Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

Rapid, Efficient and Controllable Photo-assisted Polysulfide Sealing Over MnO_2

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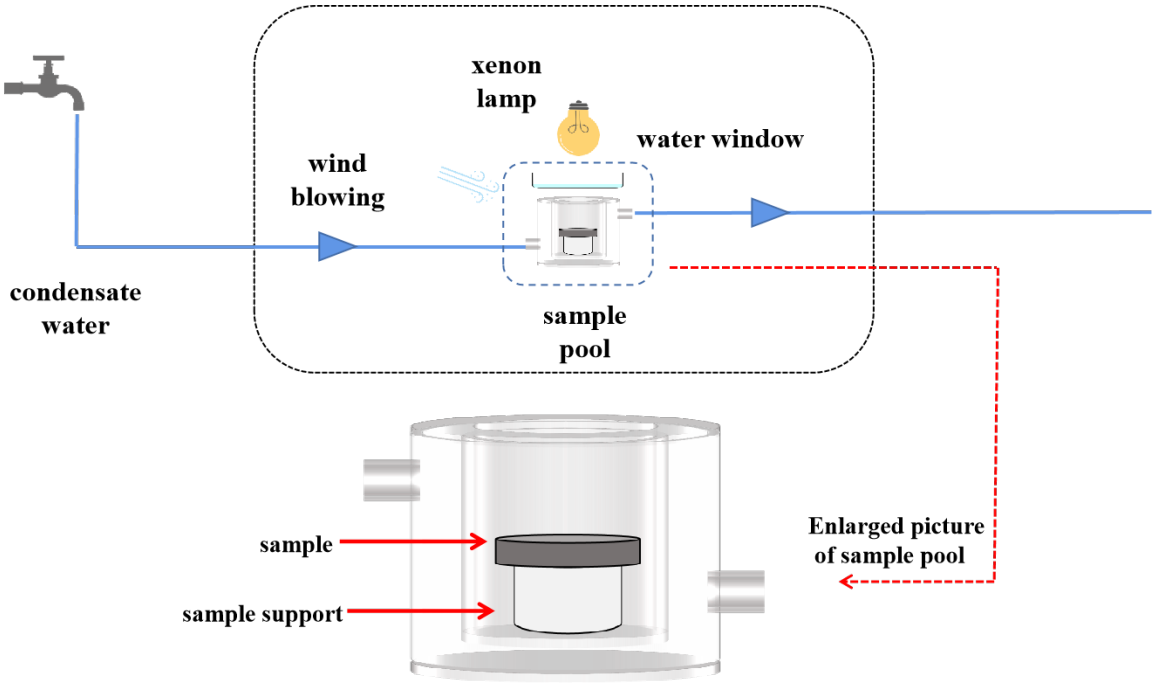

Figure S1. Diagram of glass reactor for photo-assisted polysulfide curing.

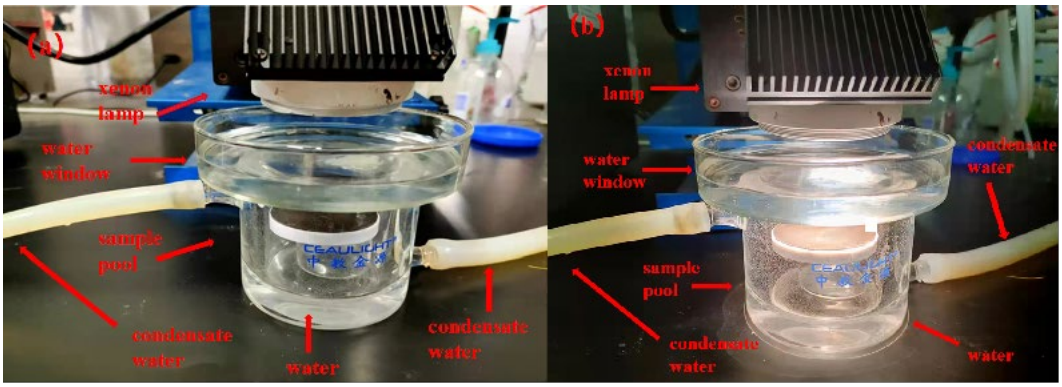

Figure S2. The photo-assisted polysulfide curing device physical drawing of the glass reactor with water window. (a) turning off light, (b) turning on light.

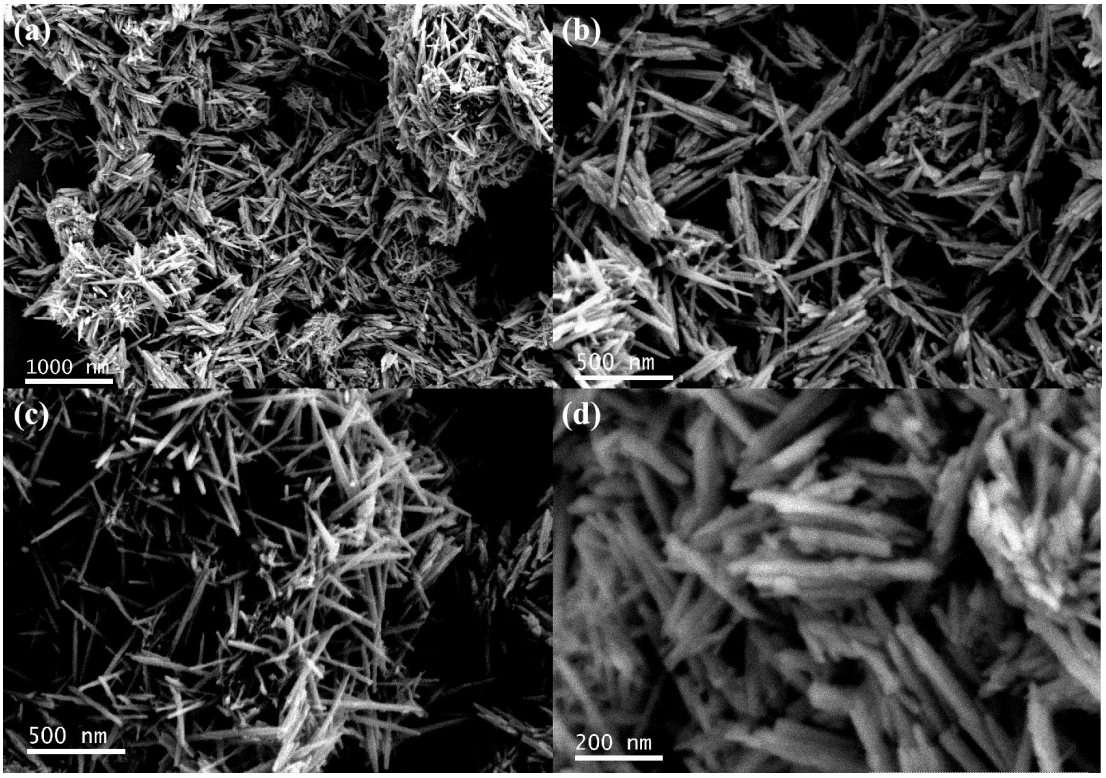

Figure S3. SEM images of α-MnO_2 at different resolutions (a) 1000 nm，(b) 500 nm，(c) 500 nm，(d) 200 nm.

