Refining Mn-Ni Synergy for the Design of Efficient Catalysts in Electrochemical Ethanol Oxidation

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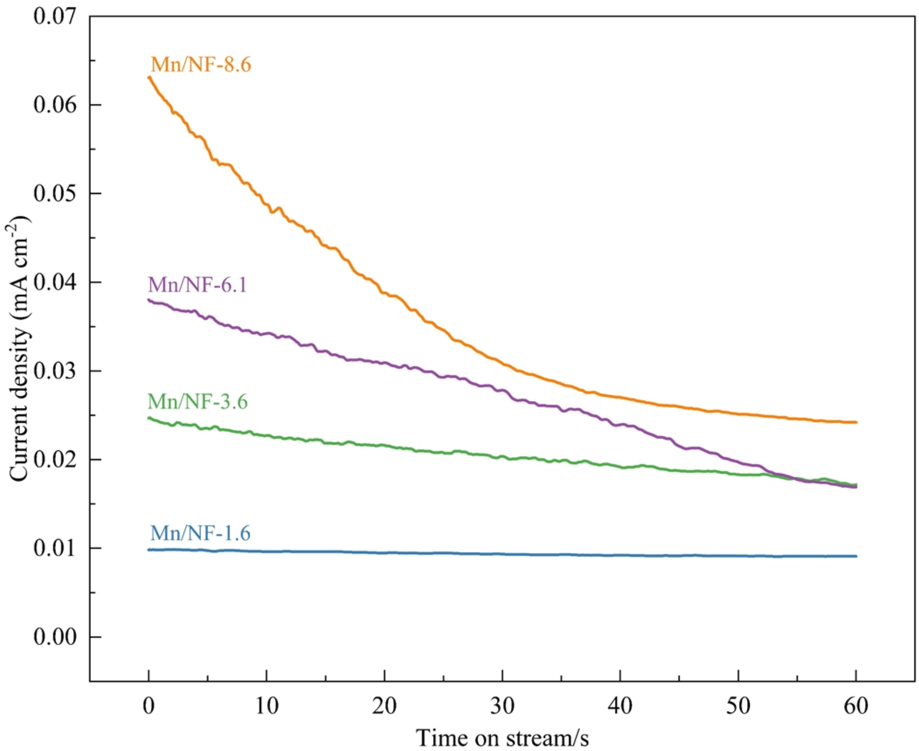

Figure S1. Electrochemical deposition current density over various Mn/NF electrodes.

