

Supporting information

Charge-storage mechanism of highly defective NiO nanostructures onto carbon nanofibers in electrochemical supercapacitor

Willian G. Nunes^a, Andre Navarro^b, Bruno Freitas^a, Rafael Vicentini^a, Aline C. Oliveira^c, Renato G. Freitas^c, Leonardo M. Da Silva^{d,‡}, Gustavo Doubek^b, Hudson Zanin^{a,}*

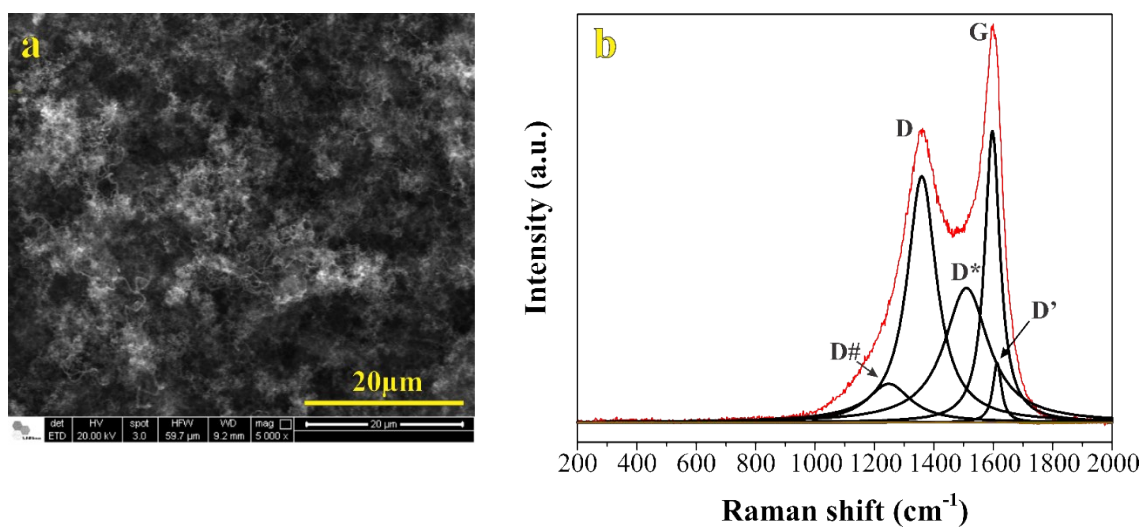


Figure S1. (a) Topview SEM micrograph and (b) Raman spectrum of the as-prepared CNFs.