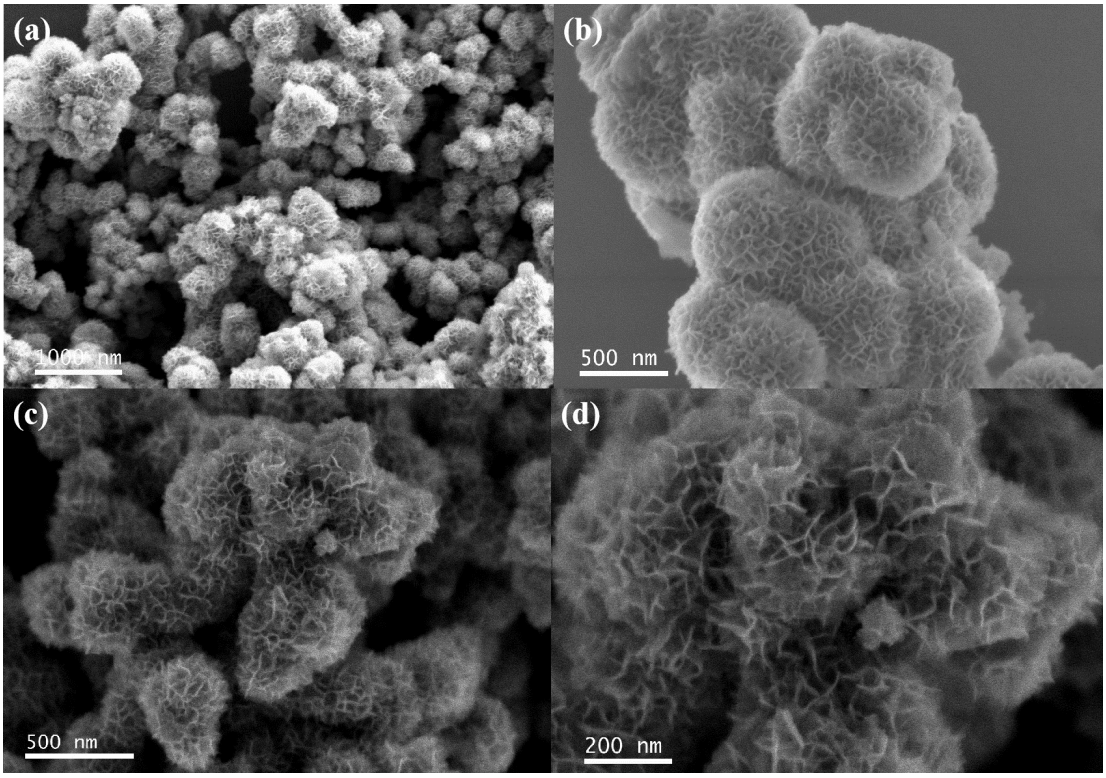

Figure S4. SEM images of δ-MnO_2 at different resolutions (a) 1000 nm, (b) 500 nm, (c) 500 nm, (d) 200 nm.

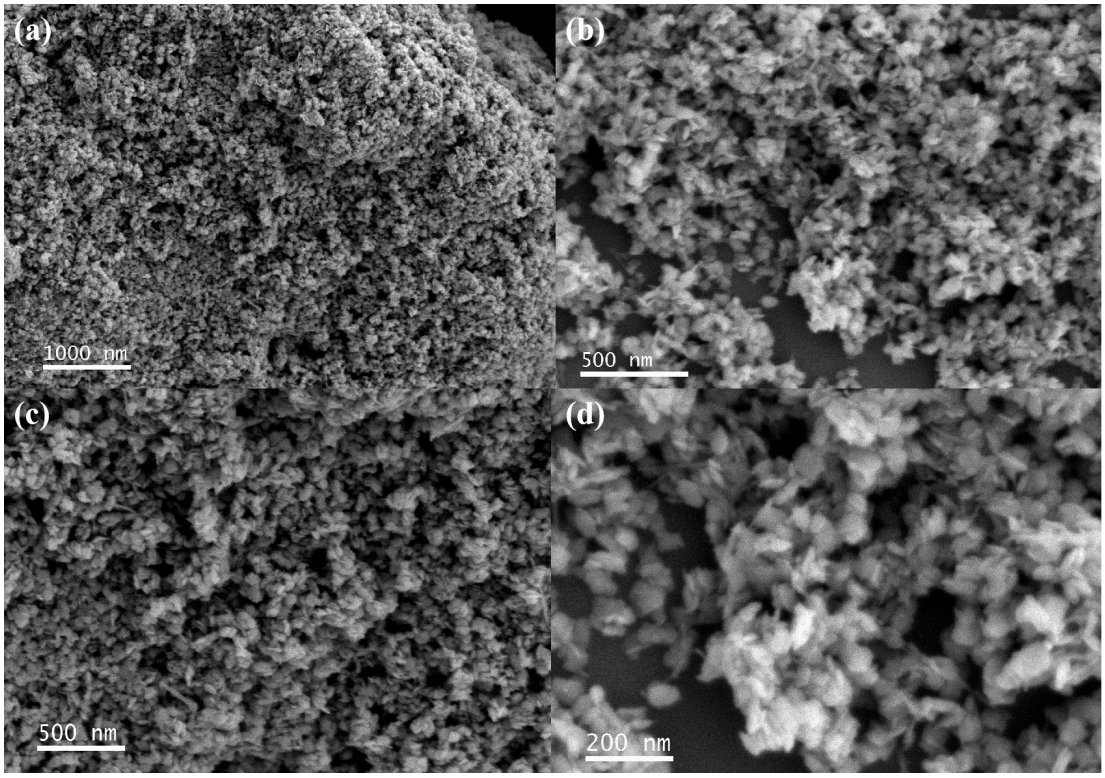

Figure S5. SEM images of γ-MnO_2 at different resolutions (a) 1000 nm, (b) 500 nm, (c) 500 nm, (d) 200 nm.

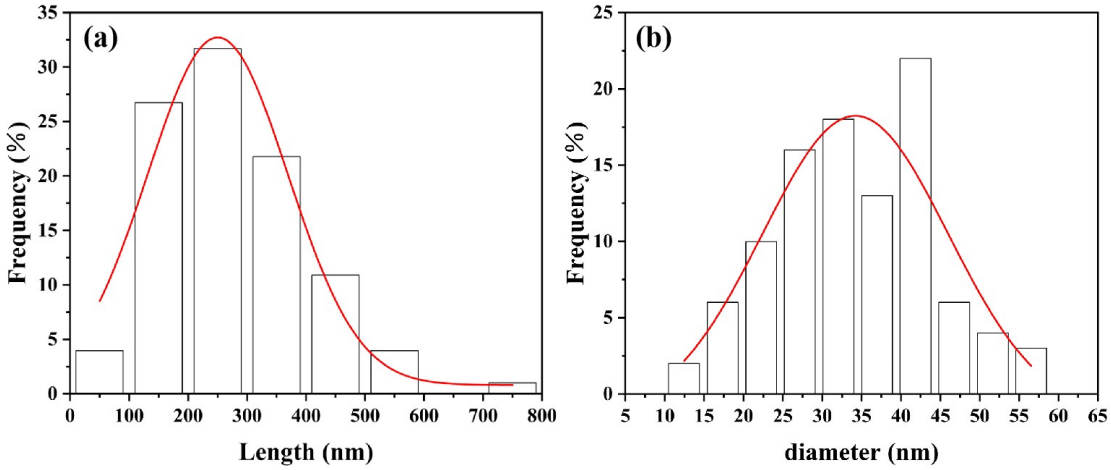

Figure S6. The length distribution (a) and diameter distribution (b) of α-MnO_2.

