Supporting Information

Synthesis and Water Oxidation Electrocatalytic and Electrochromic Behaviors of Mesoporous Nickel Oxide Thin Film Electrodes

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Table S1. Composition of the clear solutions, used for the preparations of mesoporous NiO films.

Ni(II)/$C_{12}E_{10}$ Mole Ratio		Amount of $[Ni(OH_2)_6](NO_3)_2$ (g)	Amount of CTAB (g)	Amount of $C_{12}E_{10}$ (g)	Amount of Ethanol (ml)
2:1		0.4368	0.2908	0.500	5
4:1		0.9282	0.2908	0.500	5
6:1		1.3923	0.2908	0.500	5
8:1		1.8564	0.2908	0.500	5
10:1		2.3205	0.2908	0.500	5
12:1		2.7532	0.2908	0.500	5
15:1		3.4808	0.2908	0.500	10
20:1		4.6410	0.2908	0.500	10
25:1		5.8010	0.2908	0.500	10
30:1		6.9615	0.2908	0.500	10

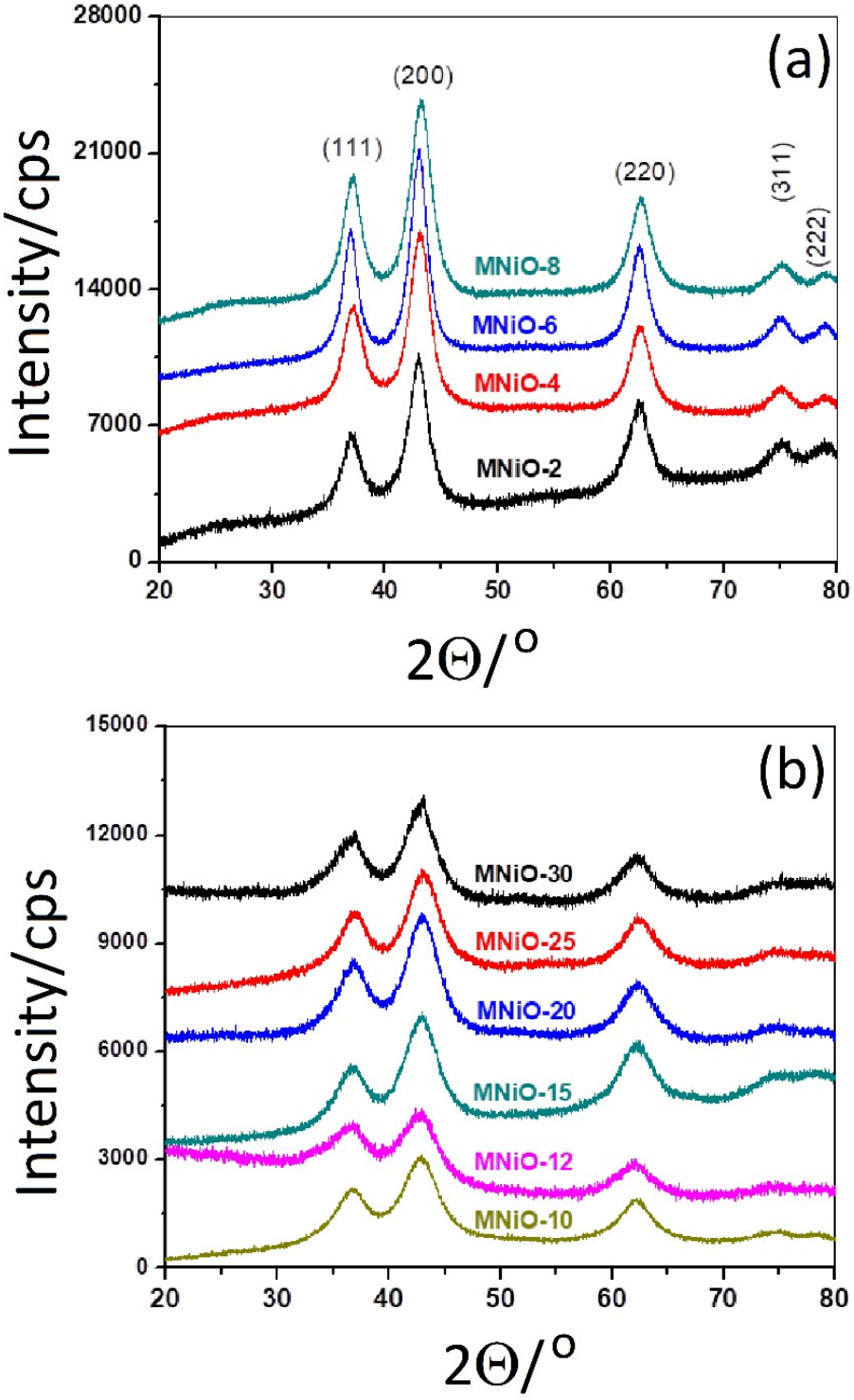

Figure S1. XRD patterns of mesoporous NiO, prepared using (a) small and (high) Ni(II)/$C_{12}E_{10}$ mole ratio solutions and calcination at 300 °C.

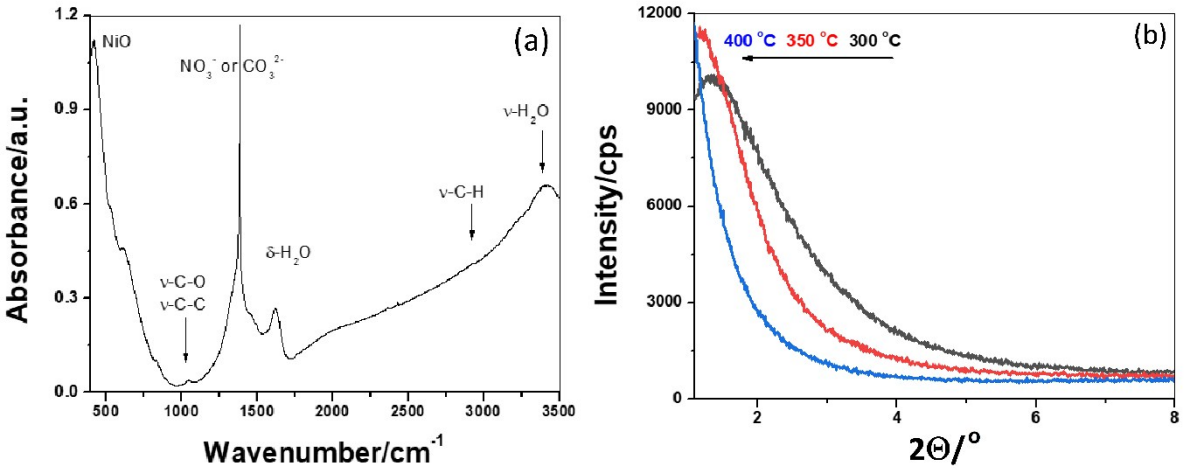

Figure S2. (a) FTIR spectrum of m-NiO-10-300 and (b) XRD patterns of m-NiO-10-300, m-NiO-10-350, and m-NiO-10-400.

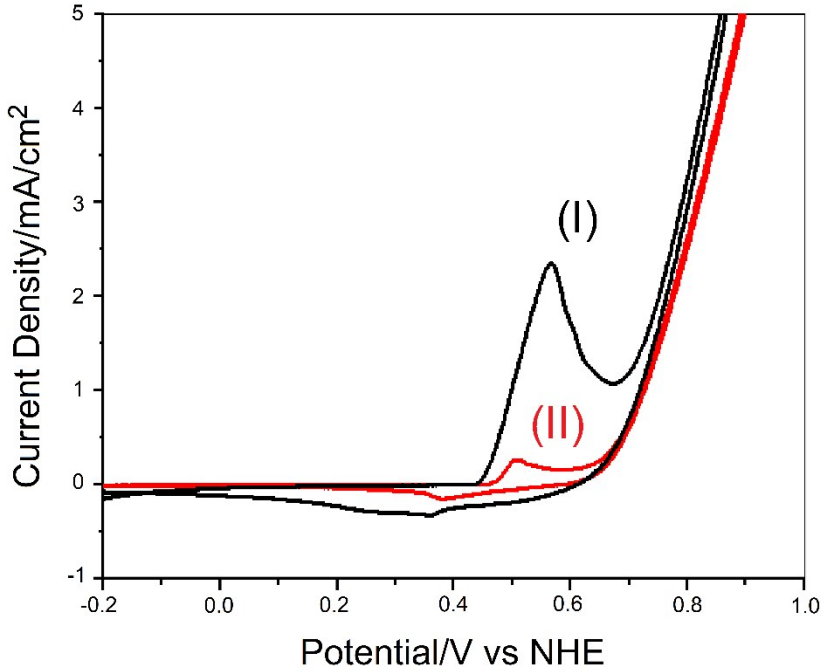

Figure S3. CV of fresh (I) and aged (II) mesoporous $Ni(OH)_2$ in 1 M KOH solution.