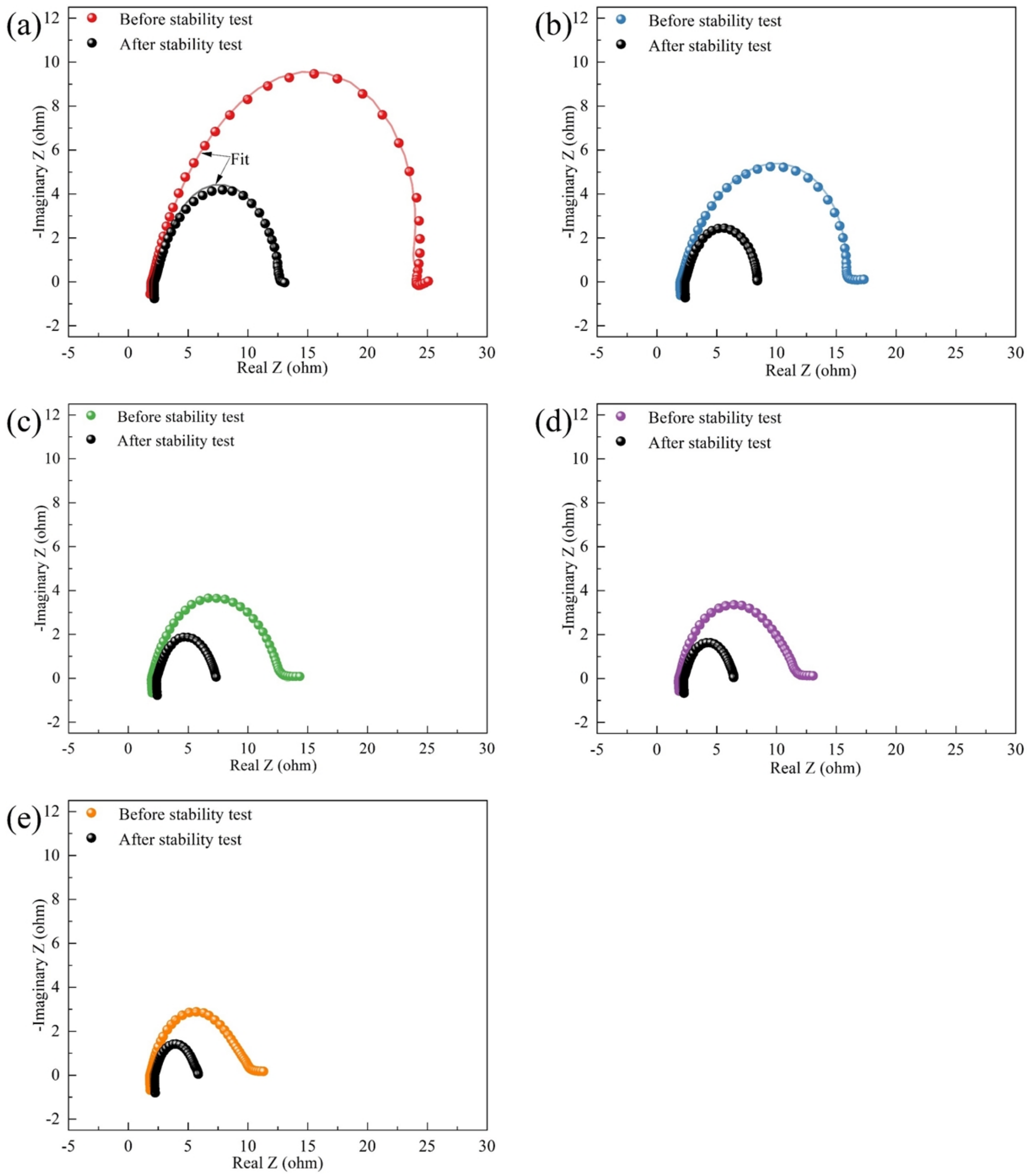

Figure S2. Comparison of Nyquist plots before and after stability test over Mn/NF-0 (a), Mn/NF-1.6 (b), Mn/NF-3.6 (c), Mn/NF-6.1 (d), and Mn/NF-8.6 (e) electrodes. In an electrolyte with 1M KOH and 1 M ethanol, at 50 mV s^{-1}.