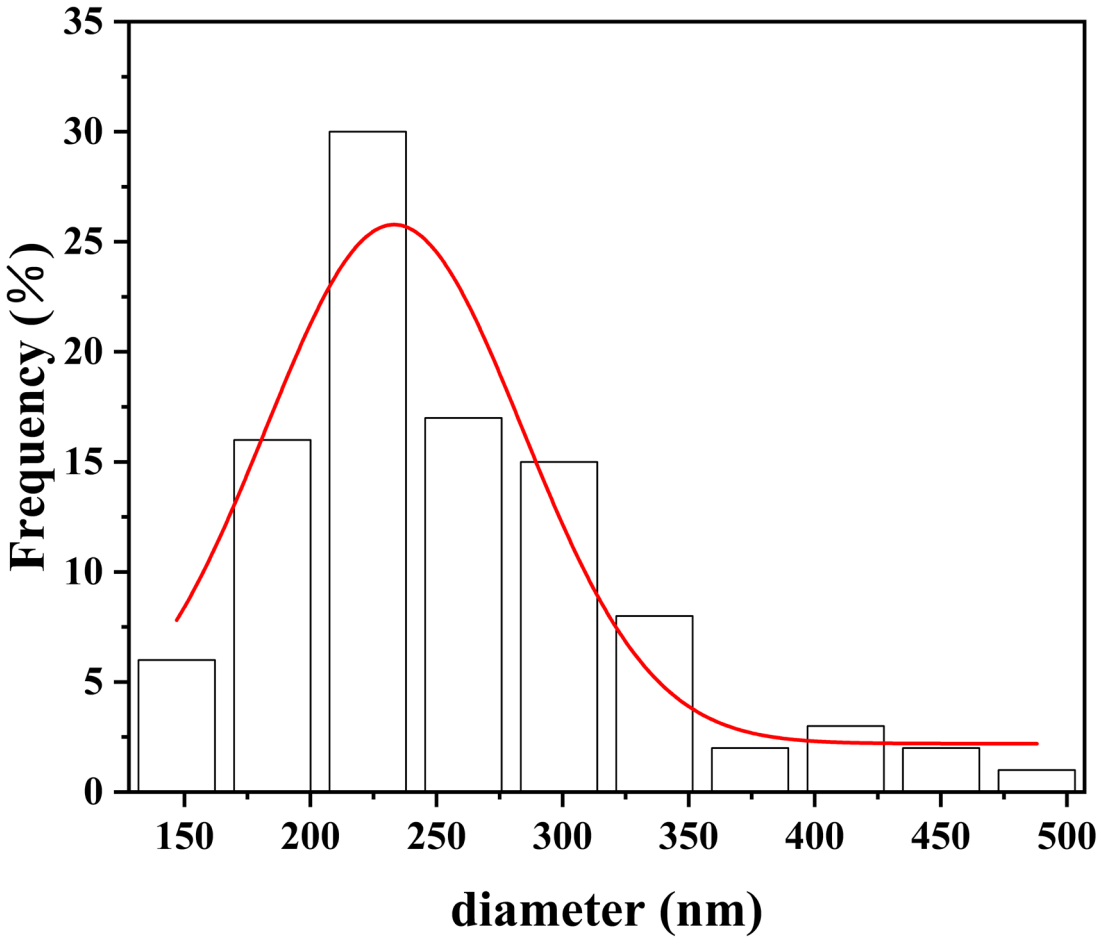

Figure S7. The diameter distribution of δ-MnO_2.

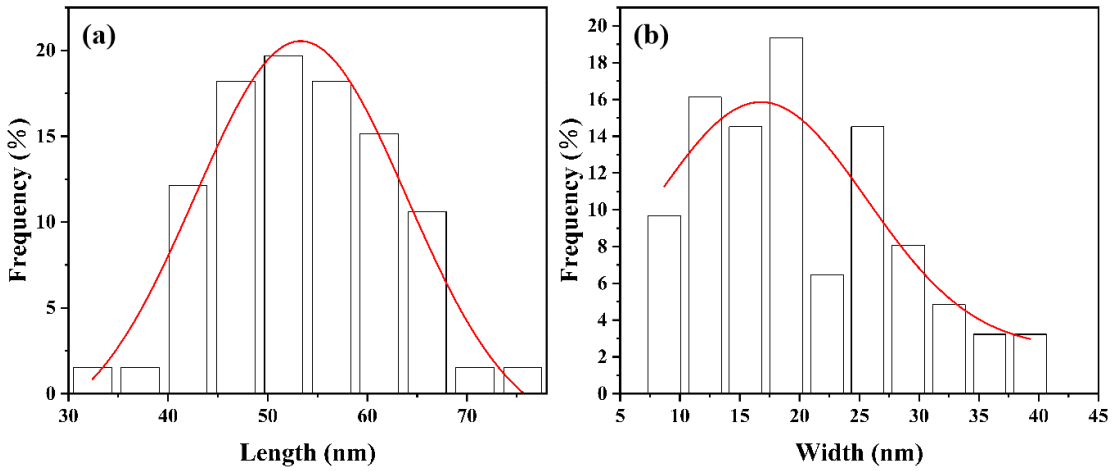

Figure S8. The length distribution (a) and width distribution (b) of γ-MnO_2.

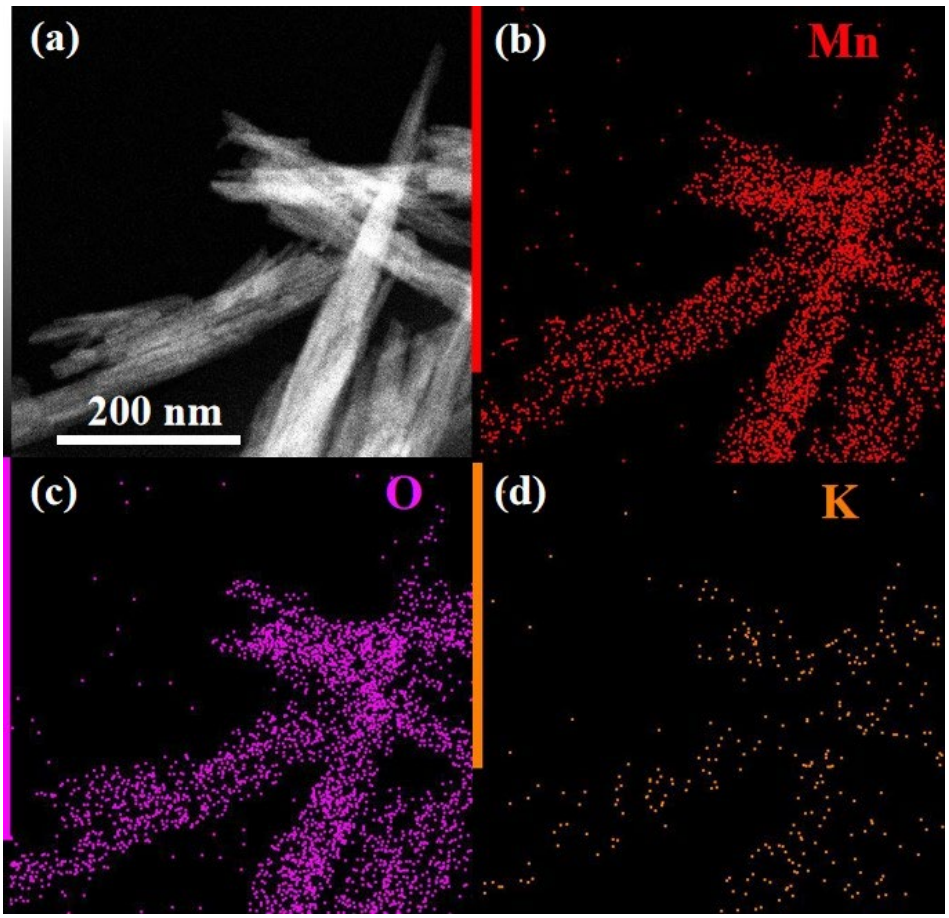

Figure S9.TEM images of α-MnO_2 with a scale bar of 200 nm (a), EDX mapping of α-MnO_2, Mn (b), O (C), and K (d).