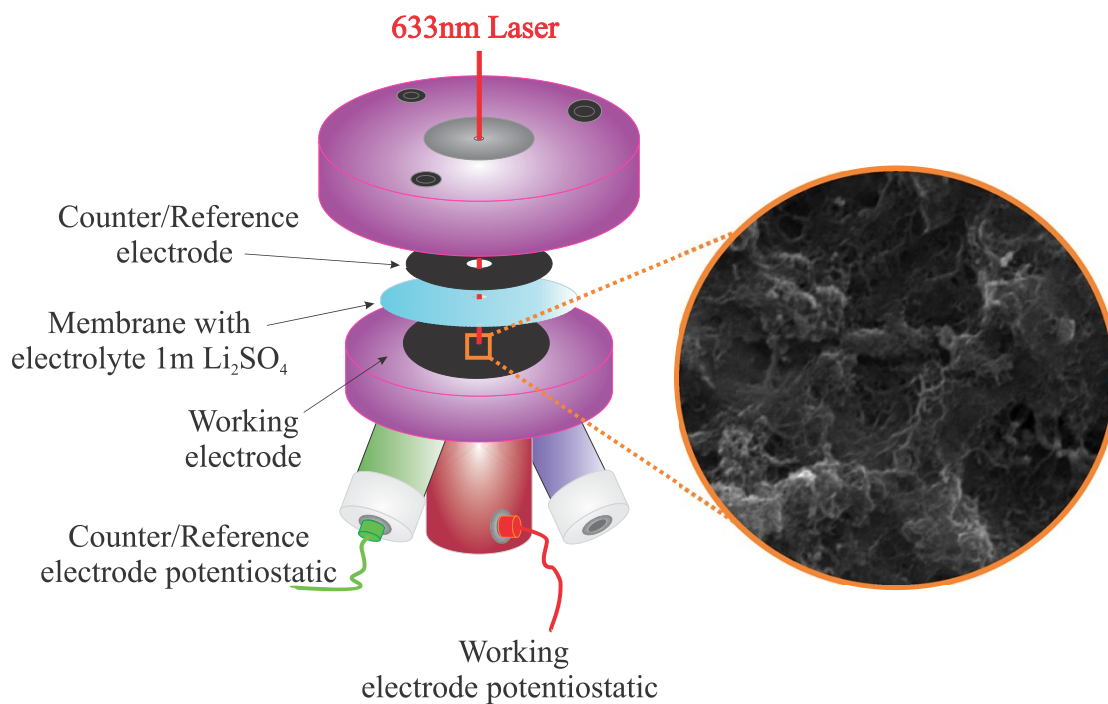


Figure S2. Schematic representation of the electrochemical cell used in the *operando* Raman studies.

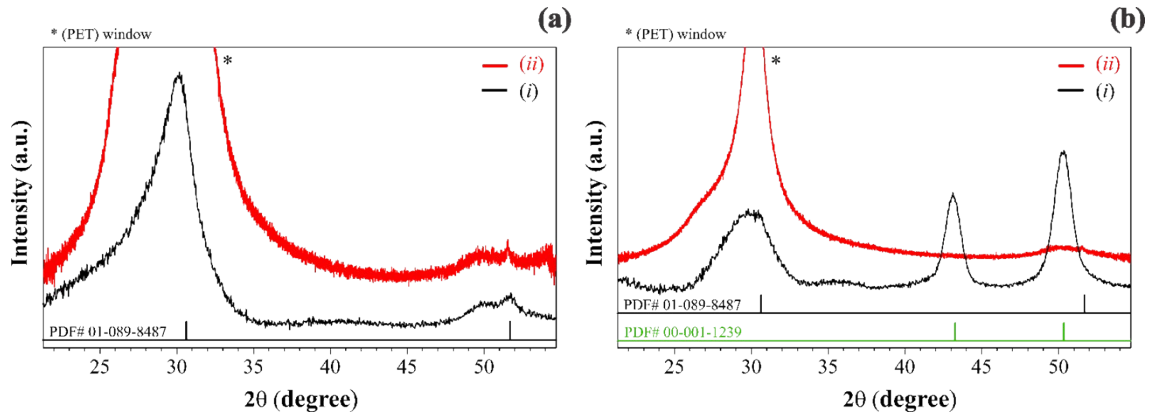


Figure S3. XRD pattern of (a) CNFs and (b) NiO@CNFs: (i) as-prepared materials and (ii) wetted electrodes in a 1 M Li_2SO_4 aqueous electrolyte. P.S. Wetted XRD patterns were taken with synchrotron light in order to increase the photon flux.

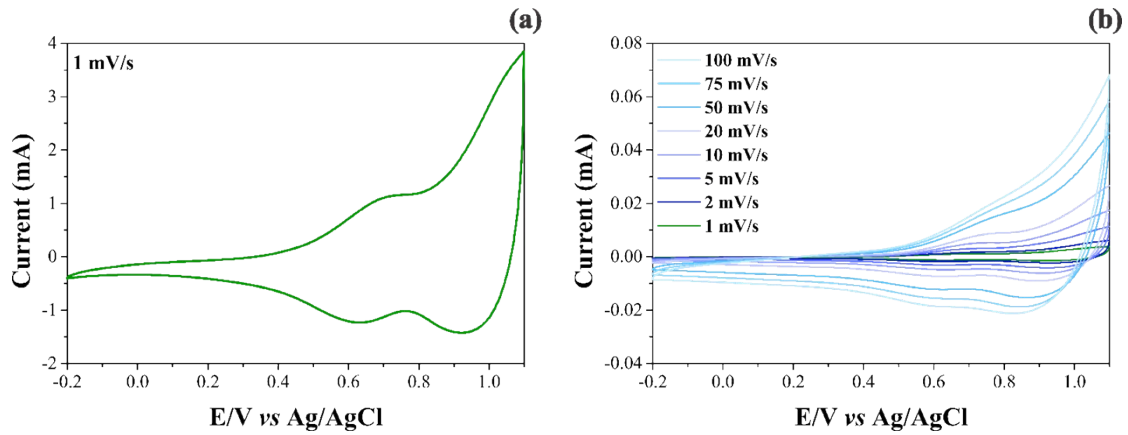


Figure S4. Cyclic voltammograms of the NiO electrode housed in a conventional three-electrode cell. Electrolyte: 1 M Li_2SO_4 aqueous solution. Scan rate (a) 1 mV s^{-1} and (b) 1 to 100 mV s^{-1} .

