Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

Supplementary data

A reduced graphene oxide-NiO composite electrode with a high and stable capacitance

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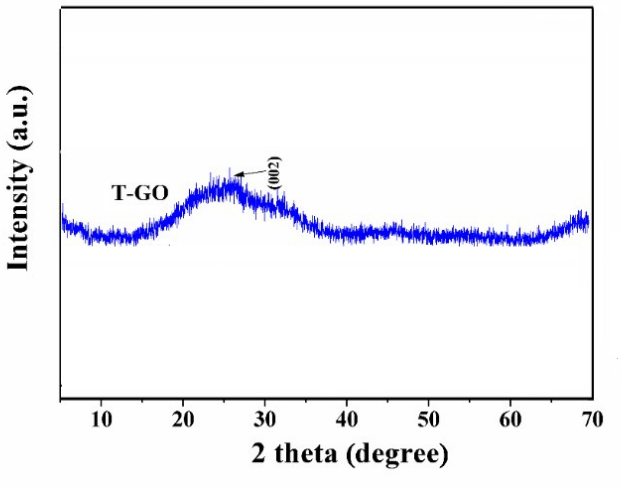

Figure S1 *XRD pattern of T-GO.*

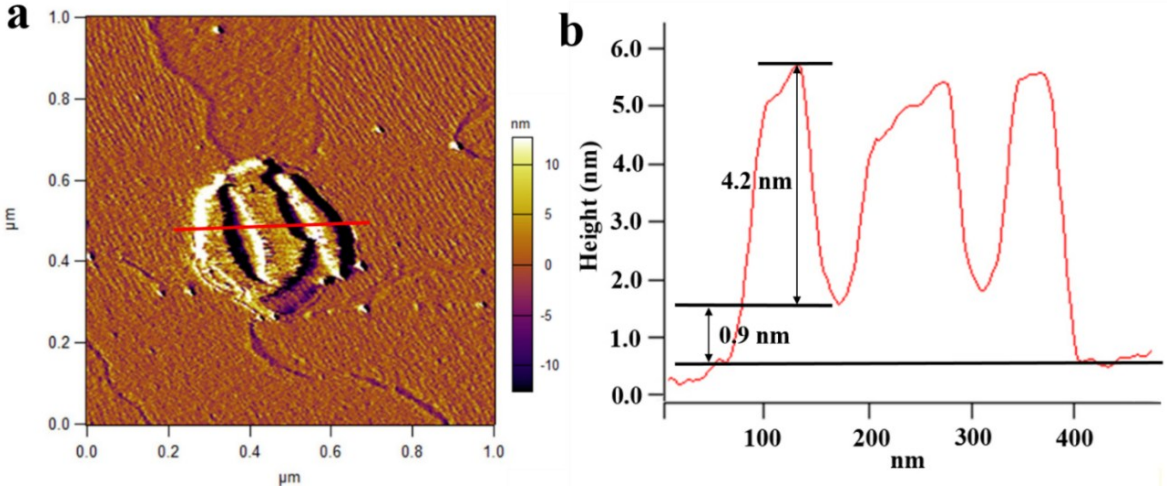

Figure S2 *(a) AFM image of nickel oxide nanoparticles on RGO from EGO-NiO and (b) cross-section thickness contour.*

