Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.
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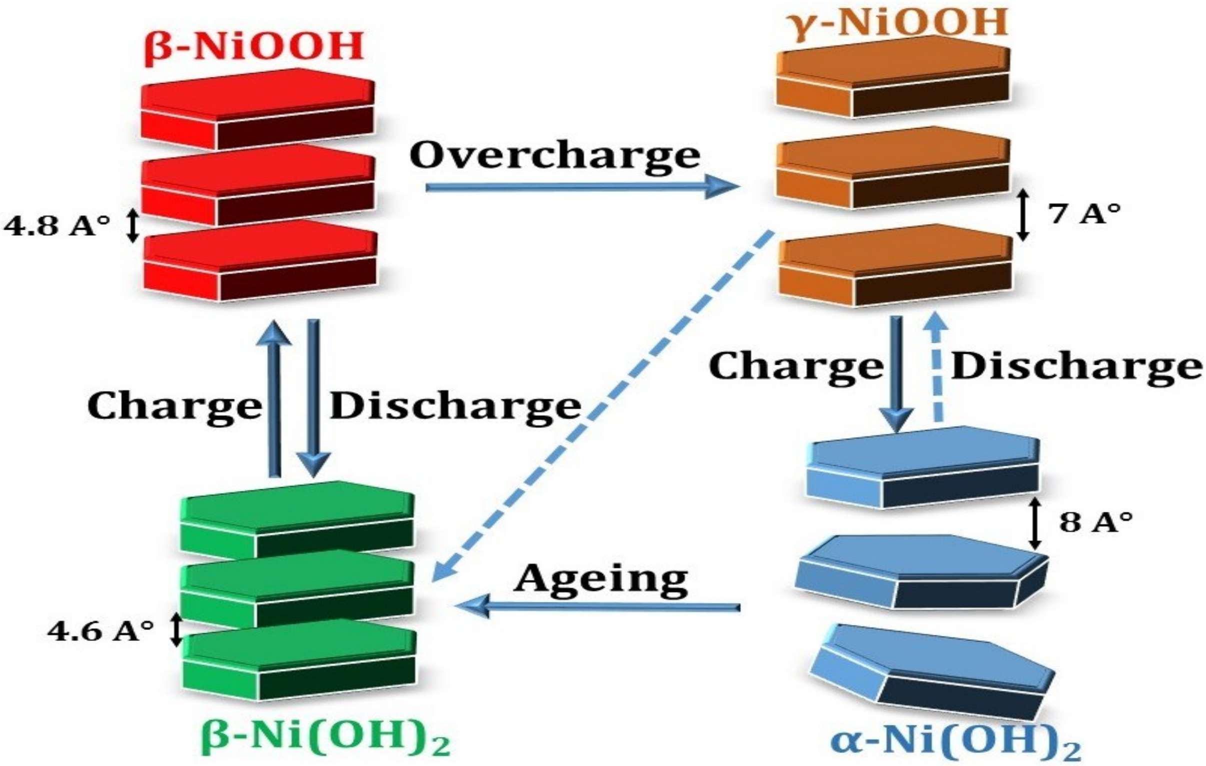

Schematic diagram S1: representation of the Bode scheme for the Ni(II)/Ni(III) redox transition in Ni hydroxide layers[1, 2].