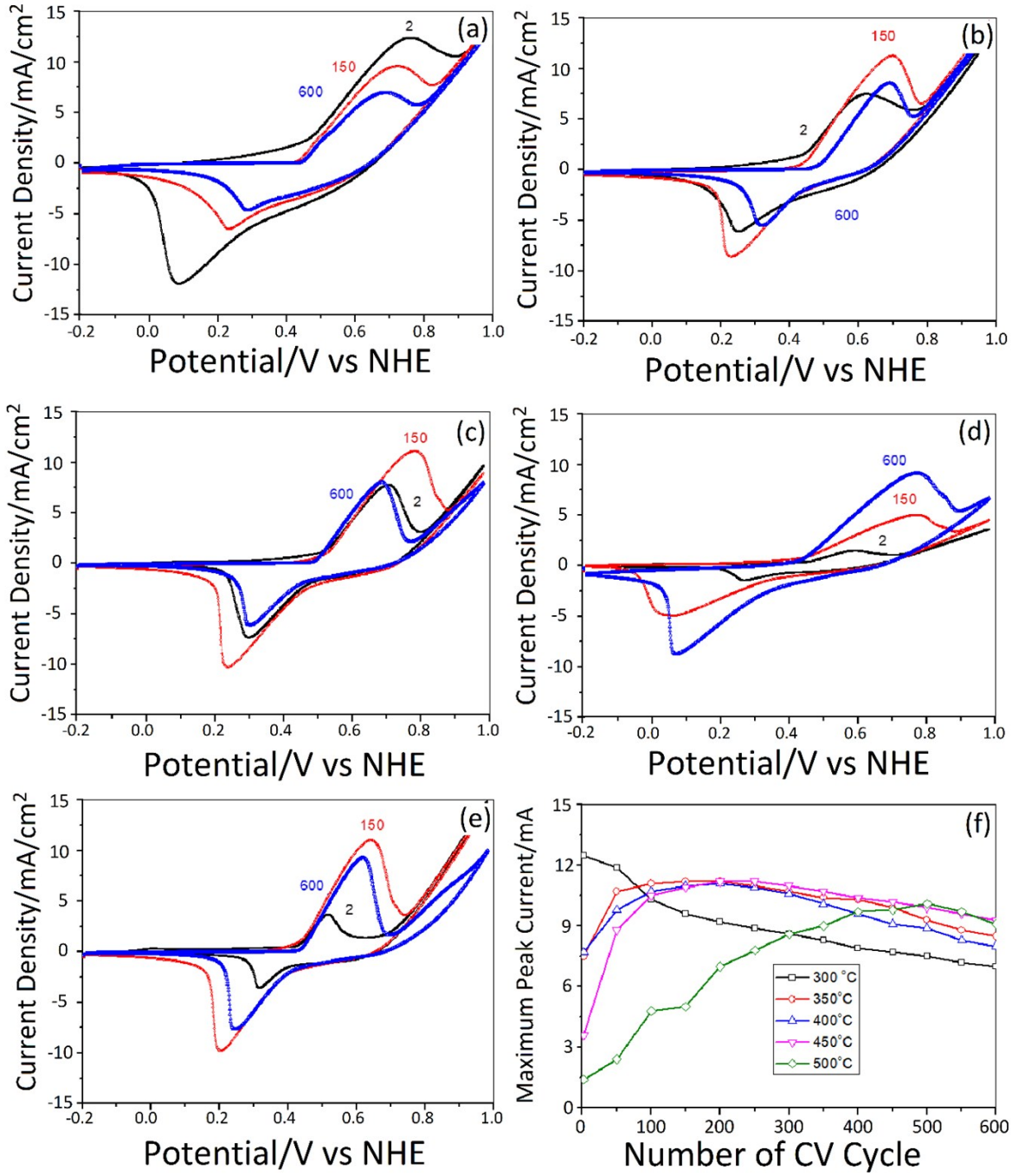

Figure S4. Time dependent CV cycles (2nd, 150th and 600th cycles) of m-NiO-10 calcined/annealed at (a) 300, (b) 350, (c) 400, (d) 450, and (e) 500 °C and (f) overall change in peak current at around 0.6 V over cycling.