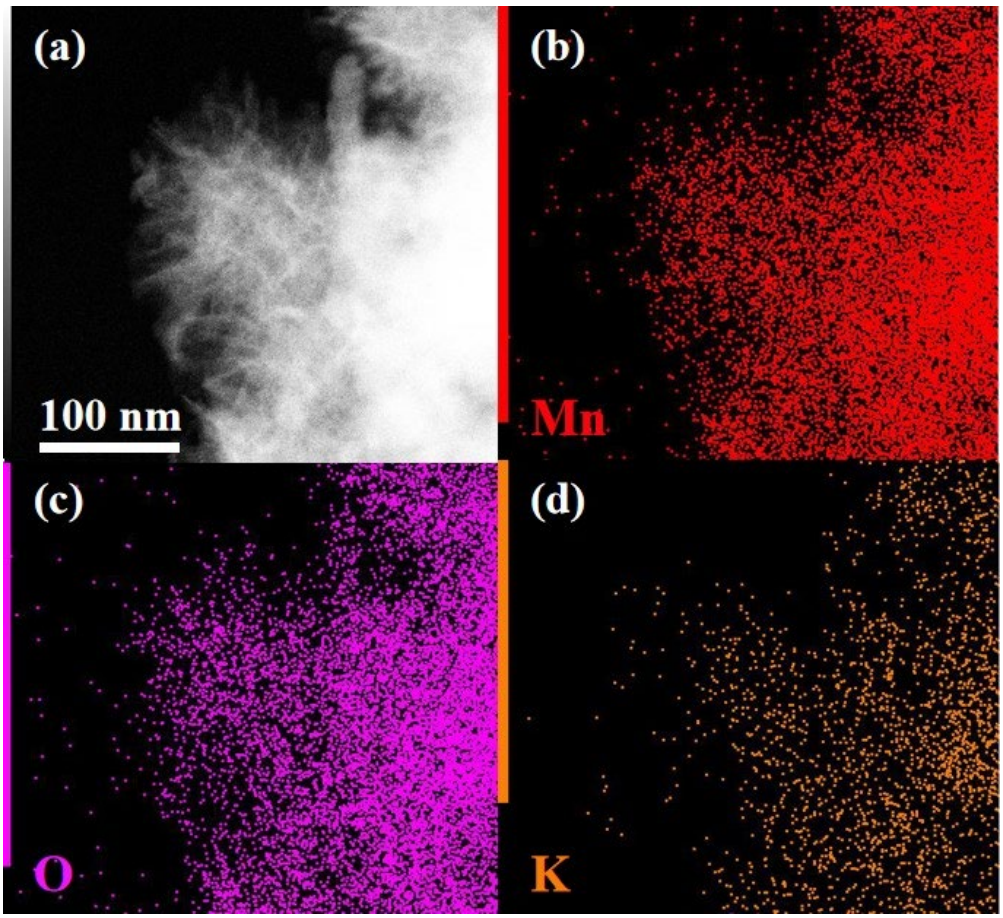

Figure S10. TEM images of δ-MnO_2 with a scale bar of 100 nm (a) and EDX mapping of δ-MnO_2, Mn (b), O (C), and K (d).

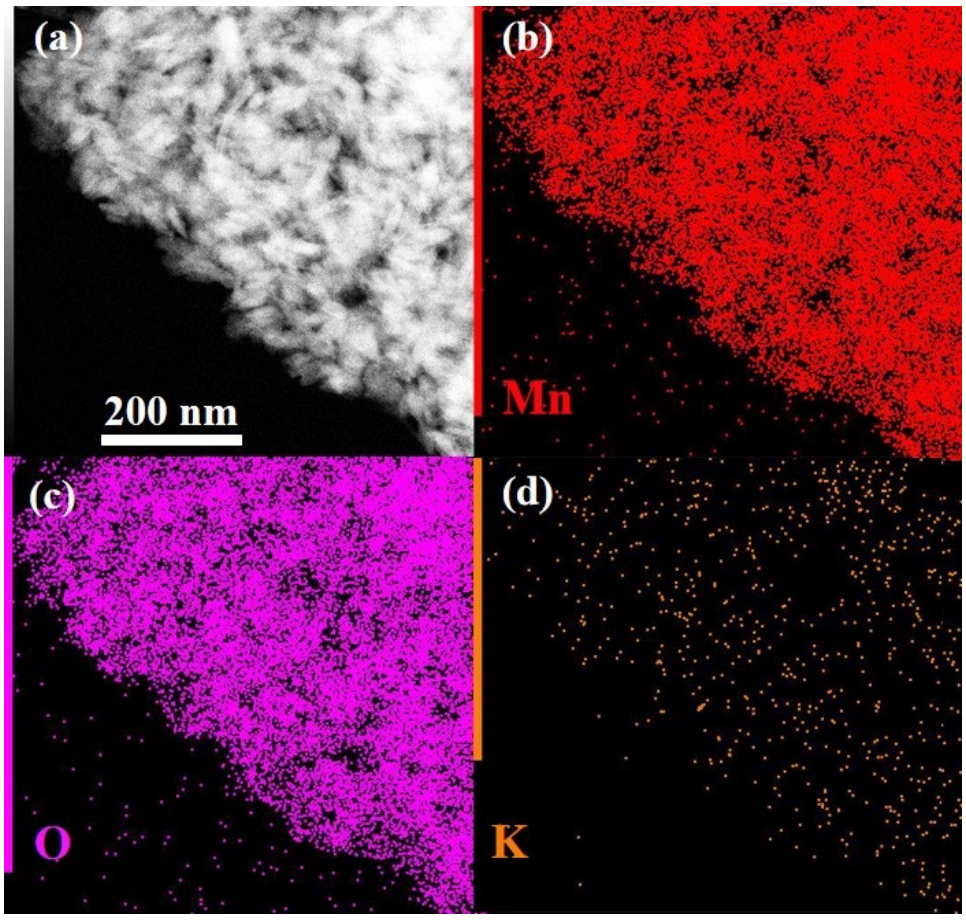

Figure S11. TEM images of γ-MnO_2 with a scale bar of 200 nm (a) and EDX mapping of γ-MnO_2, Mn (b), O (C), and K (d).