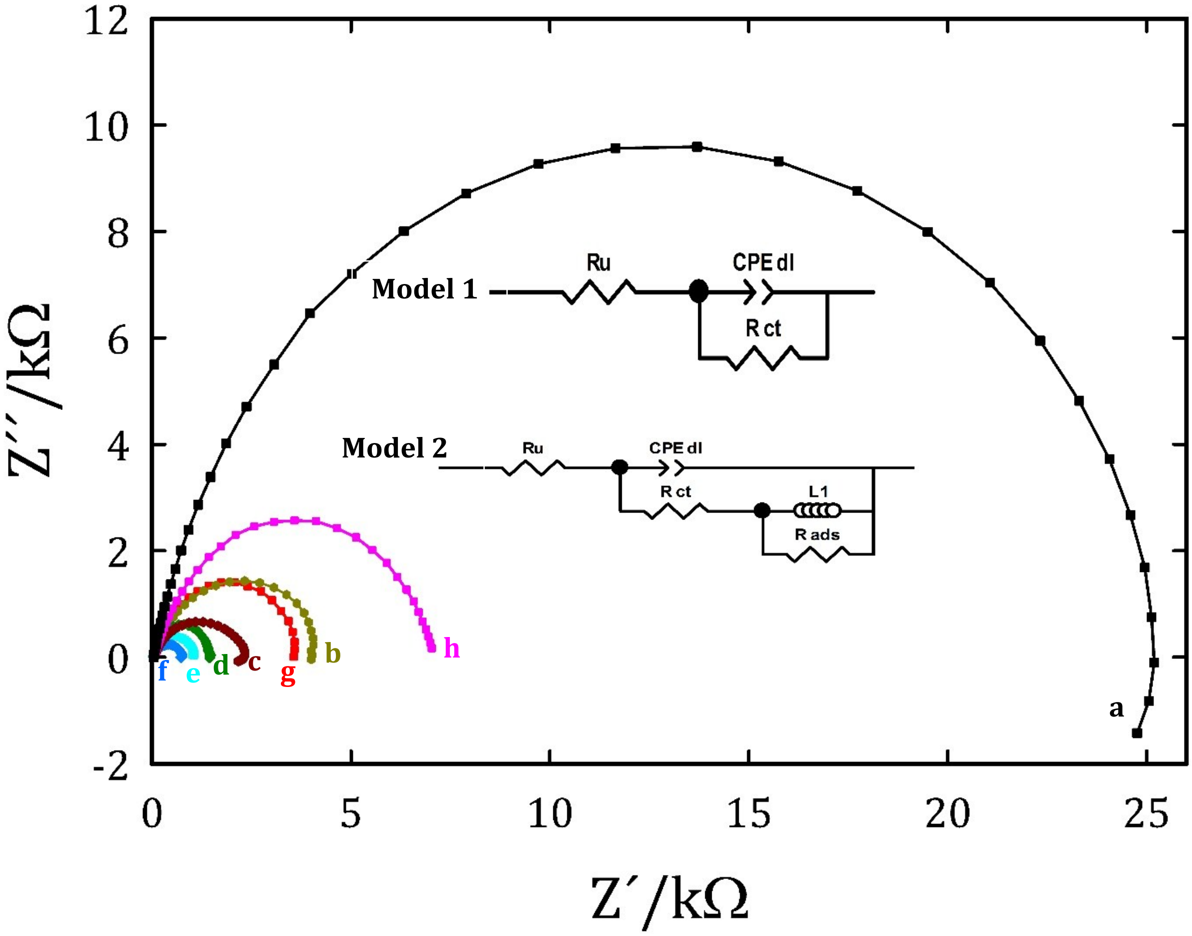

Figure S1: Nyquist plot obtained at nano-CS-NiOOH/GC electrode with various nickel compositions (typically: a) 0%, b) 10%, c) 20%, d) 30%, e) 40%, f) 50%, g) 70% and h) 100%) in 0.1 M NaOH containing 1 mM glucose at 0.42 V vs SCE. Catalyst loading is 2 mg cm^{-2}. Equivalent circuit model 1 is used for nickel composition higher than 50%, while model 2 is used to fit the data of the electrode with nickel composition less than 50%.

