

Supplementary Information

Voltage Control of Magnetism in Ni-Co Oxide Mesoporous Films: Impact of Porosity on Oxygen Magneto-Ionics Performance

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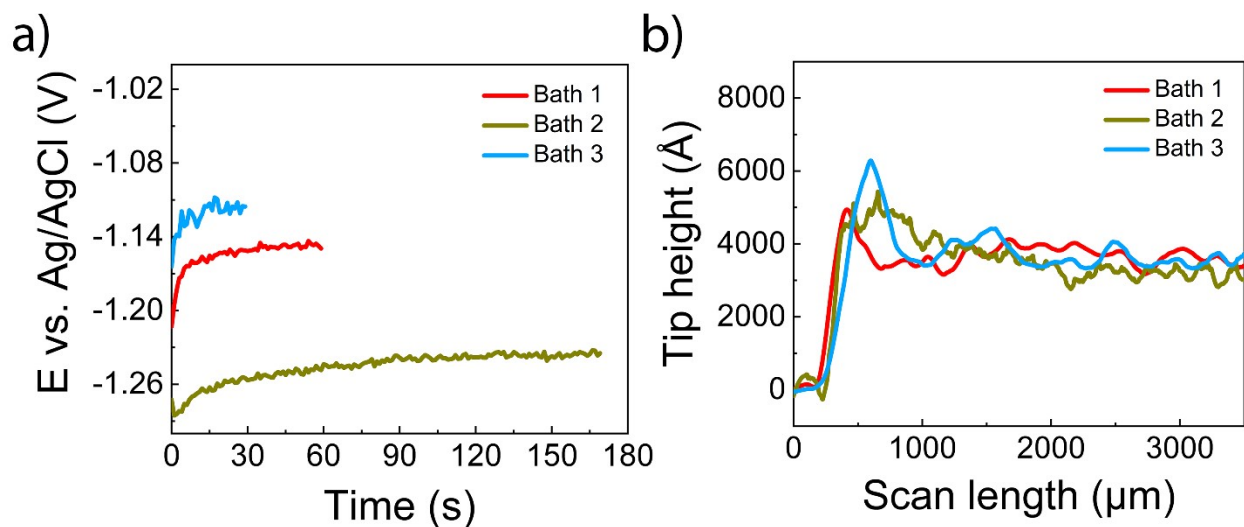


Figure S1. a) E-t curves recorded during the deposition of the Ni-Co films from the three different baths and b) corresponding film thickness measured as ‘tip height’ versus scan length by mechanical profilometry. The tip was placed on the step formed by the Ni-Co layer and the gold surface. The step profile was recorded as the tip moved deeper into the Ni-Co layer.

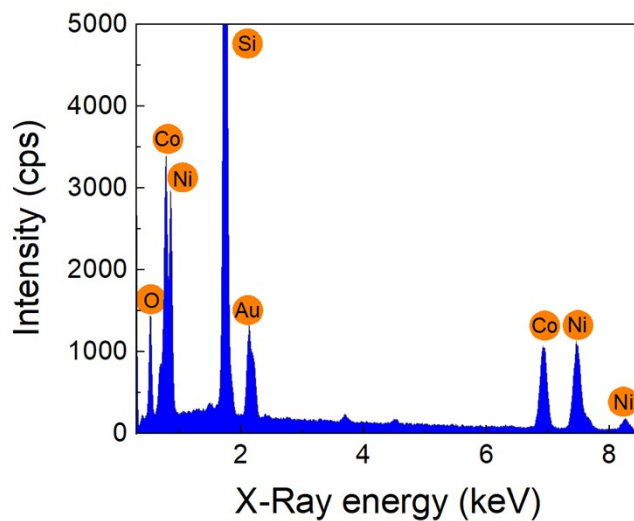


Figure S2. EDX pattern of the Ni-Co film obtained from Bath 1. The Si and Au signals belong to the substrate.

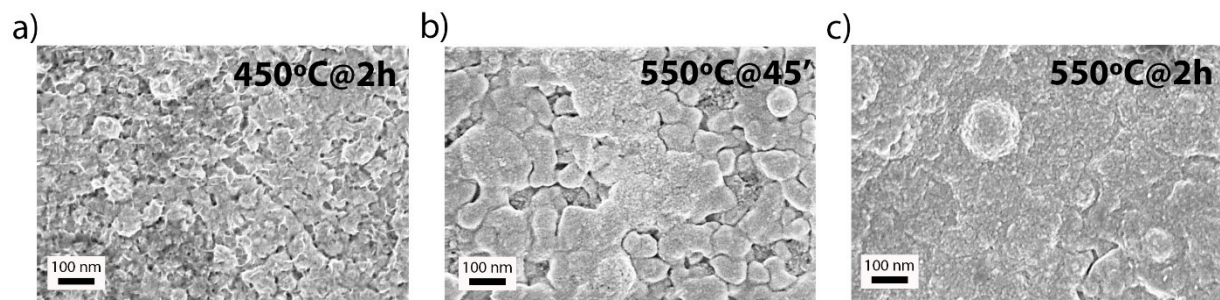


Figure S3. SEM images of the mesoporous Ni-Co film obtained from Bath 1 after annealing at a) 450 °C for 2h, b) 550 °C for 45 min, and c) 550 °C for 2 h.