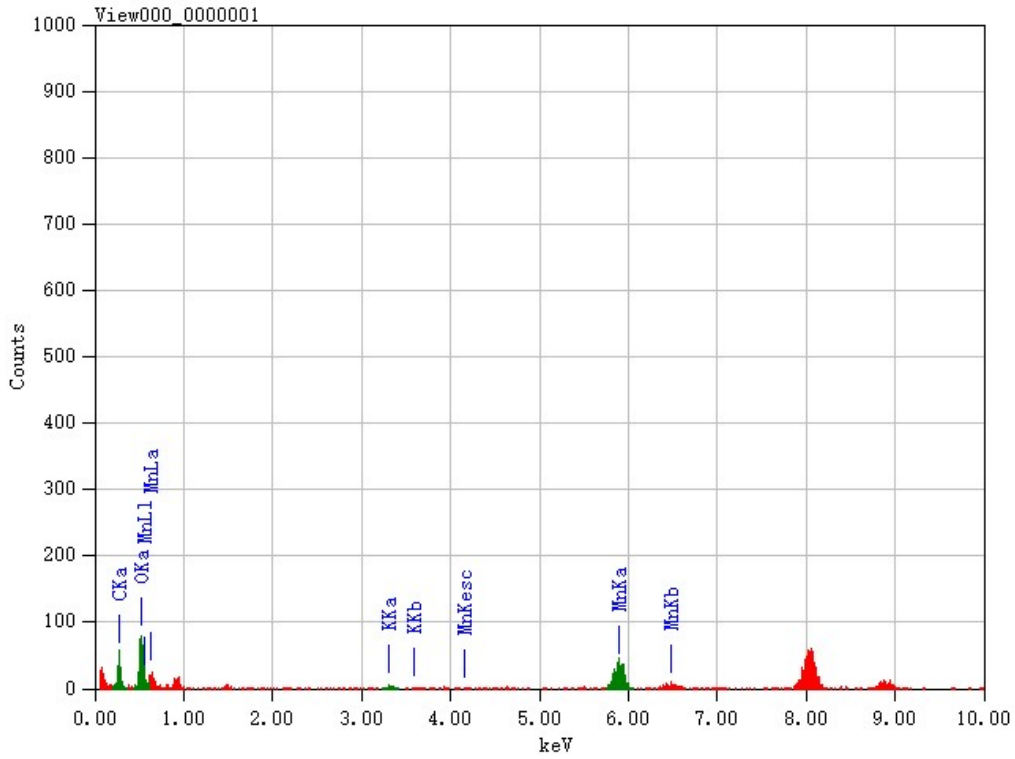

Figure S12. EDS spectra of α-MnO_2.

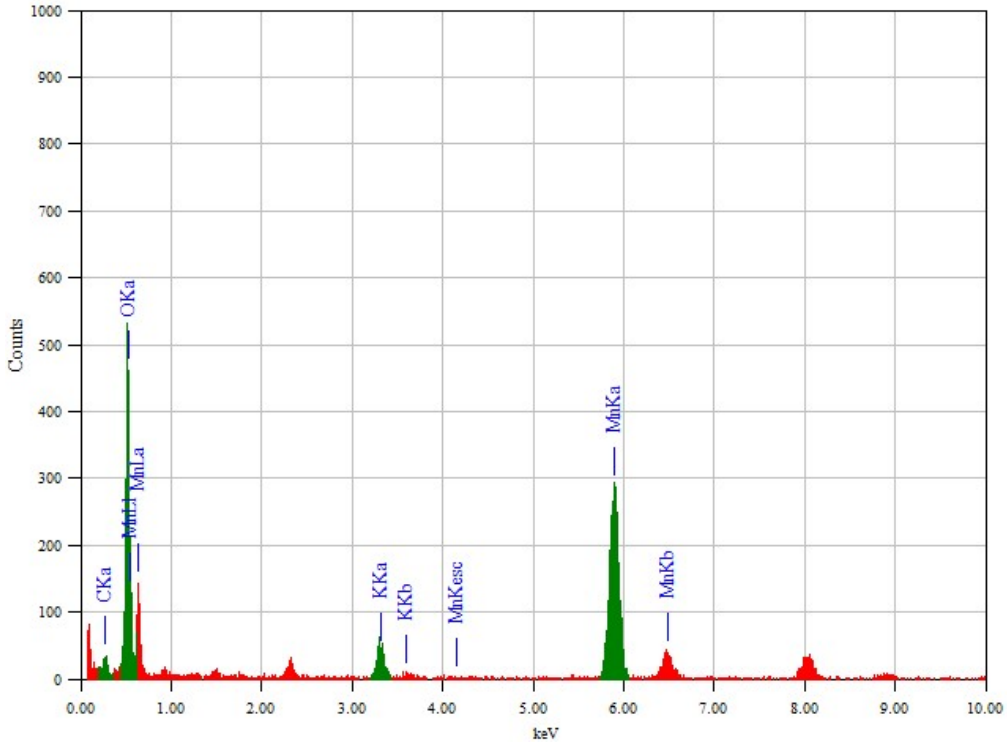

Figure S13. EDS spectra of δ-MnO_2.

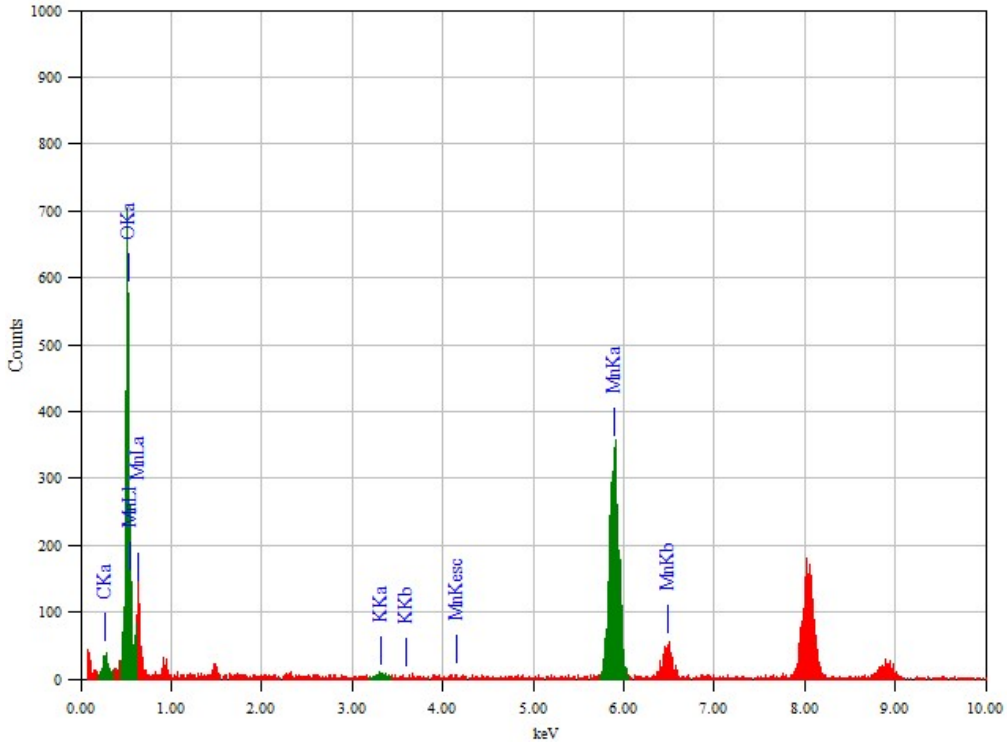

Figure S14. EDS spectra of γ-MnO_2.