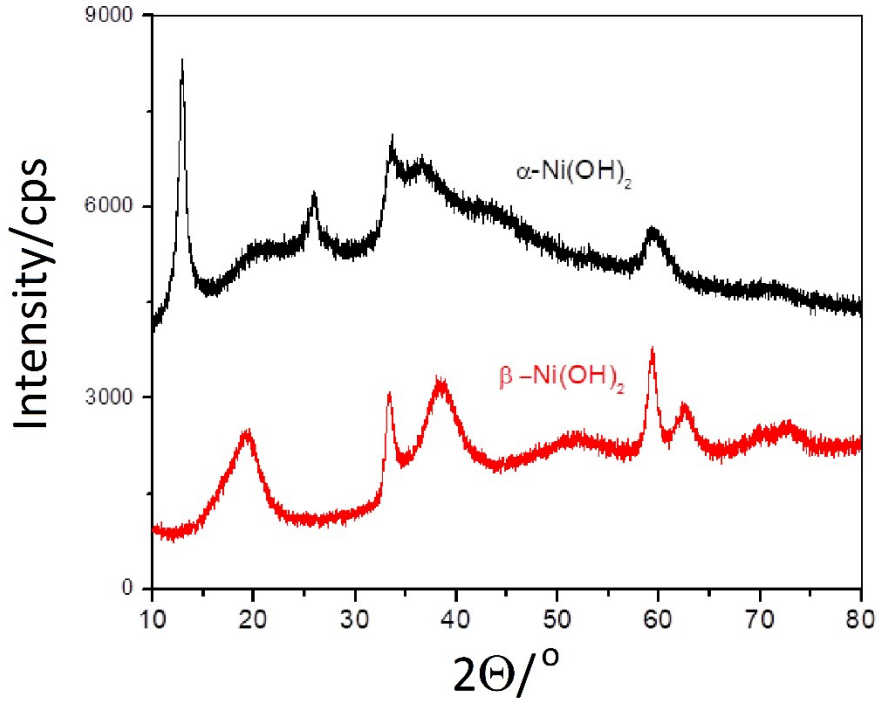

Figure S5. XRD of $Ni(OH)_2$ (top) the fresh and (bottom) aged in 1M KOH solution for 1 day.

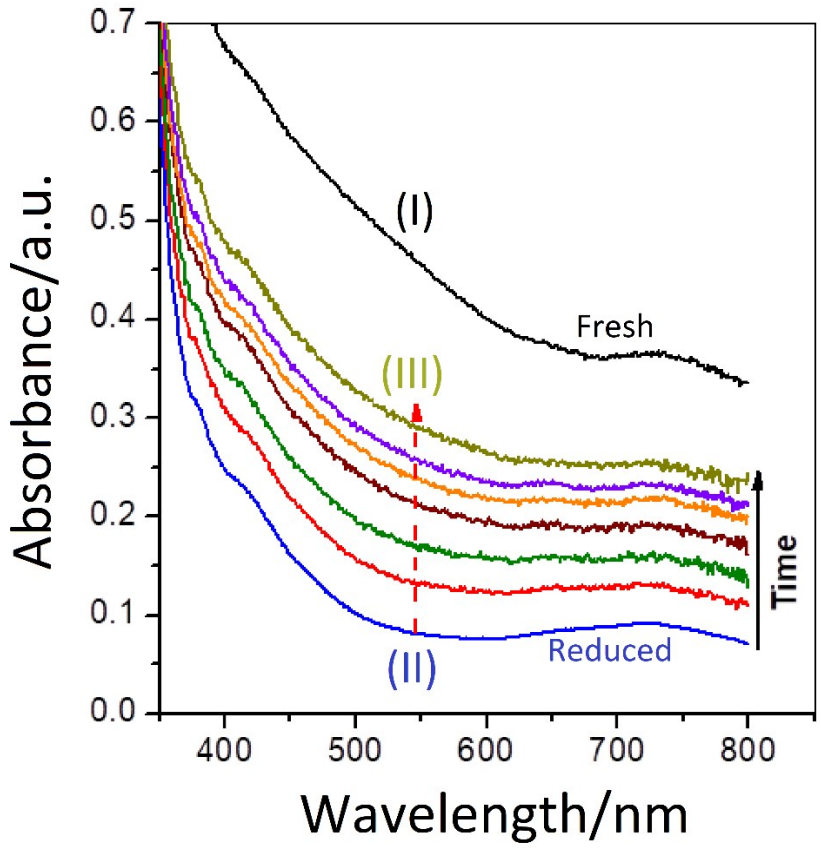

Figure S6. UV-Vis spectra of m-NiO calcined at 300 °C, (I) fresh sample, (II) the same sample treated with $NaBH_4$ solution and (II) to (III) washed and aged under ambient condition for bottom to top 5, 10, 25, 45, 60, and 300 min.