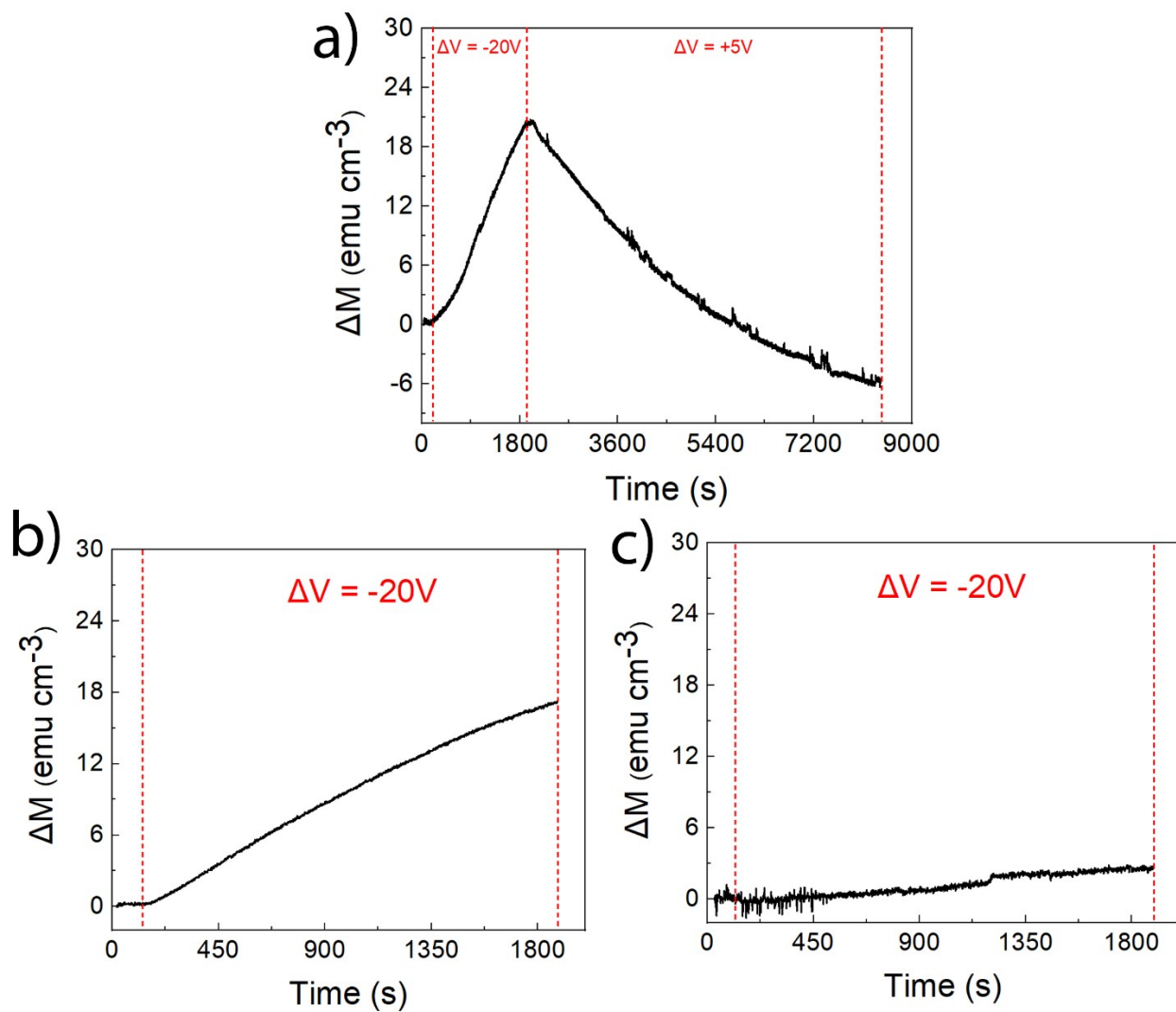


Figure S4. Evolution of ΔM vs time for the as-annealed Ni-Co films obtained from Baths 1 (a), 2 (b) and 3 (c) upon application of -20 V for 1800 s. The response recorded upon a subsequent positive biasing of the sample in (a) is also shown.