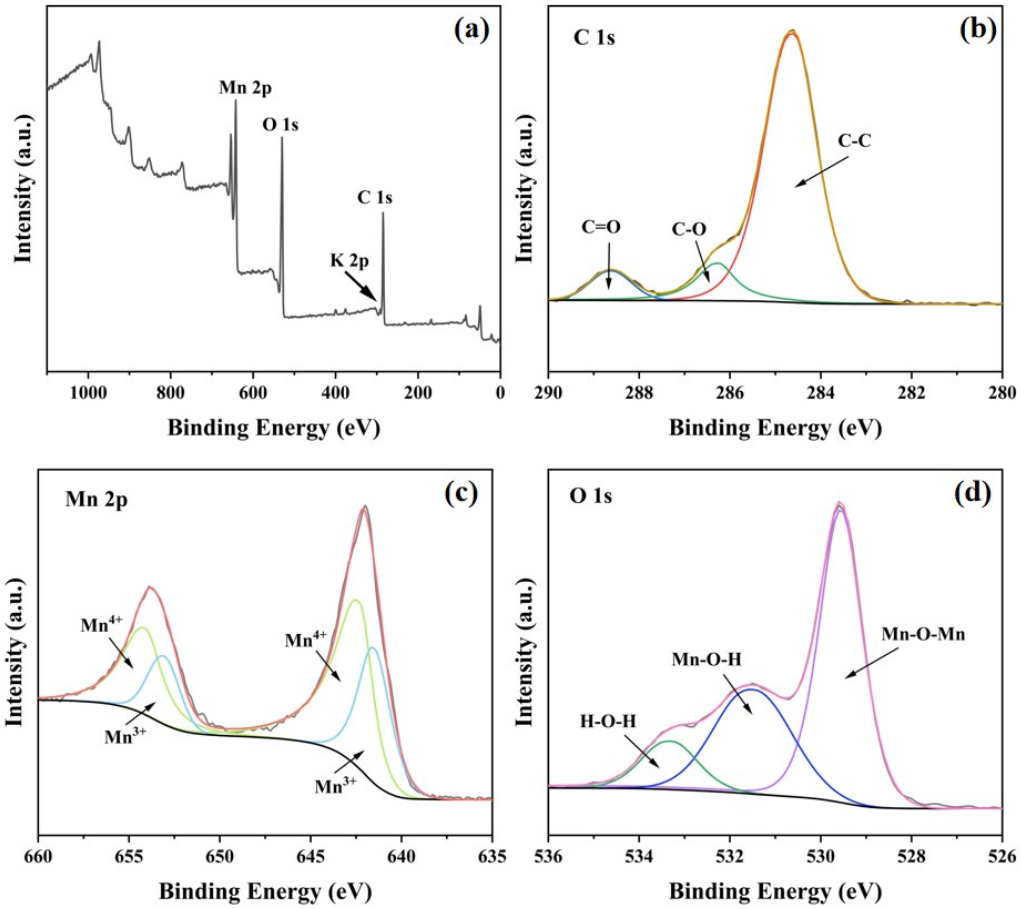

Figure S15. XPS survey spectrum (a) spectrum of C 1s (b) Mn 2p (c) and O 1s (d) for α-MnO_2.

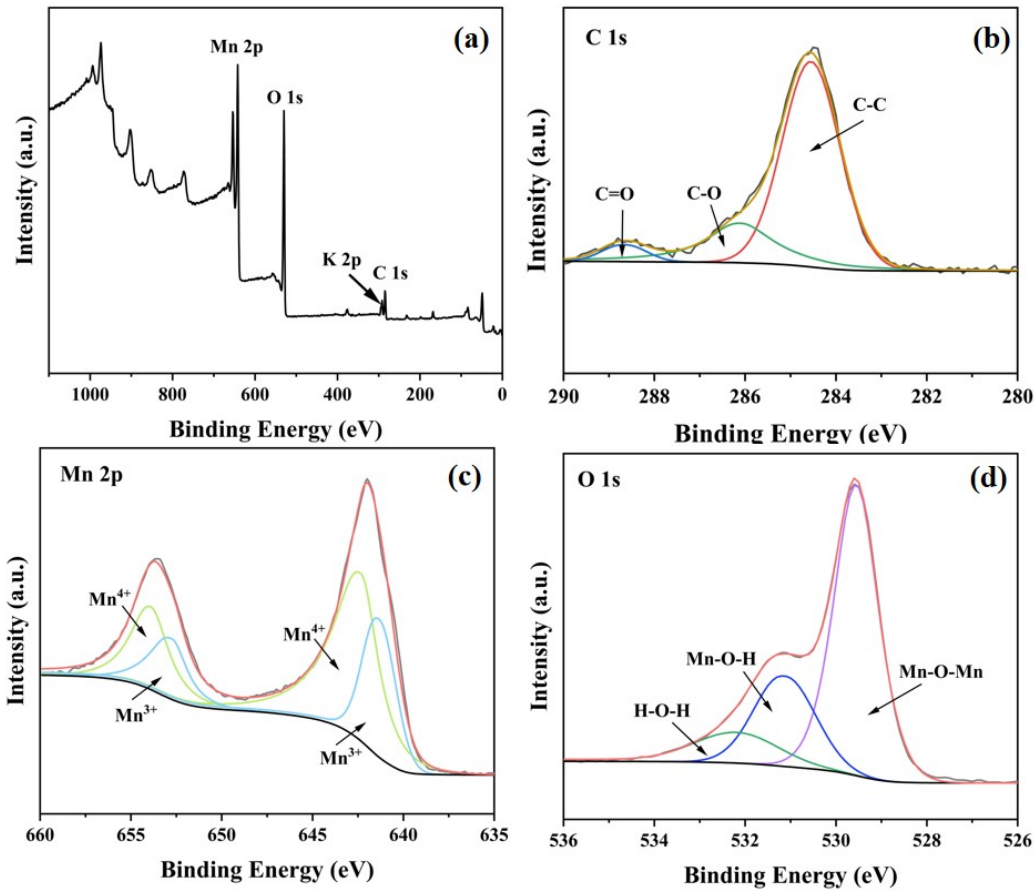

Figure S16. XPS survey spectrum (a) spectrum of C 1s (b) Mn 2p (c) and O 1s (d) for δ-MnO_2.

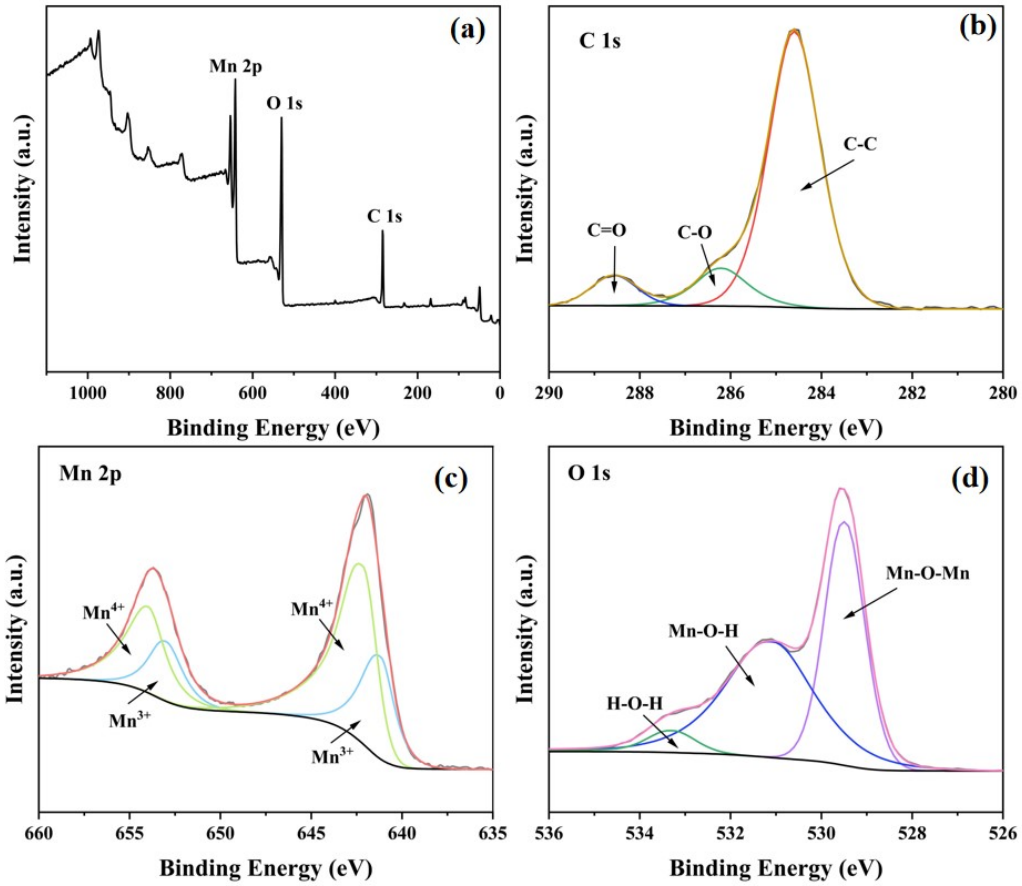

Figure S17. XPS survey spectrum (a) spectrum of C 1s (b) Mn 2p (c) and O 1s (d) for γ-MnO_2.