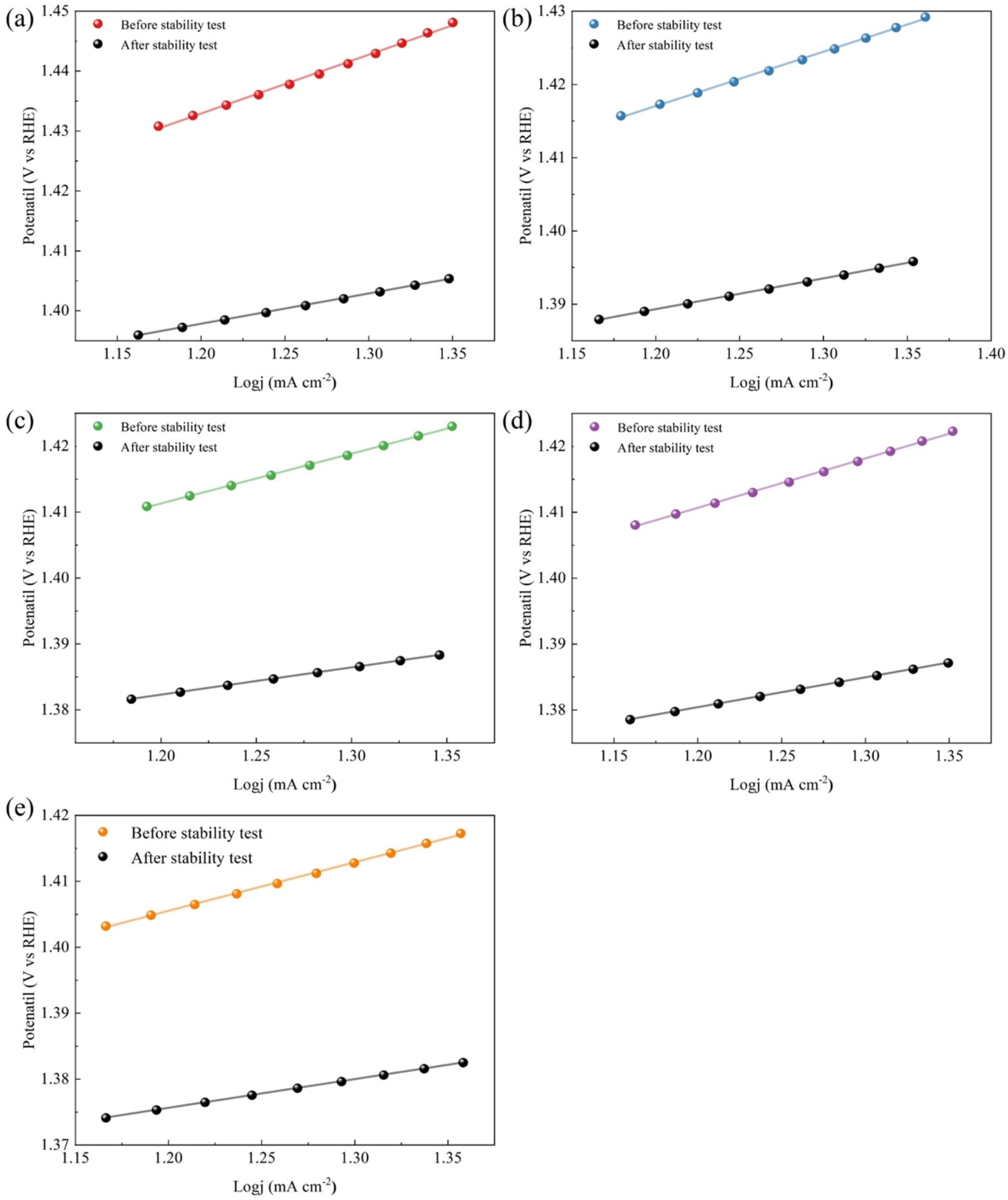

Figure S3. Comparison of Tafel plots before and after stability test over Mn/NF-0 (a), Mn/NF-1.6 (b), Mn/NF-3.6 (c), Mn/NF-6.1 (d), and Mn/NF-8.6 (e) electrodes. In an electrolyte with 1M KOH and 1 M ethanol, at 10 mV s^{-1}. The potentials are IR compensated.