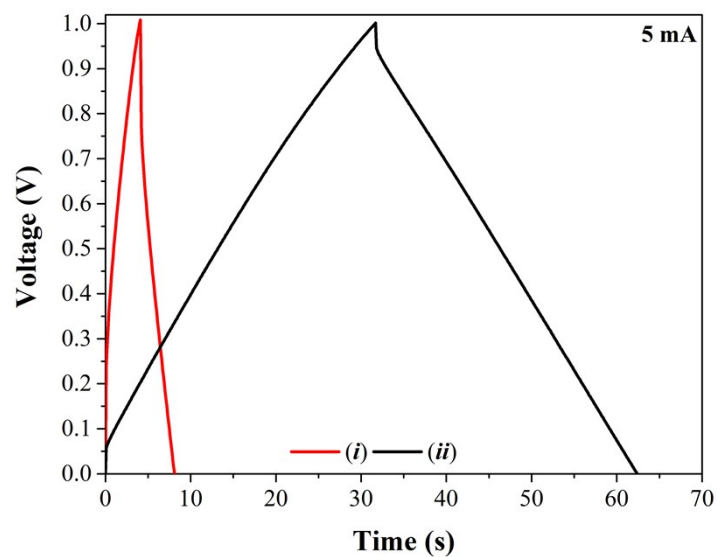


Figure S5. Contrasting GCD from **(i)** CFNs and **(ii)** NiO@CNFs at 5 mA.

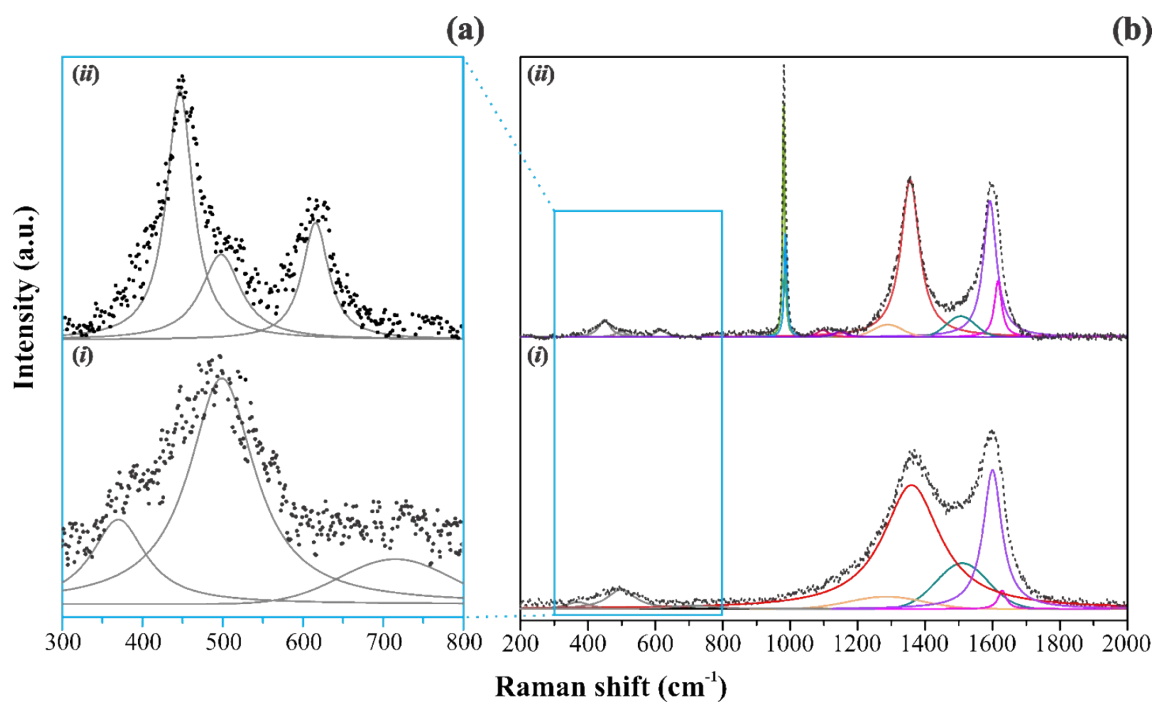


Figure S6. Raman spectra of NiO@CNFs: **(i)** as-prepared and **(ii)** wetted materials in a 1 M Li_2SO_4 aqueous electrolyte: **(a)** zooming in the 300 to 800 cm^{-1} range and **(b)** full range spectra for overview. No voltage was applied to cell here (unplugged cell, OCV).