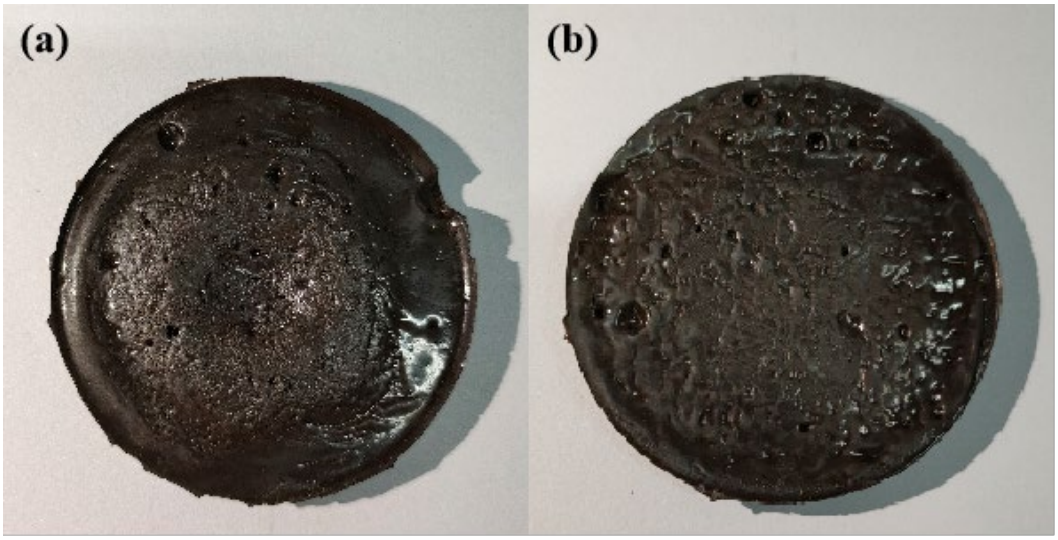

Figure S18. The polysulfide sealant photos over δ-MnO_2 under different conditions: (a) the position of rubber was fixed, (b) the rubber was uniformly shaken.

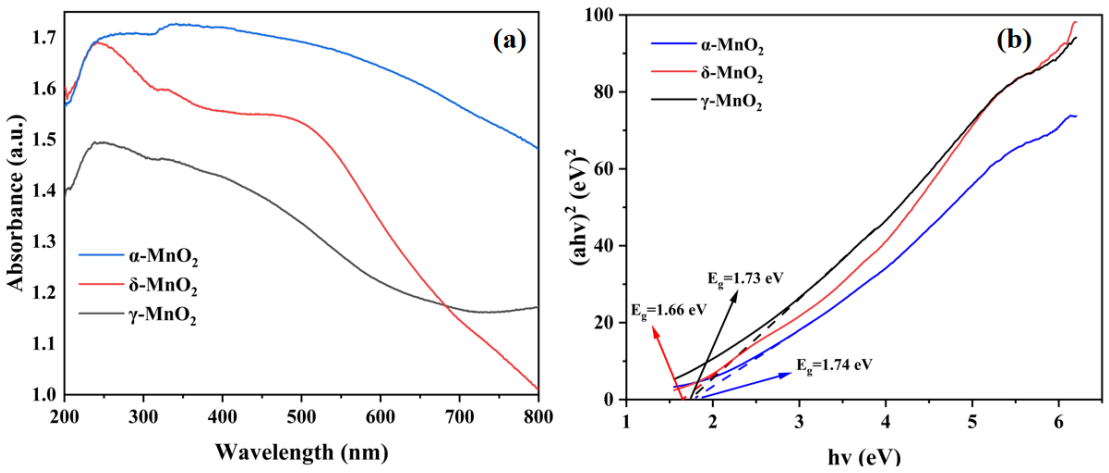

Figure S19. UV-Visible diffuse reflectance spectra of MnO_2 (a), and Tauc's plot for MnO_2 (b).

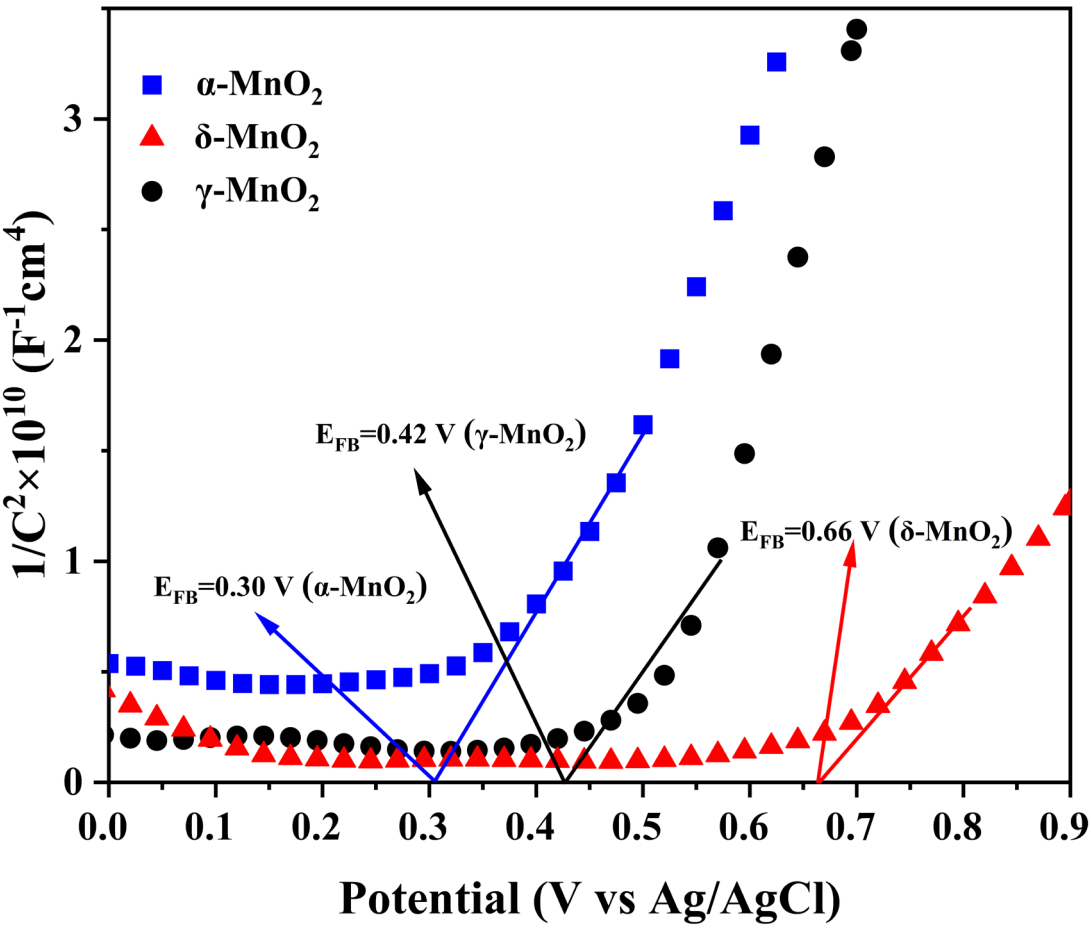

Figure S20. Mott-Schottky plot of MnO_2 in 0.5 M Na_2SO_4 solution at 1000 Hz.