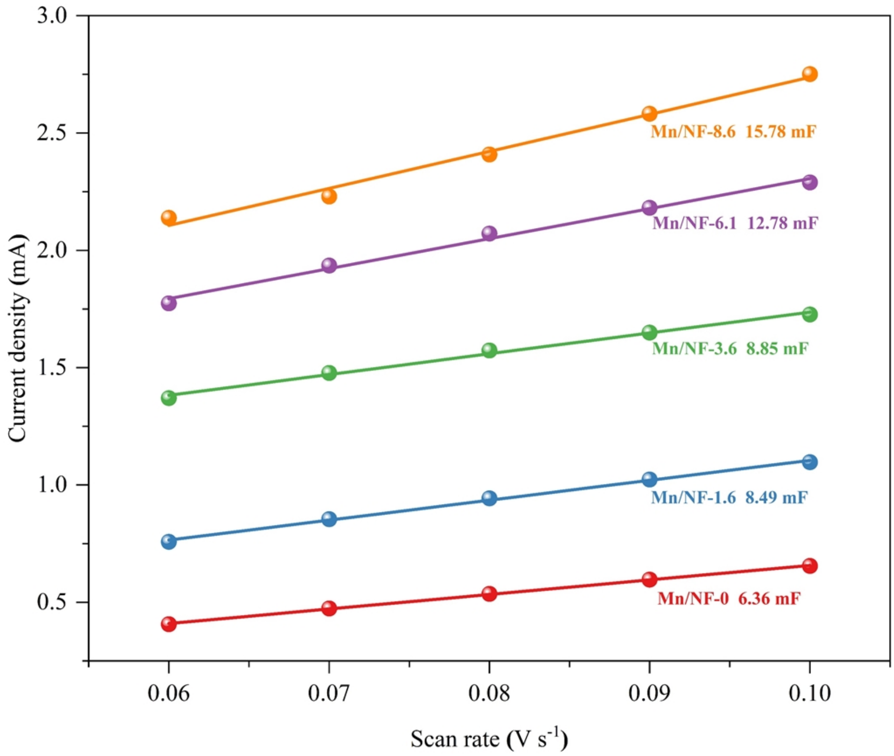

Figure S4. Double-layer capacitance measurements for determining ECSA for various Mn/NF electrodes in 1mol L^{-1} KOH with 1mol L^{-1} EtOH.

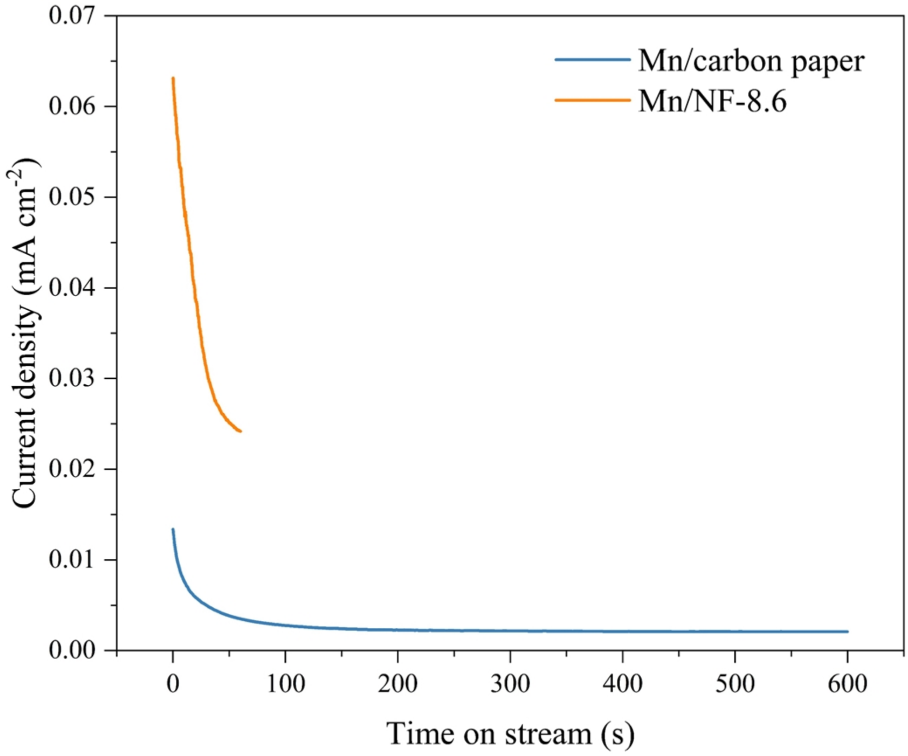

Figure S5. Electrochemical deposition current density over Mn/NF-6.1 and Mn/carbon paper. As the deposition current density over carbon paper is much lower, a longer deposition time was applied.