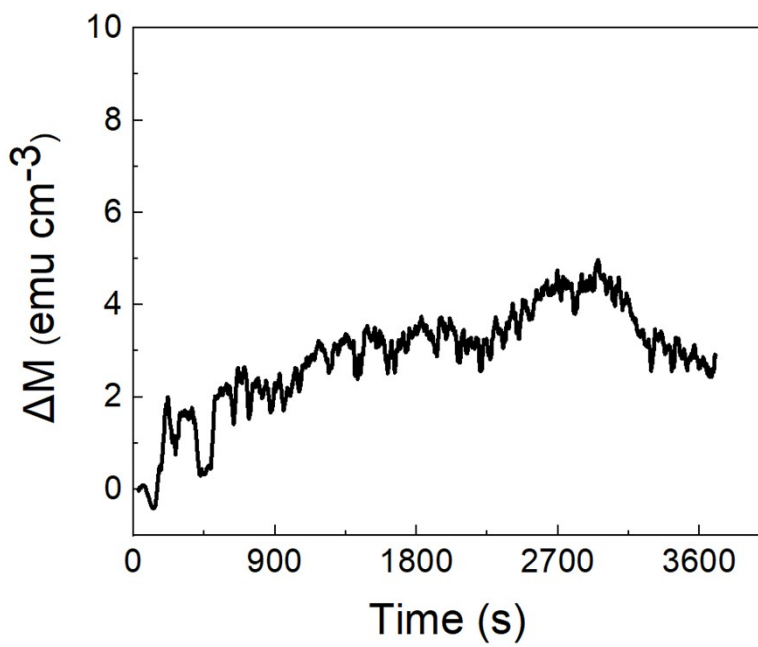


Figure S5. Evolution of ΔM with time upon electrolyte-gating the mesoporous Si/Ti/Au/Ni-Co oxide sample at -100V . The same sample had previously been subjected to 5 negative (-20 V , 800 s) / positive ($+5\text{ V}$, 5400 s) cycles (low frequency), suggesting the occurrence of irreversible microstructural and/or compositional changes.

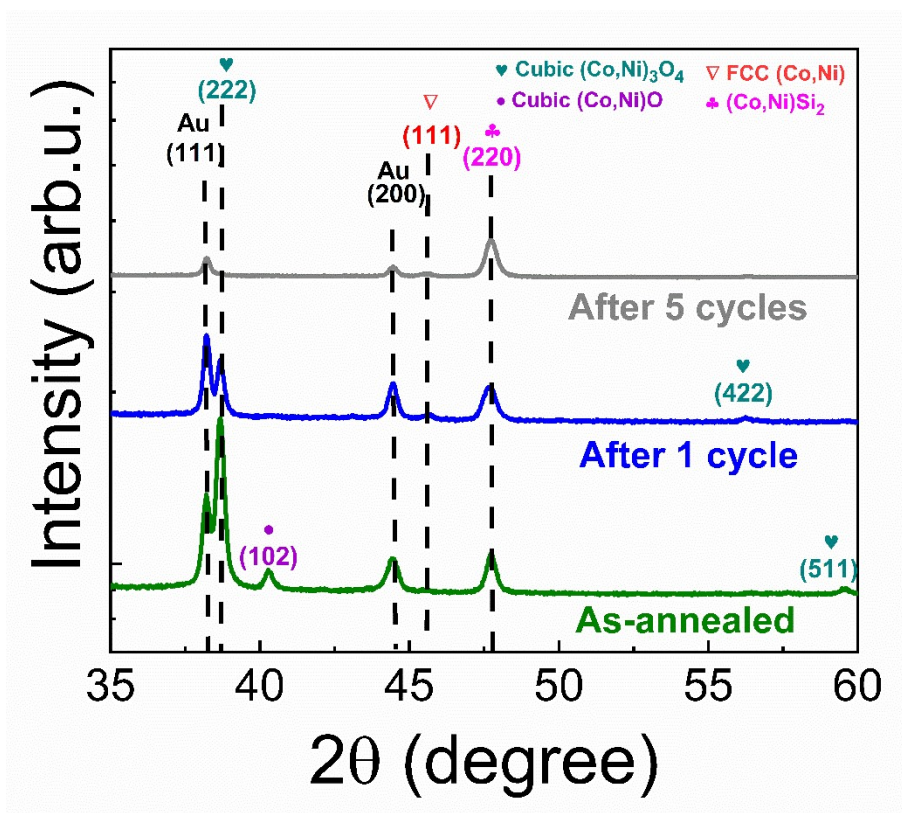


Figure S6. XRD patterns of the As-annealed, ‘After 1 cycle’ (corresponding to the ‘Recovery’ state in Figure 4(a) of the main manuscript), and ‘After 5 cycles’ for mesoporous Ni-Co oxide-coated Si/Ti/Au samples. Negative and positive biasing correspond to -20 V for 30 min and $+5$ V for 90 min per cycle, respectively.