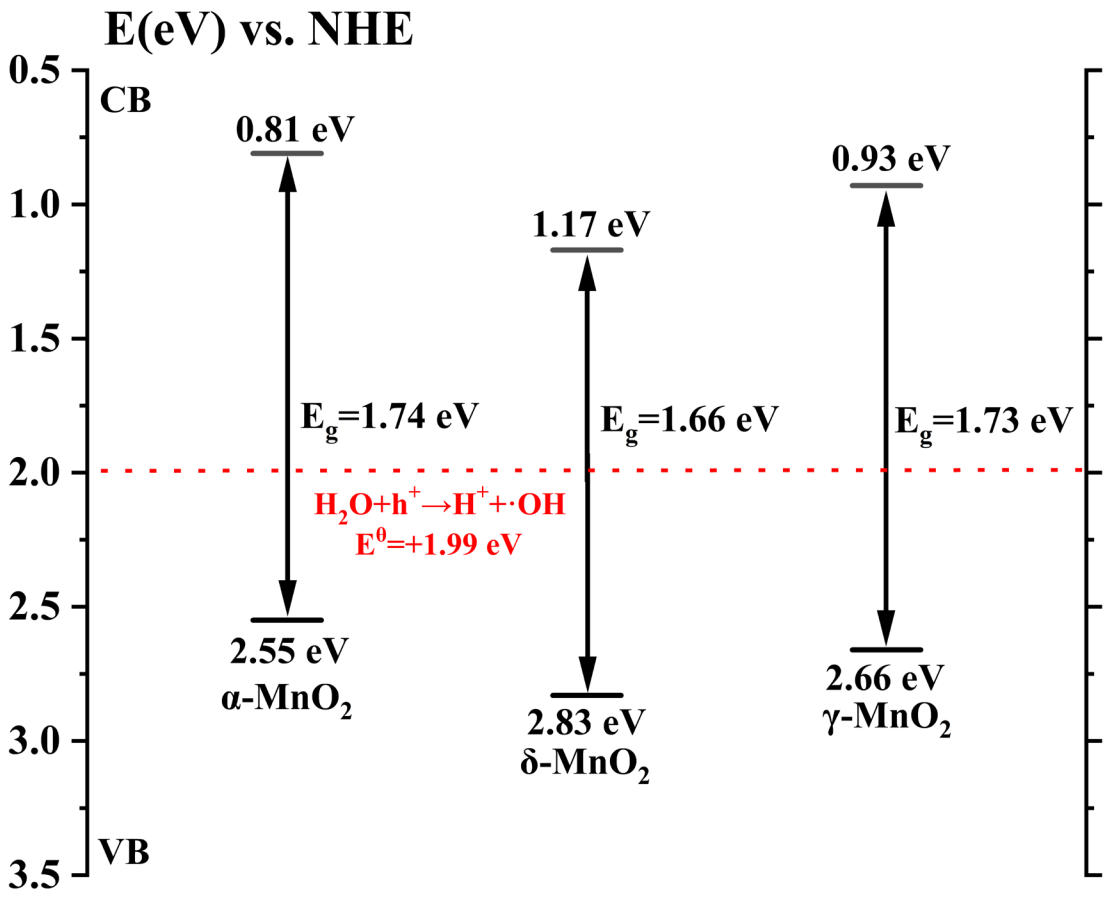

Figure S21. Diagram of energy band structure.

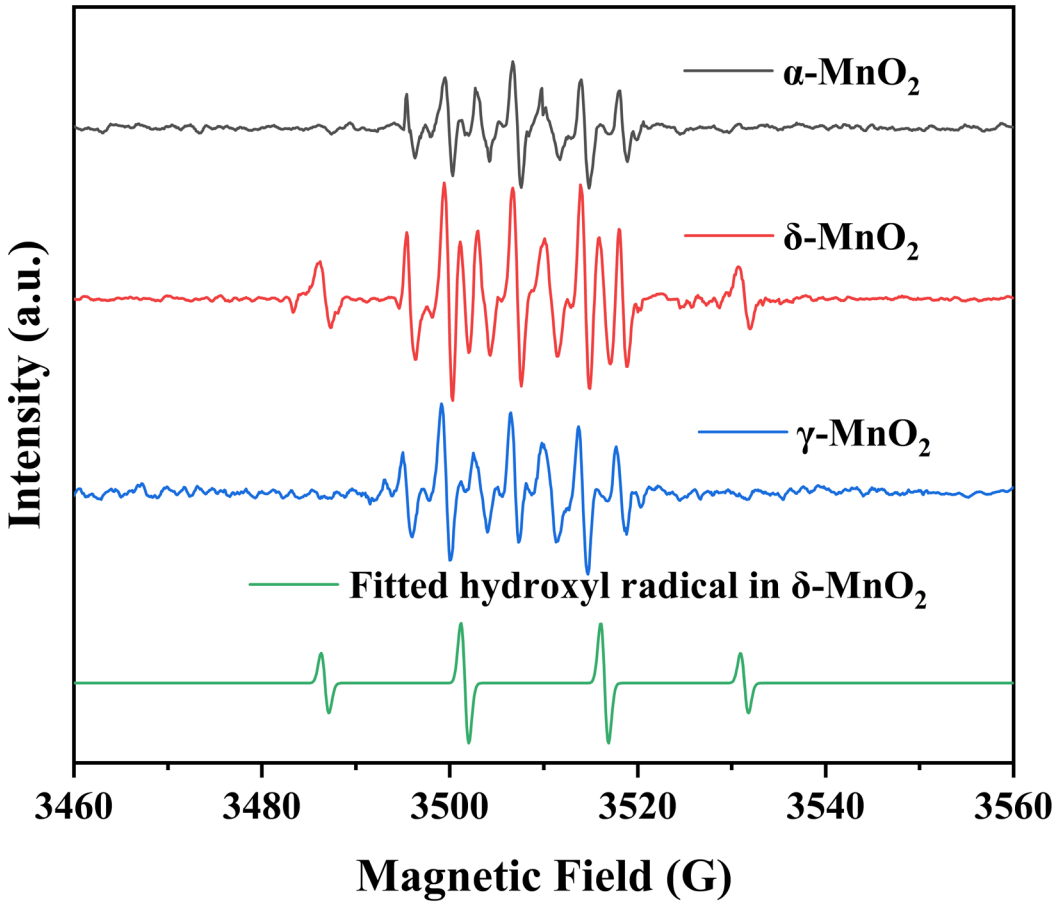

Figure S22. ESR spectra of α-MnO_2, δ-MnO_2, γ-MnO_2 and fitted hydroxyl radical in δ-MnO_2.

Table S1. Content of Mn and O elements in α-MnO_2, δ-MnO_2, γ-MnO_2.

	α-MnO_2	**δ-MnO_2**	**γ-MnO_2**
Mass % (Mn)	33.27	54.72	55.80
Mass % (O)	28.71	36.76	40.19
Atom % (Mn)	11.07	26.91	26.46
Atom % (O)	32.79	62.09	65.42
Mass % (K)	1.62	5.23	0.39
Atom % (K)	0.76	3.62	0.26
Mass % (C)	36.40	3.28	3.63
Atom % (C)	55.38	7.38	7.86
O/Mn	2.96	2.31	2.47

Table S2. Summary of the results of the XPS analysis.

	α-MnO_2	**δ-MnO_2**	**γ-MnO_2**
K %	0.29	1.37	0
C %	33.7	9.44	25.92
Mn %	8.40	14.79	10.28
O %	25.88	32.23	28.41
K/ Mn %	0.035	0.093	0
Mn^{4+}/ Mn %	63.27	62.97	66.48
O/Mn	3.08	2.18	2.76