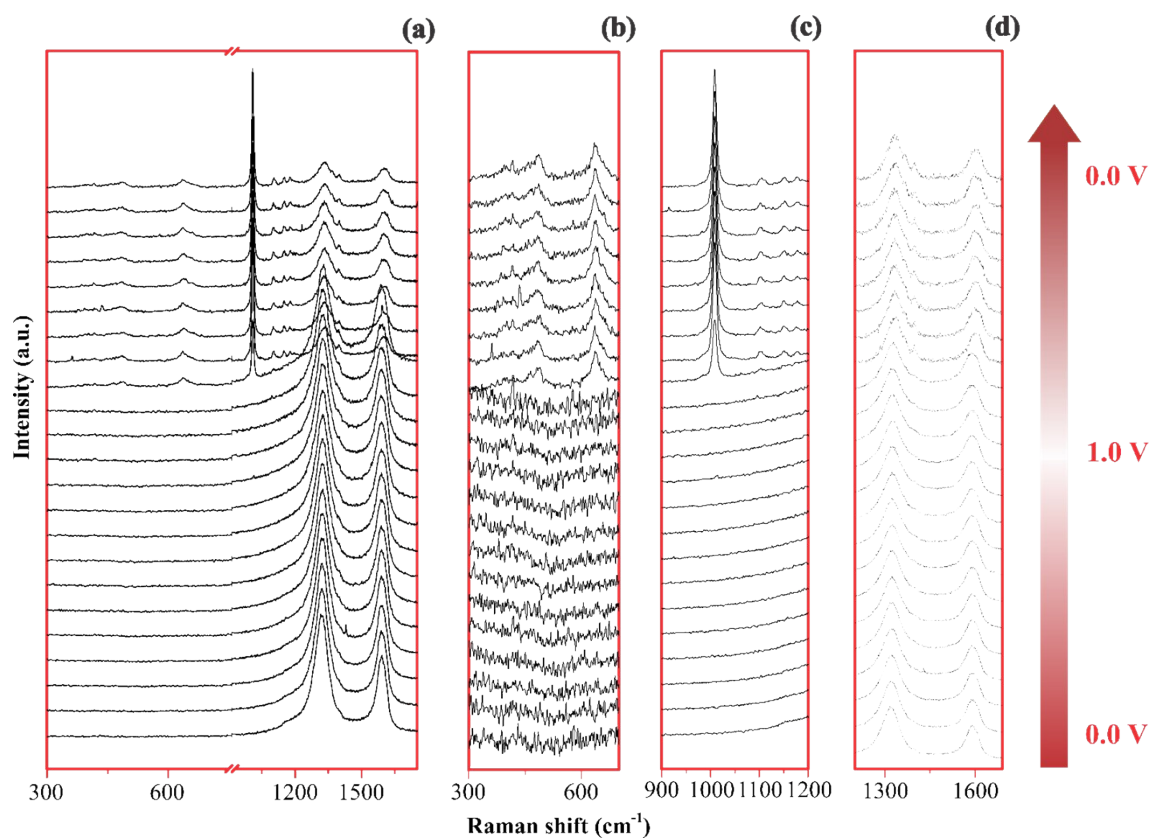


Figure S7. Extended Raman spectra of the CNFs electrode under dynamic polarization conditions in a 1 M Li_2SO_4 aqueous electrolyte from 0 to 1.0 V and with 633 nm excitation laser wavelength.

