

Supporting Information

Sustainable Synthesis of Adipic Acid via MnO_x -Catalyzed Electrooxidation of Cyclohexanol in Neutral Electrolyte

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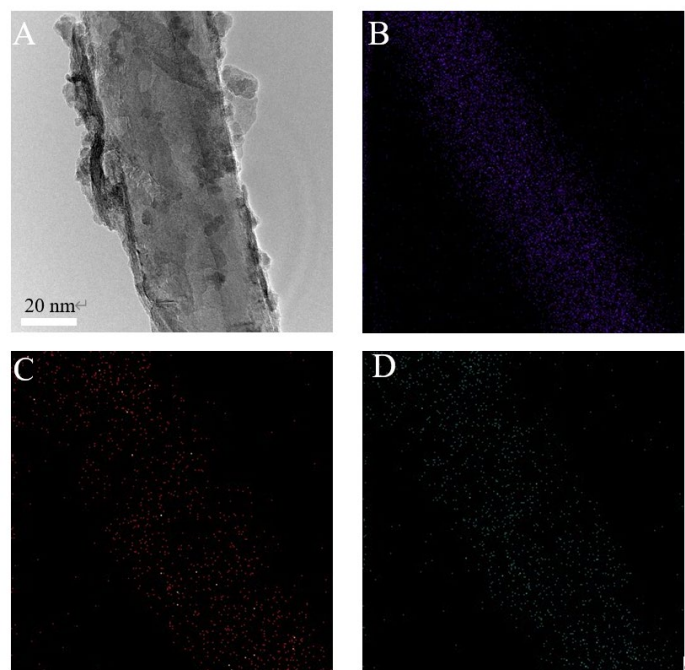


Figure S1. TEM image of MnO_x/CNT-C catalyst (A) and corresponding EDS elemental mapping of C (B), Mn (C), and O (D).

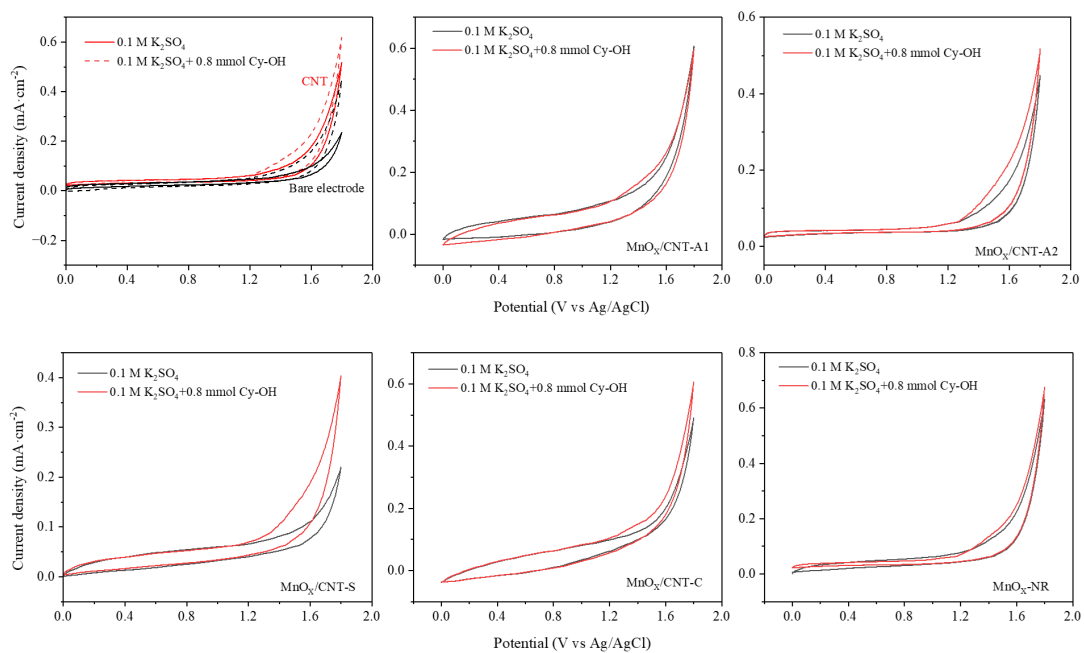


Figure S2. Cyclic voltammograms of the electrocatalytic oxidation of Cy-OH over different catalysts. (Reaction conditions: 25 °C, 5 mg catalyst, 30 mL of 0.1 M K₂SO₄ with and without 0.8 mmol Cy-OH, scan rate = 50 mV s⁻¹.)