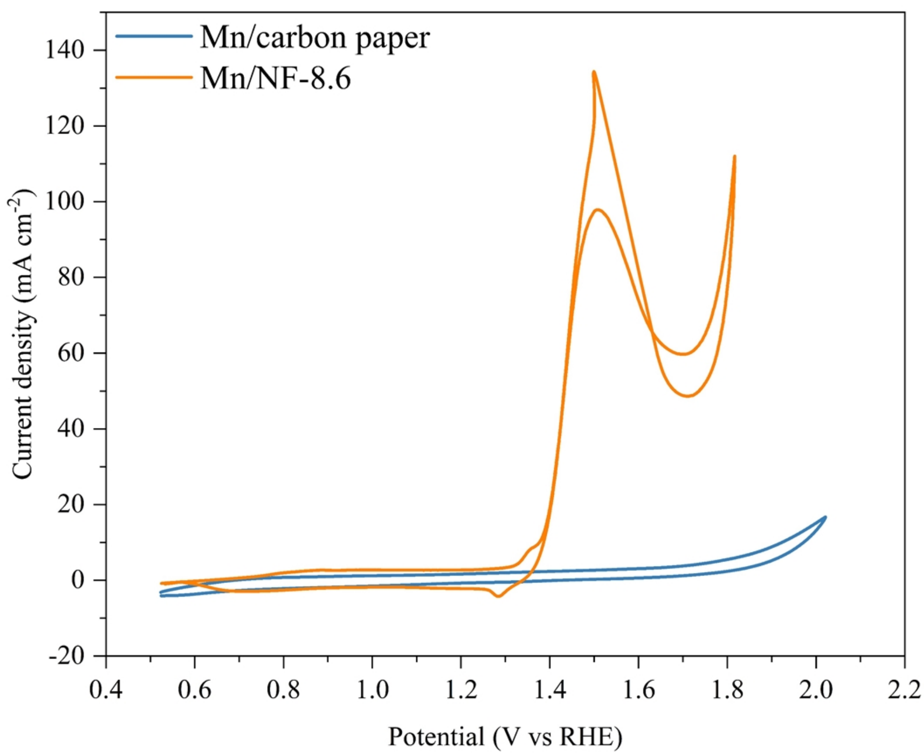

Figure S6. CV curves for ethanol oxidation over Mn/NF-6.1 and Mn/carbon paper. In an electrolyte with 1M KOH and 1 M ethanol, at 50 mV s^{-1}. The potentials are IR compensated.

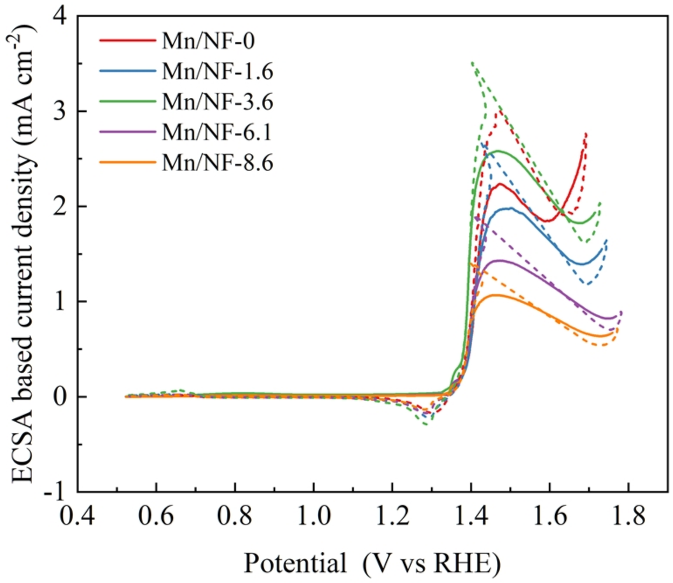

Figure S7. ECSA-based CV curves obtained at the Mn/Ni electrode after stability testing.

Table S1. Binding energies for Mn^{3+} and Mn^{4+}, as well as the Mn^{3+}/Mn^{4+} and $(O_{ad}+O\text{-}H_{ad})/O_L$ ratio.

	BE[a] for Mn^{3+} (eV)	BE for Mn^{4+} (eV)	Mn^{3+}/Mn^{4+} ratio	M-OH/M-O ratio
NF/Mn-1.6	642.27	644.71	1.97	0.66
NF/Mn-3.6	642.33	644.75	1.85	0.81
NF/Mn-6.1	642.31	644.64	1.77	1.18
NF/Mn-8.6	642.33	644.65	1.72	1.30

[a] Binding energy.