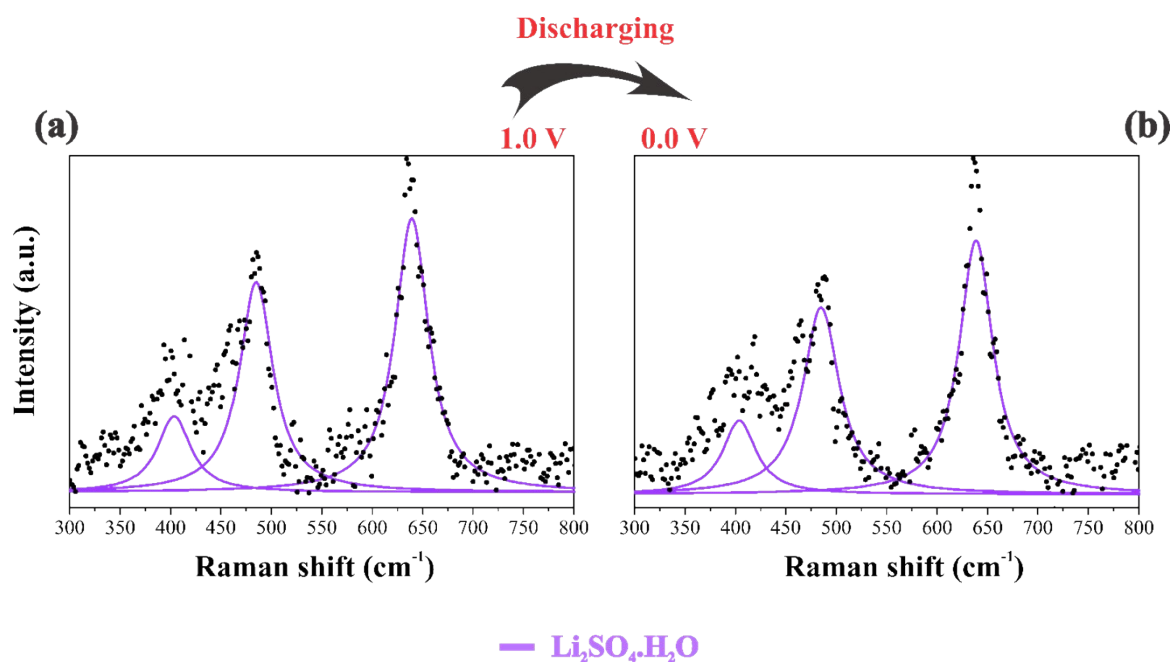


Figure S8. Raman spectra of CNFs electrode under polarization conditions in a 1 M Li_2SO_4 aqueous electrolyte from 1.0 a 0 V and with 633 nm excitation laser wavelength zooming at 300 to 800 cm^{-1} range.

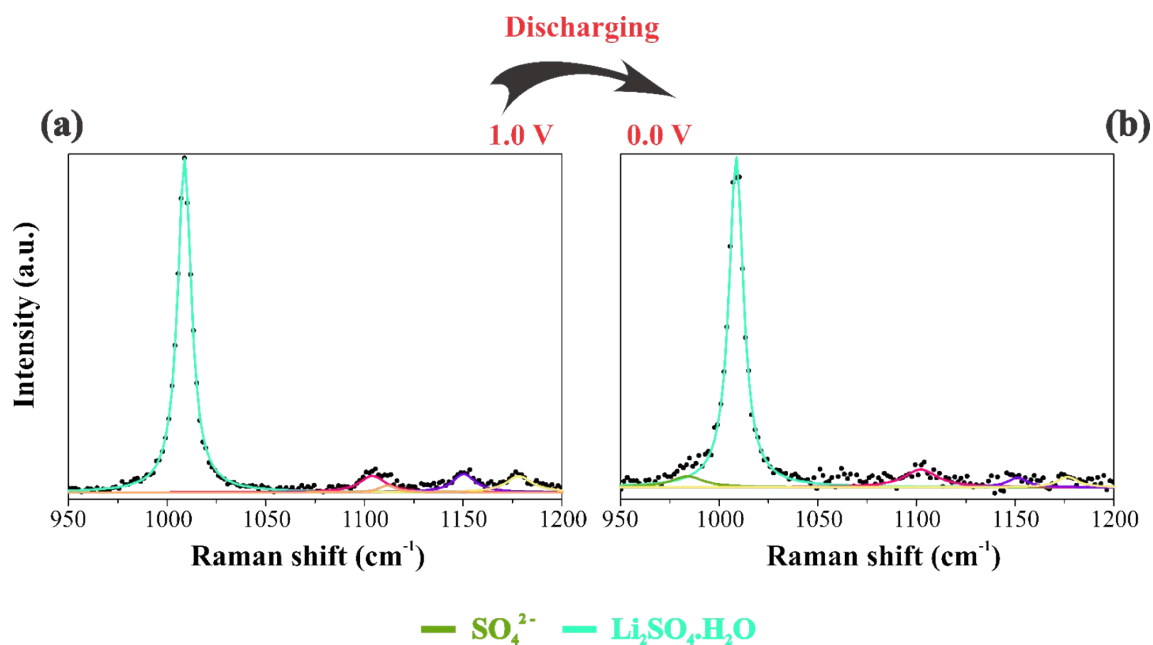


Figure S9: Raman spectra of the CNFs electrode under polarization conditions in 1 M Li_2SO_4 aqueous electrolyte from 1.0 to 0 V and with 633 nm excitation laser wavelength zooming at 950 to 1200 cm^{-1} range.