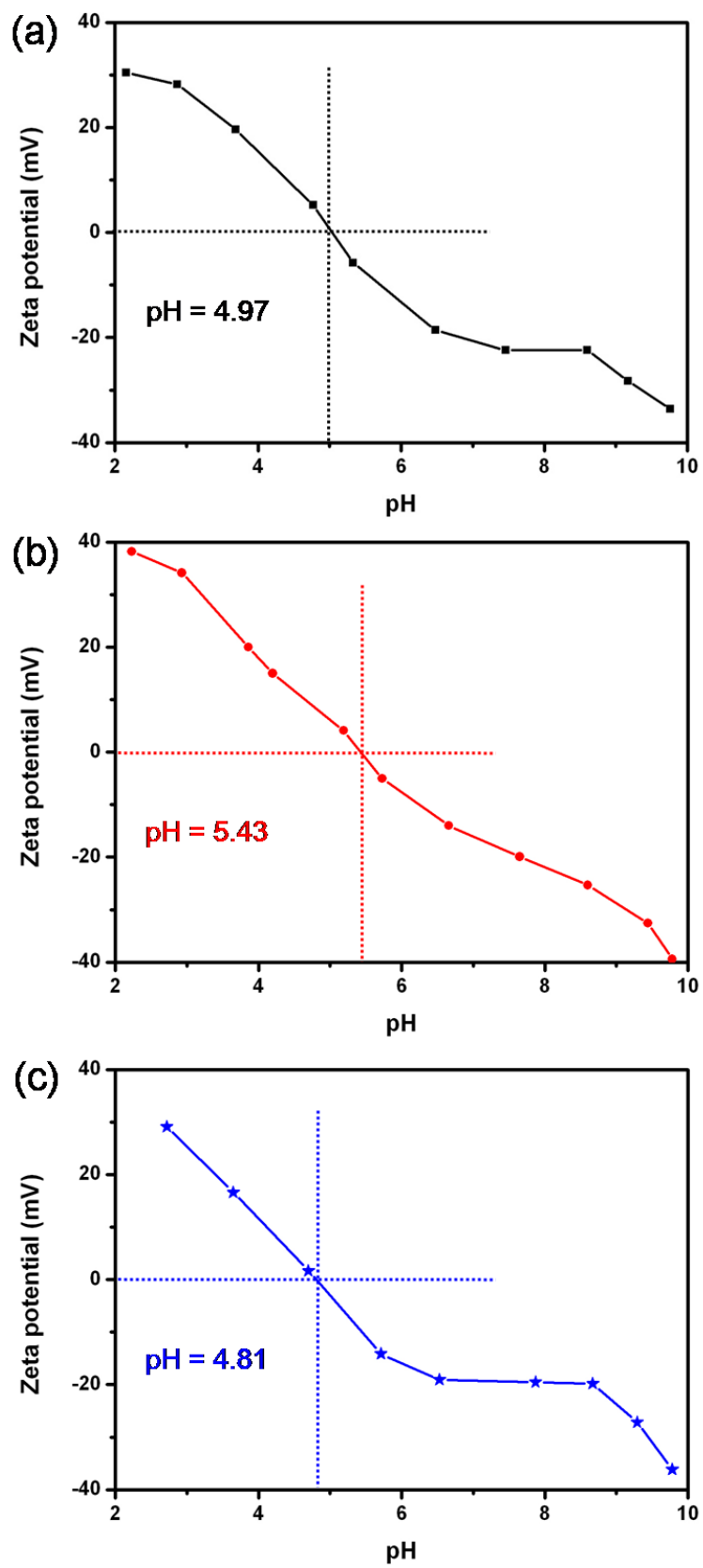


Fig. S5 The pH of the zero point of charge of the as-prepared M1 (α -MnO₂), M2 (α -MnO₂) and M3 (β -MnO₂), respectively.

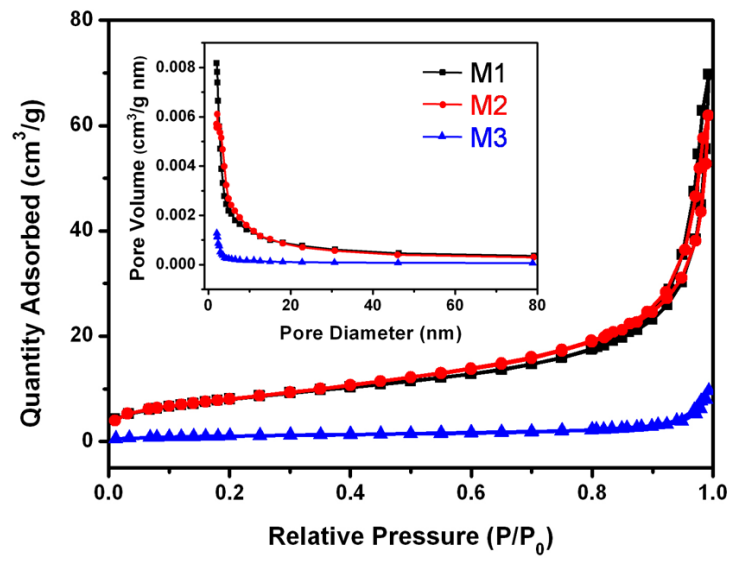


Fig. S6 The BET specific surface area of M1 (α -MnO₂), M2 (α -MnO₂) and M3 (β -MnO₂), respectively.