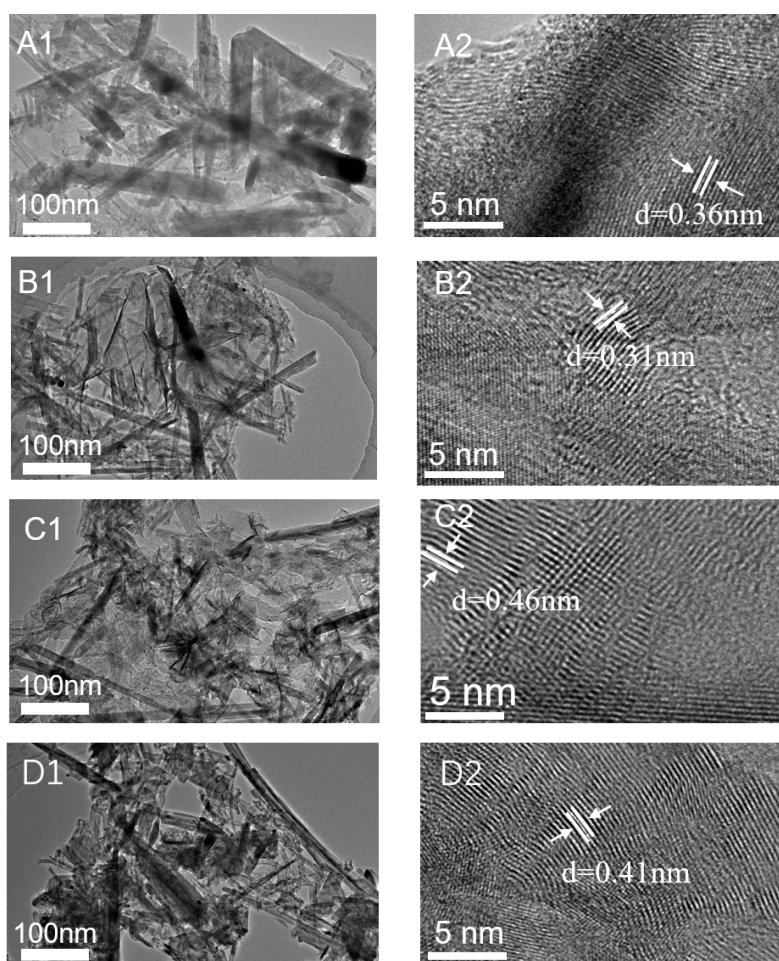


Figure S3. TEM and HRTEM images of the used catalysts: MnO_x/CNT-A1 (A), MnO_x/CNT-A2 (B), MnO_x/CNT-S (C), and MnO_x/CNT-C (D).

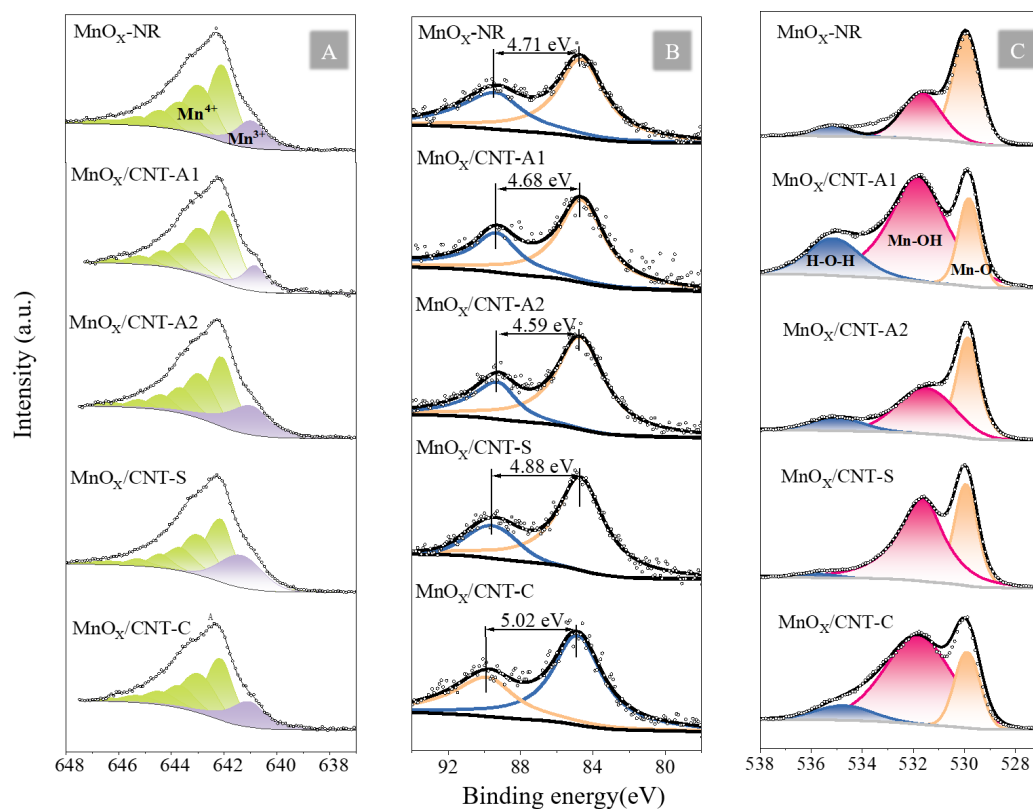


Figure S4. XPS spectra in the Mn 2p (A), Mn 3s (B), and O 1s (C) regions for used MnO_x-NR, MnO_x/CNT-A1, MnO_x/CNT-A2, MnO_x/CNT-S, and MnO_x/CNT-C catalysts.