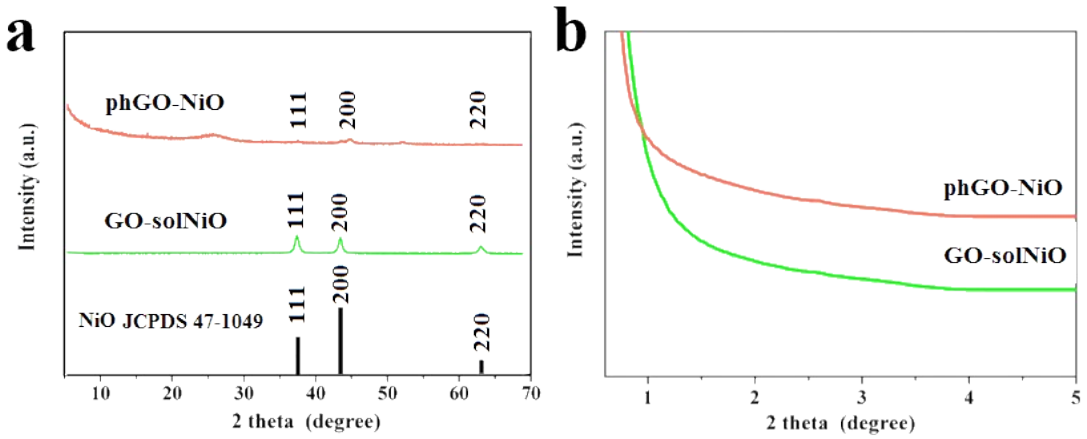

Figure S3 *(a) XRD patterns of GO-solNiO and phGO-NiO and (b) small-angle XRD patterns of GO-solNiO and phGO-NiO.*

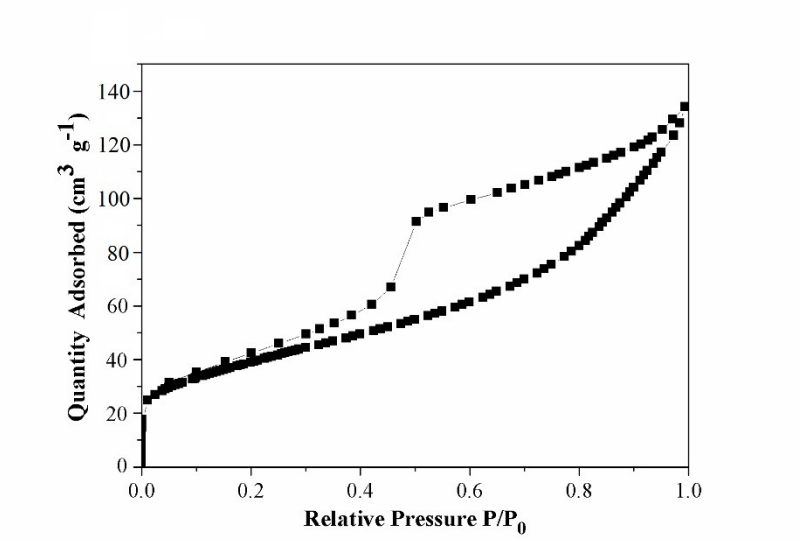

Figure S4 *N_2 adsorption-desorption isotherm of EGO-NiO.*

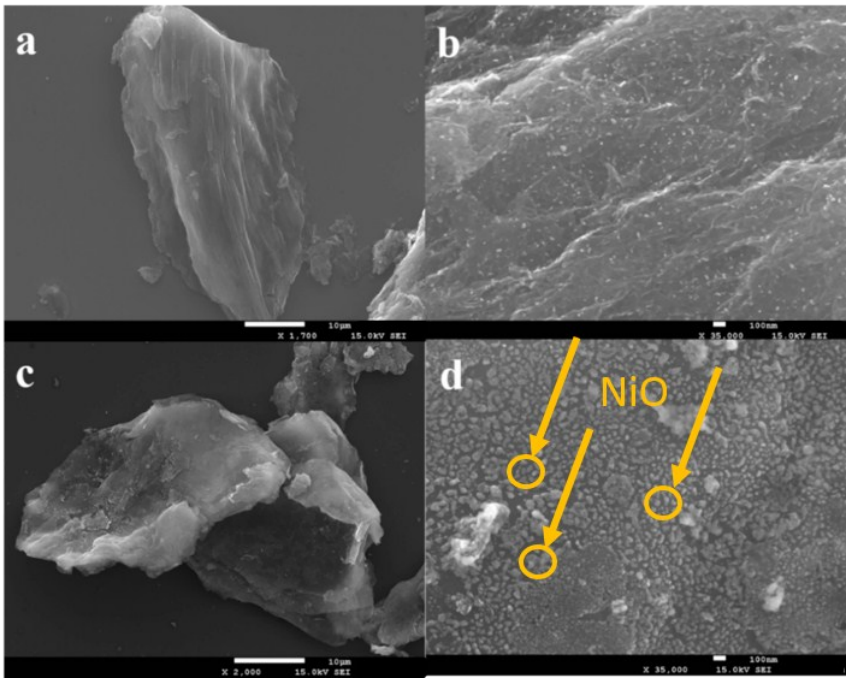

Figure S5 *SEM images in low and high magnifications of GO-solNiO (a, b) and phGO-NiO (c, d).*