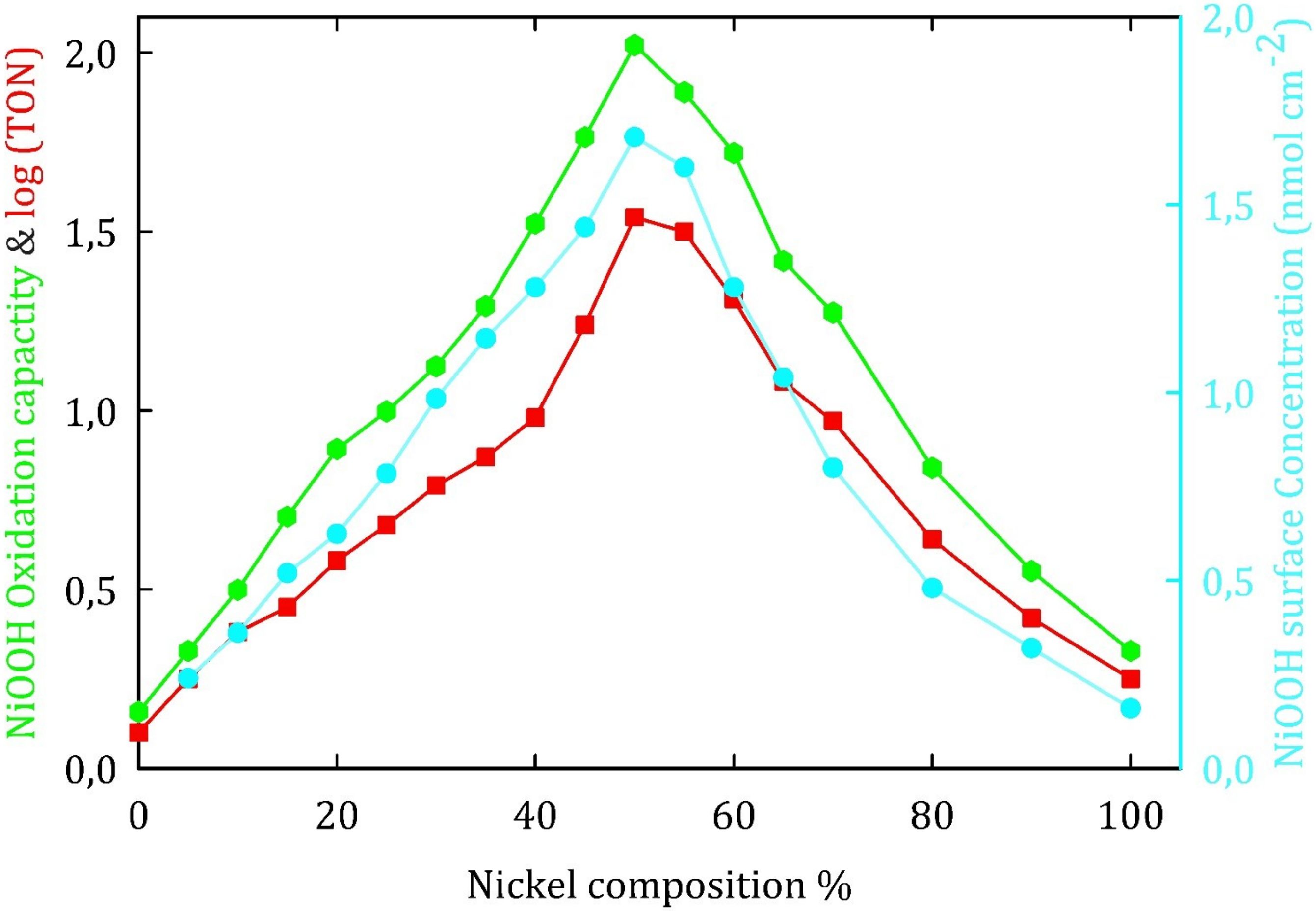

Figure S2: the variation of the NiOOH surface concentration (cyan line), NiOOH oxidation capacity (light green line) and number of oxidized glucose molecules per active NiOOH per second (TON, red line) with the nickel composition (%). NiOOH average surface concentration was estimated by integrating the area under the anodic peak of the redox $Ni(OH)_2/NiOOH$: Surface conectration= Q/nF, where the Q is the amount of charge consumed during $Ni(OH)_2/NiOOH$ transformation c/cm^2, F is the faradays constant, and n is the number of electron (n=1). While the TON and NiOOH capacity are calculated as in Figure 6.