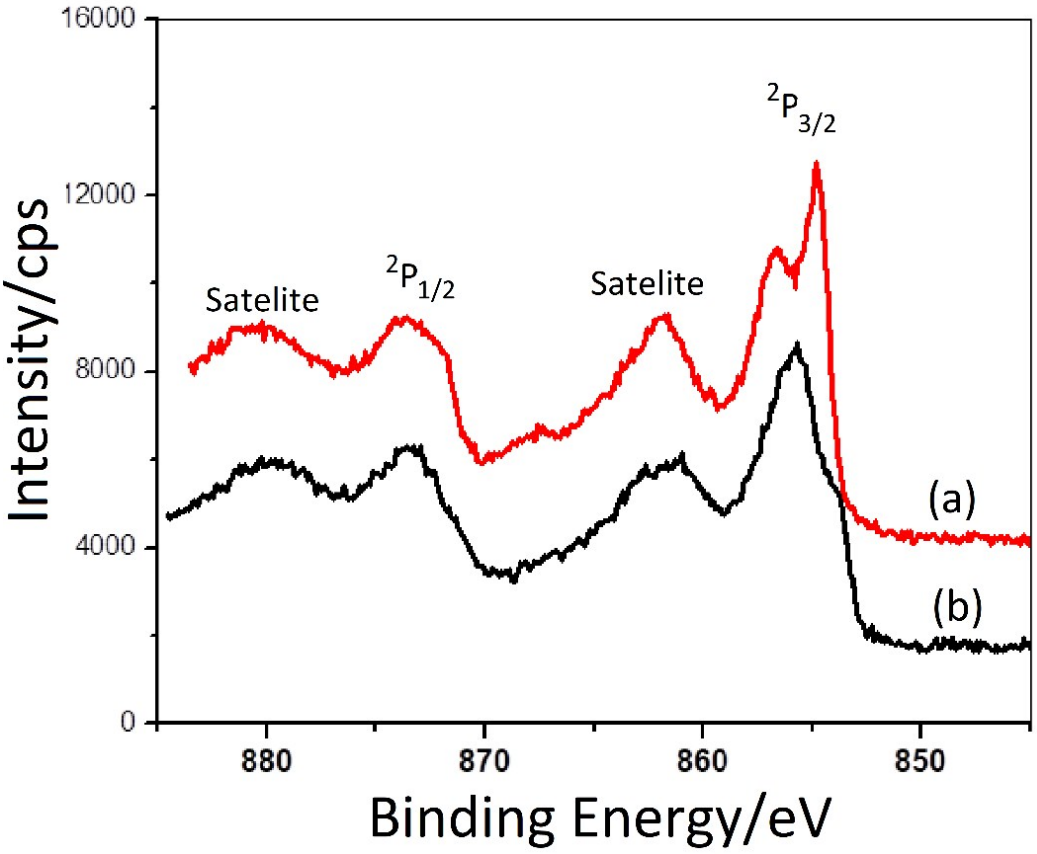

Figure S7. XPS spectra of m-NiO before and after CV (1000 cycle).