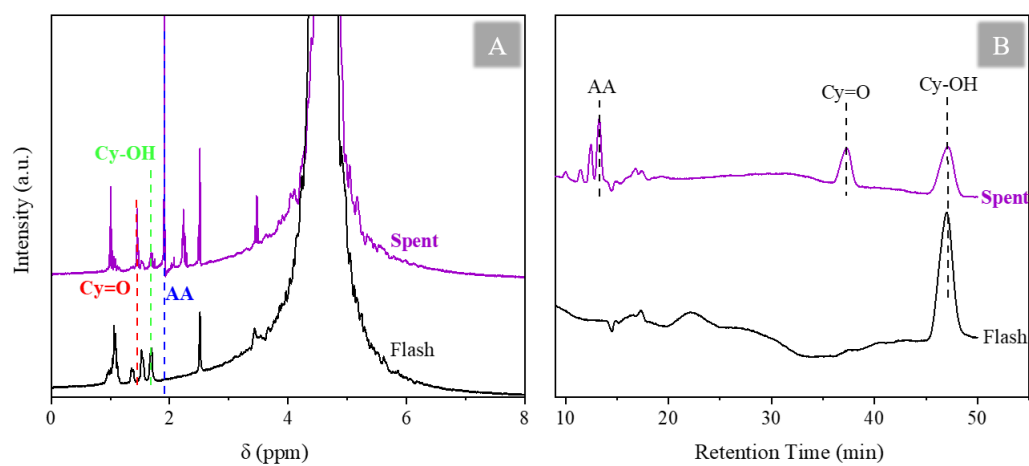


Figure S5. ¹H-NMR spectrum (A) and HPLC chromatogram (B) of Cy-OH, Cy=O and AA in flash and spent states. (Reaction conditions: 40 mg MnOx/CNT-C, 0.8 mmol Cy-OH, 30 mL 0.1 M K₂SO₄, 1.25V, 80 °C, 4h).

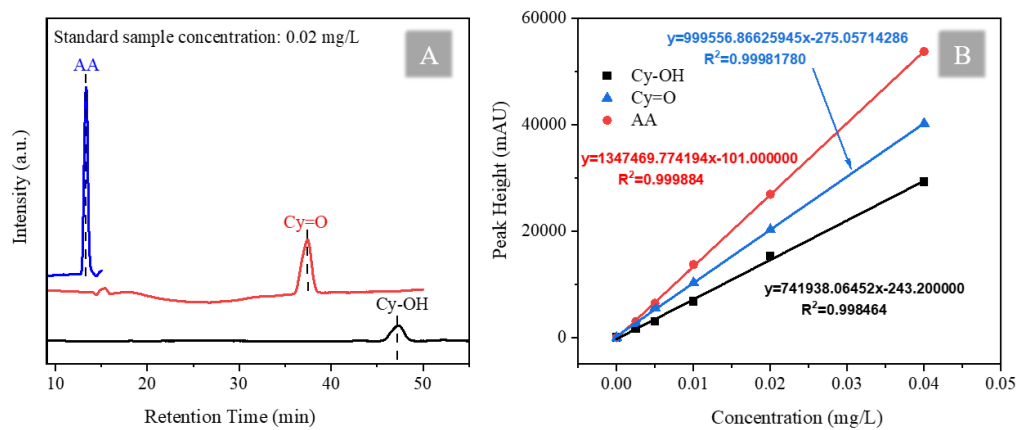


Figure S6. Calibration curves (A) based on peak area versus concentration and standard peak positions (B) for Cy-OH, Cy=O, and AA in HPLC.

Table S1. The surface electronic structures of different catalysts after the electrocatalytic oxidation reaction.

Catalyst	$\text{Mn}^{3+}/\text{Mn}^{4+}$		AOS	
	Flash	Spent	Flash	Spent
$\text{MnO}_x\text{-NR}$	0.07	0.40	3.55	3.66
$\text{MnO}_x/\text{CNT-A1}$	0.24	0.16	3.68	3.70
$\text{MnO}_x/\text{CNT-A2}$	0.10	0.31	3.43	3.80
$\text{MnO}_x/\text{CNT-S}$	0.07	0.26	3.42	3.47
$\text{MnO}_x/\text{CNT-C}$	0.18	0.25	3.03	3.31