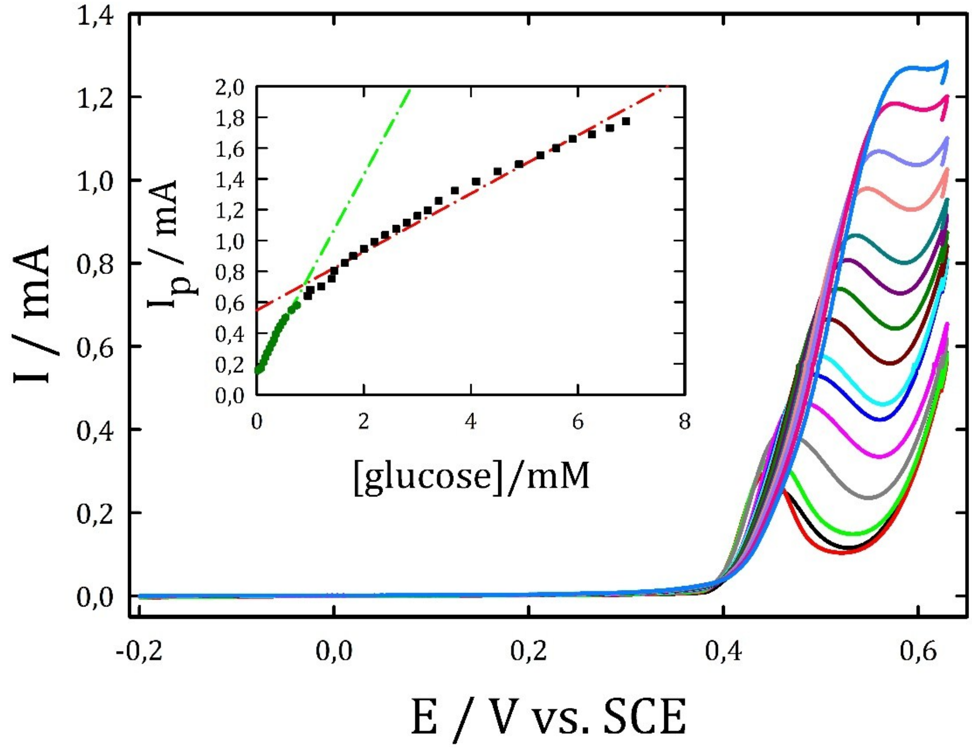

Figure S3: LSVs obtained at nano-CS-NiOOH/GC electrode in 0.1 M NaOH containing various glucose concentrations (minimum 0,5μM and maximum 7 mM). Inset shows the variation of the glucose oxidation peak current (Ip) with glucose concentration ([glucose]).

[redacted]

[redacted]	Sensitivity (μA mM^{-1} cm^{-2})	Linear range
[redacted]	221	1-8 mM
[redacted]	325	0,5-4 mM
[redacted]	463	0,3-2 mM
[redacted]	583	Up to 4 mM
[redacted]	648 and 1890	Up to 1,7 mM and between 1,7-7 mM
[redacted]	120	0,4-2,3 mM
[redacted]	24	0,8-1,9 mM