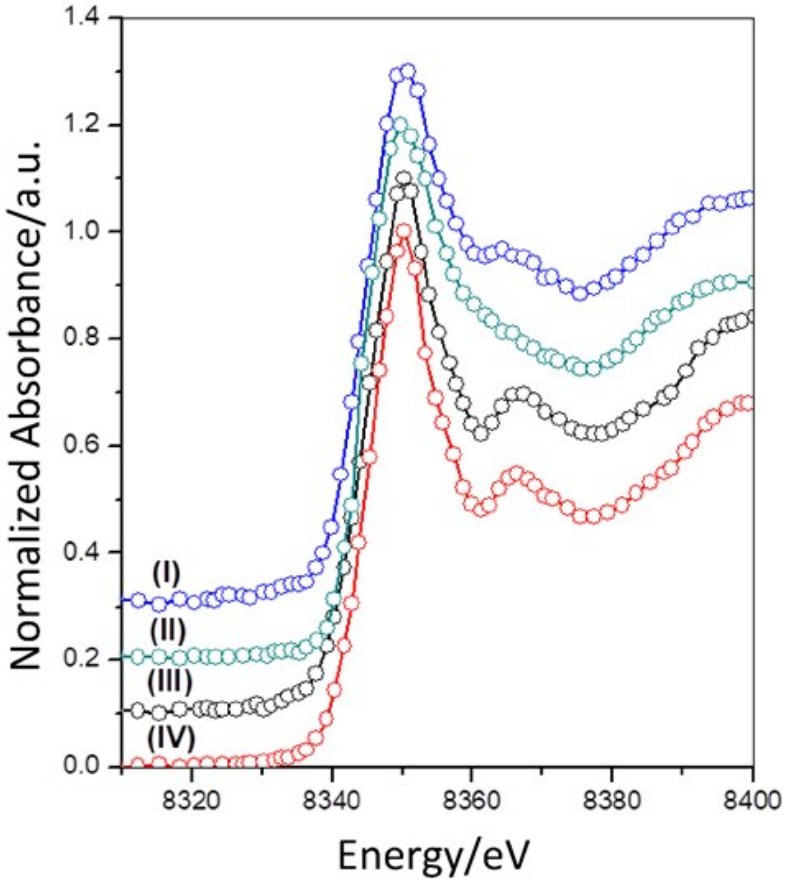

Figure S8. Ni K-edge XANES spectra of (I) *m*-$Ni(OH)_2$, (II) *m*-NiO-10-300, (III) *m*-NiO-10-400. (IV) *m*-NiO-10-400 after 1000 CV cycles.

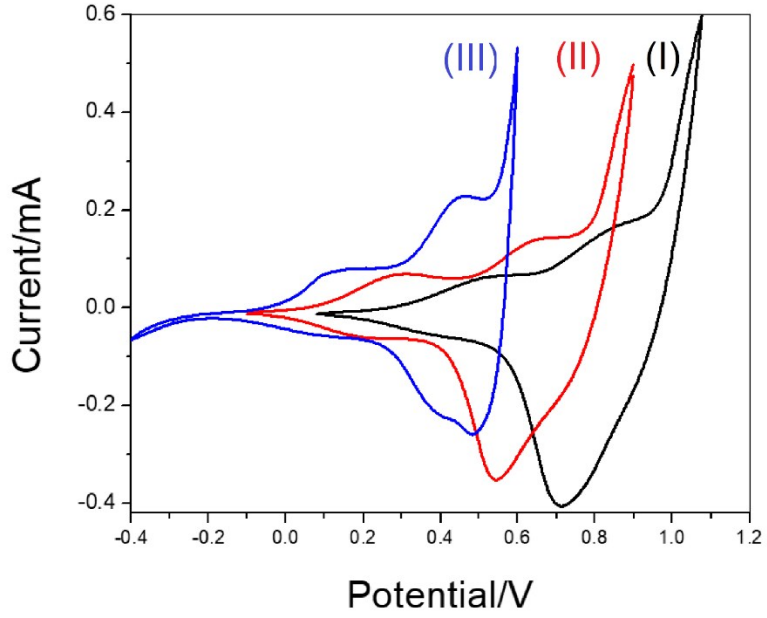

Figure S9. CVs of m-NiO-10-300 at 3 different pH values of (I)7, (II) 10.2, and (III) 12.85.

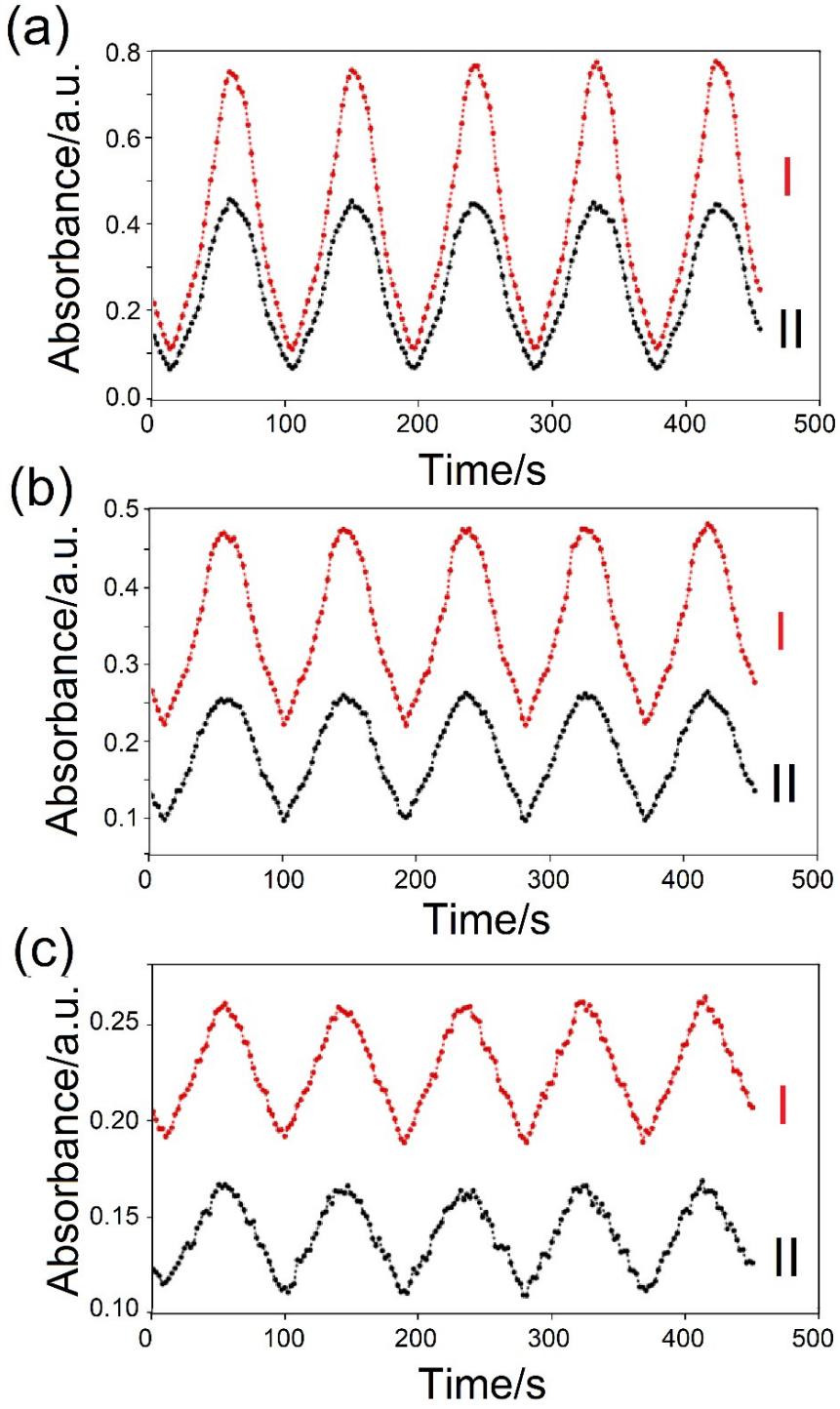

Figure S10. Electrochromic (absorbance vs time plot) behavior of *m*-NiO-10, calcined at (a) 300, (b) 400, and (c) 500 ^{o}C. Absorbance values: (I) 585 nm and (II) 886 nm.

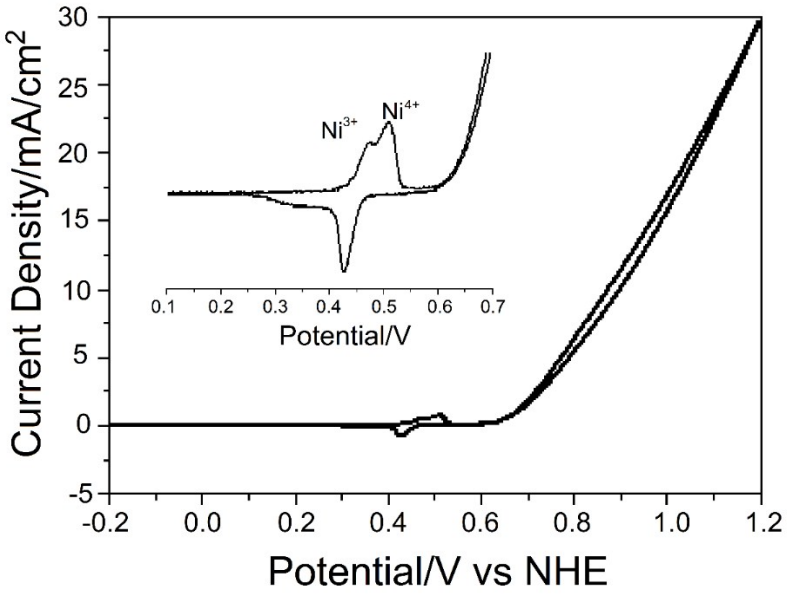

Figure S11. CV of m-NiO-10-400 with a scan rate of 1 mV/S.