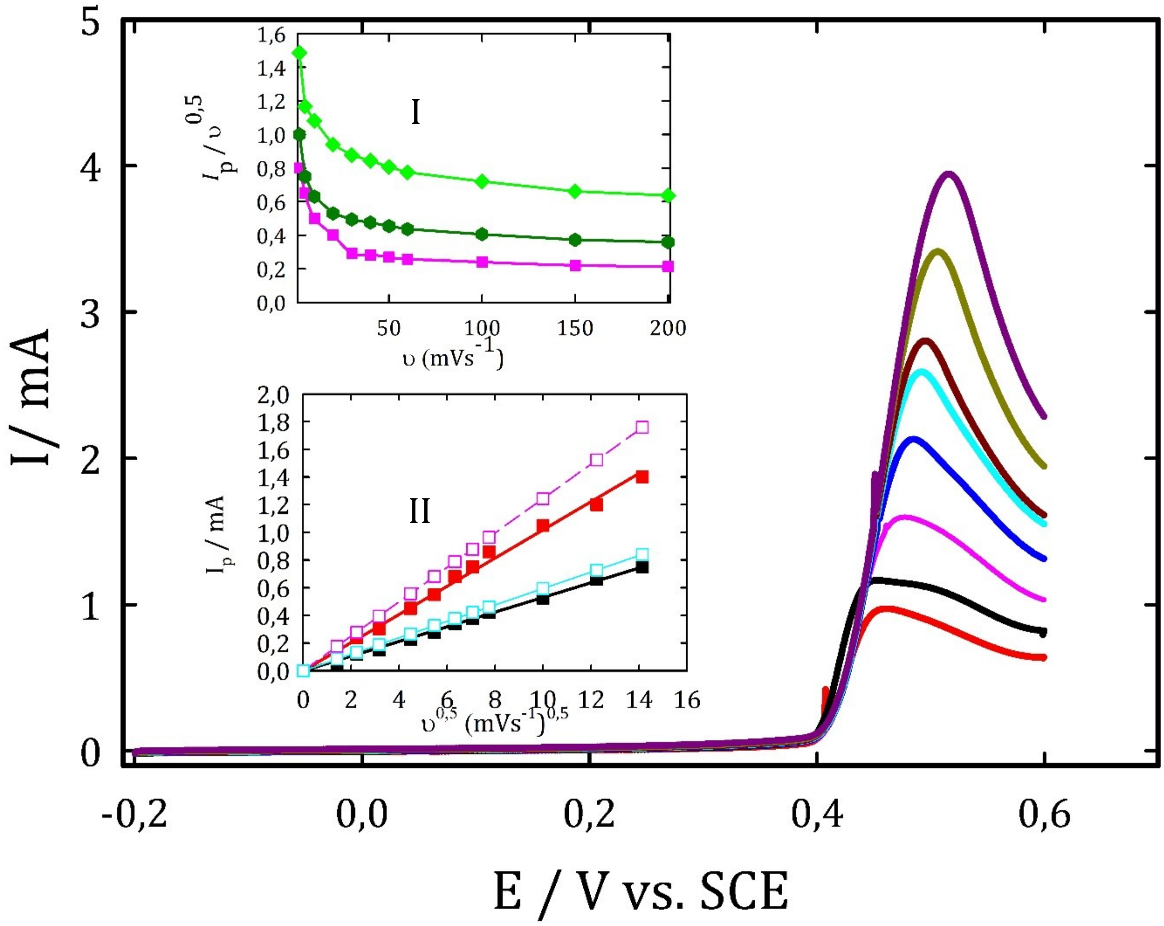

Figure S4: the LSVs of glucose oxidation obtained at nano-CS-NiOOH/GC electrode with 50% nickel in 1 mM glucose at various scan rate (minimum scan rate 2 mV/s and maximum scan rate 200 mV/s). Inset I shows the variation of Ip/V0.5 with scan rate (V) of nano-CS-NiOOH/GC electrodes with 10% (pink line), 30% (green line) and 50% (light green line) nickel and Inset II shows the variation of Ip with V0,5 of nano-CS-NiOOH/GC electrodes with 70% (red line) and 100% (black line) nickel. The cyan and pink dashed lines show the Theorthical plot of Randles-Sevcik equations for 70% and 100%, respectively.

The peak current, Ip of diffusion-controlled totally irreversible process can be given by Randles–Sevcik equation: Ip= 2.99×10^5 n $(\alpha n_\alpha)^{0.5}$ A C $(DV)^{0.5}$. where *Ip* is the peak current (A), *n* is the total number of electrons, α is the charge transfer coefficient, *na* is the number of electrons in the rate determining step (*na* = 1), *A* is the surface area of the working electrode (cm^2), *D* is the diffusion coefficient of the glucose, *C* is the bulk concentration of the glucose and *v* is the scan rate (V s^{-1}). It was calculated using values of $D = 6.7 \times 10{-}6$ cm^2 s^{-1}, $A = 0.7$ cm^2 and α (as calculated from the slope of Tafel plot given in Figure S5)[3].