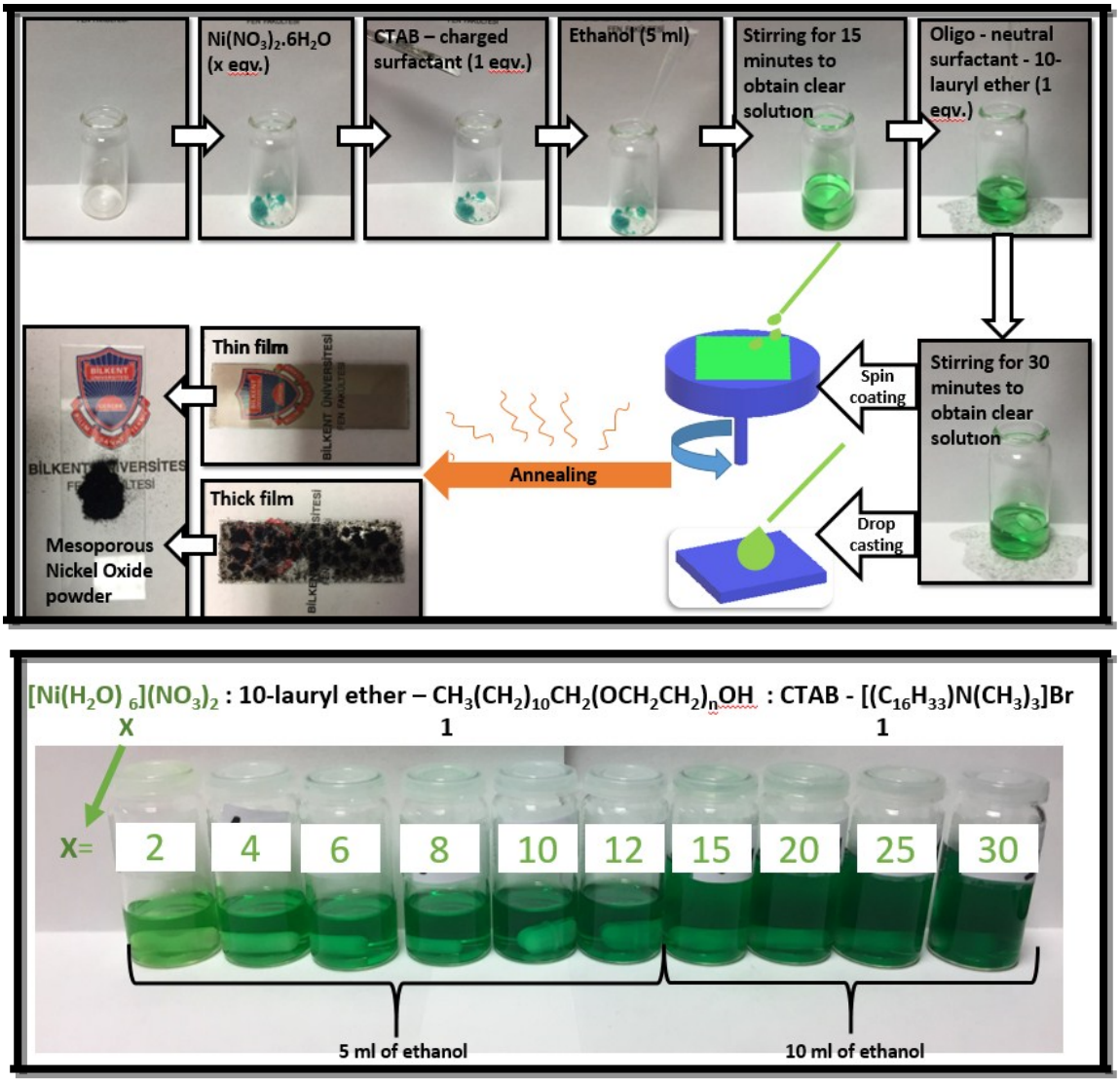

Figure S12. Schematic representation of the procedure (top) and photographs of the clear solutions at various concentrations (bottom).