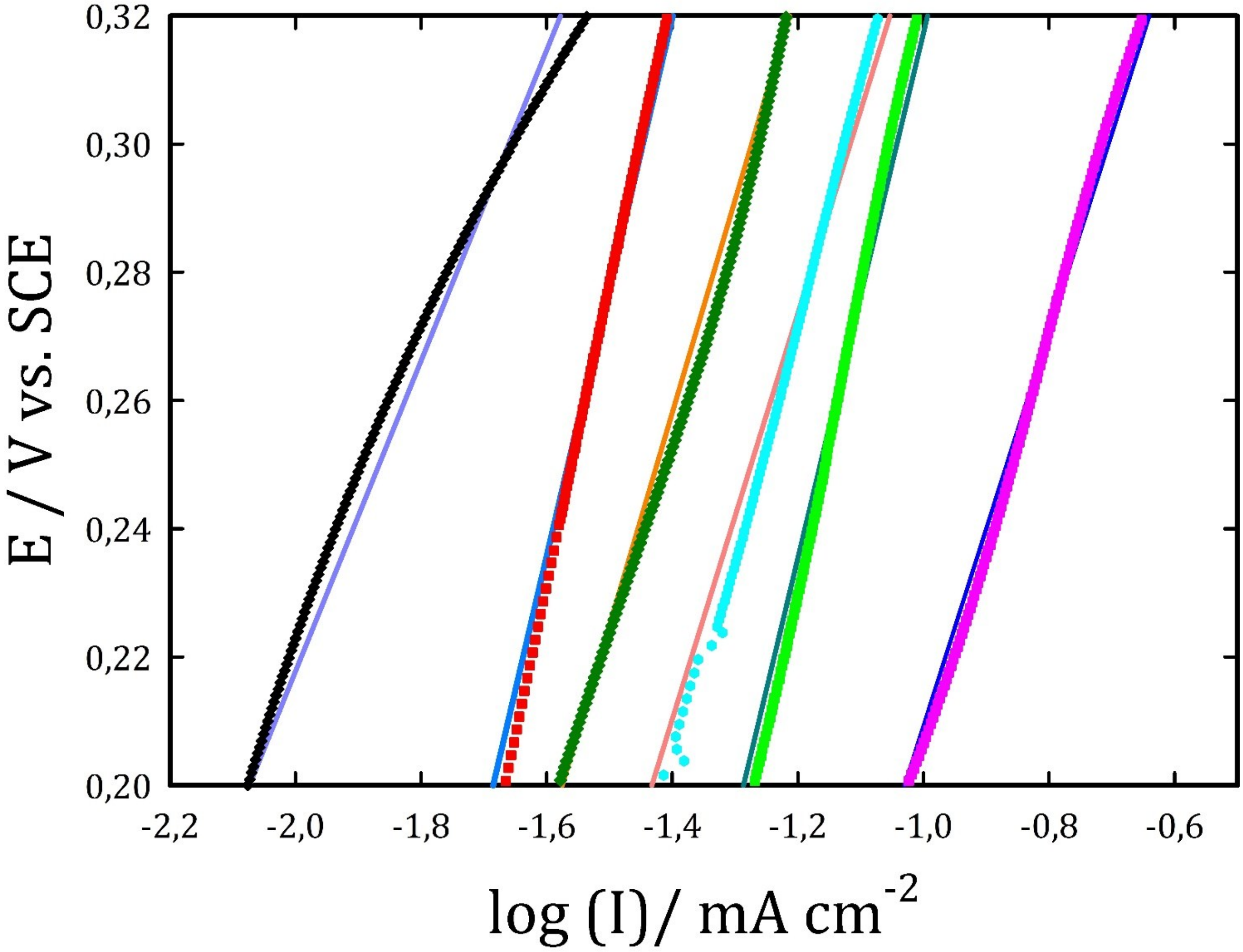

Figure S5: Tafel plot of nano-CS-NiOOH/GC electrode with various nickel compositions, typically, 100% (black line), 70% (red-line), 10% (pink line), 30% (green line), 40% (cyan line) and 50% (pink line).

1. P. Oliva, J. Leonardi, J. Laurent, C. Delmas, J. Braconnier, M. Figlarz, F. Fievet and A. De Guibert, *Journal of Power Sources*, 1982, **8**, 229-255.
2. R. L. Doyle, I. J. Godwin, M. P. Brandon and M. E. G. Lyons, *Physical Chemistry Chemical Physics*, 2013, **15**, 13737-13783.
3. A. S. Danial, M. M. Saleh, S. A. Salih and M. I. Awad, *Journal of Power Sources*, 2015, **293**, 101-108.