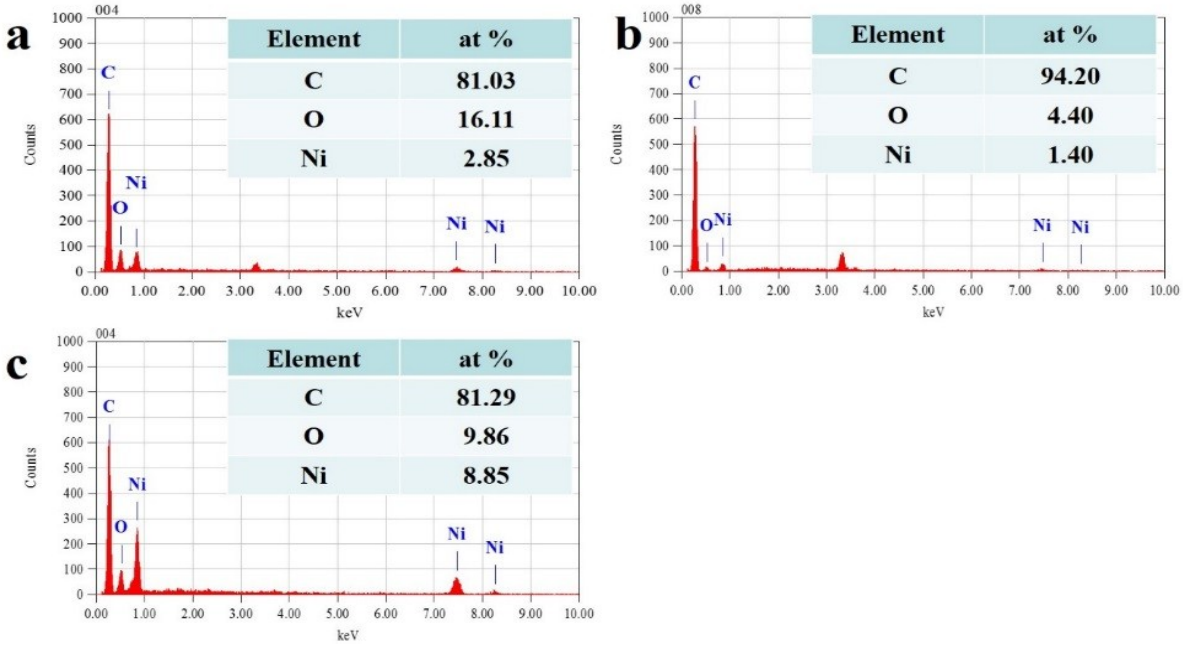

Figure S6 *SEM-EDS data of (a) EGO-NiO, (b) GO-solNiO and (c) phGO-NiO.*

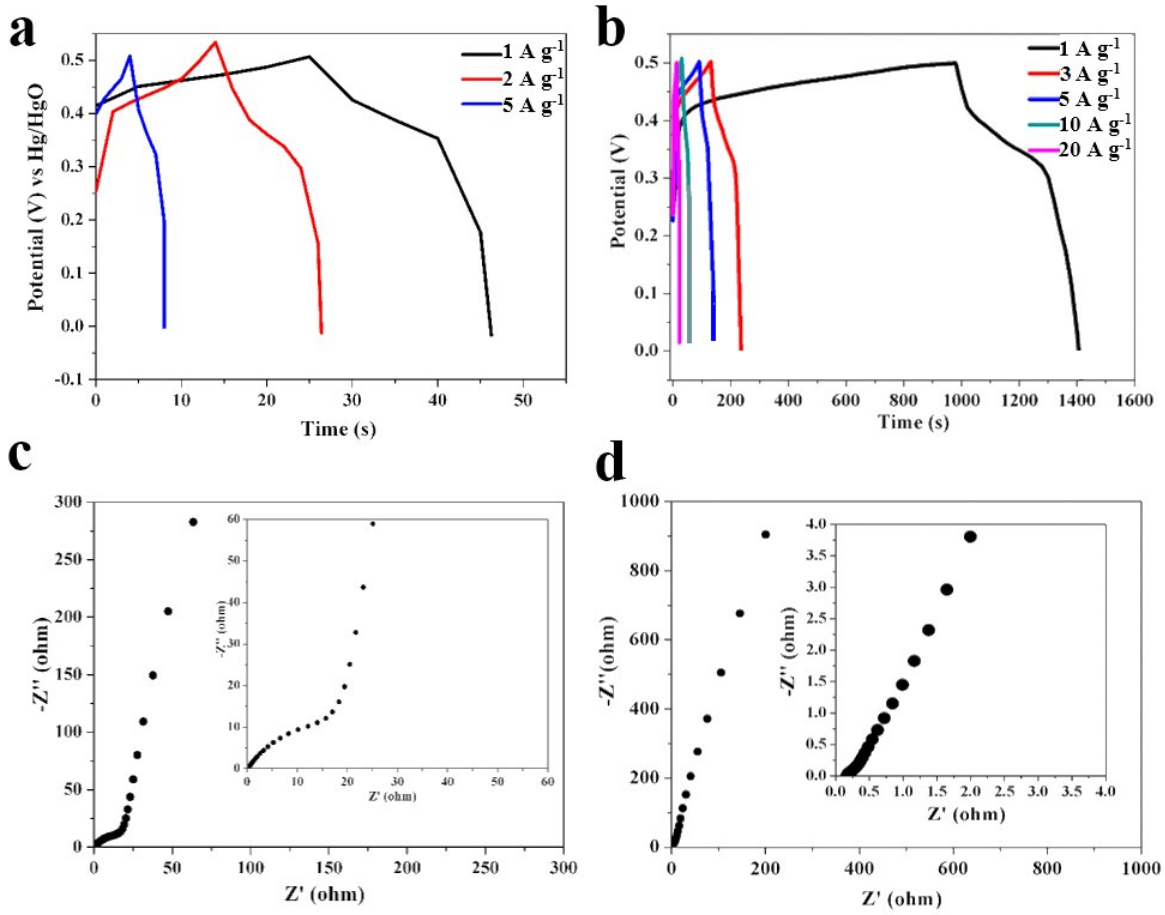

Figure S7 *GCD curves at different current densities of pristine GO (a) and EGO-NiO (b), Nyquist plots of GO (c) and EGO-NiO (d). The insets in Figures S6 c and d show high-frequency Nyquist plots.*

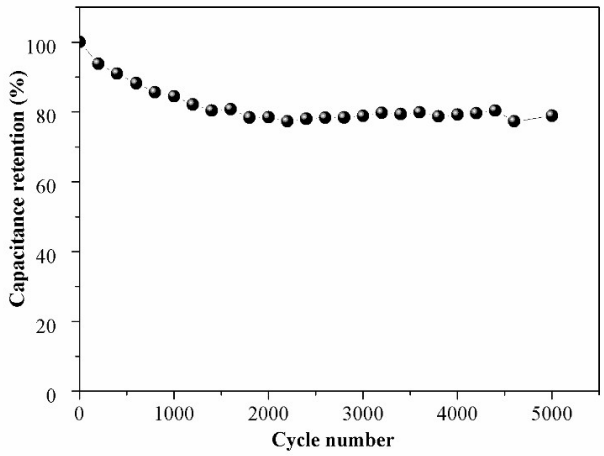

Figure S8 *Cycling performance of EGO-NiO for 5000 cycles at 20 A g^{-1}*

Table S1 *Comparison of NiO-based pseudocapacitive electrode materials*

Materials	Preparation method	Specific capacitance C_s ($F \cdot g^{-1}$)	Cycle stability (%, cycle numbers)
NiO-reduced graphene oxide (this work)	Vacuum-thermal treatment	880 at 1 A g^{-1}	84%, (1000) at 20 A g^{-1}
NiO film [54]	Chemical bath deposition + template removal	309 at 1 A g^{-1}	89%, (4000) at 1 A g^{-1}
NiO/Graphene [55]	Vacuum promoted low-temperature heat treatment	220 at 0.1 A g^{-1}	100%, (1000) at 2 A g^{-1}
NiO/ultrathin derived graphene [56]	Nanocasting + chemical bath deposition	425 at 2 A g^{-1}	79%, (2000) at 10 A g^{-1}
NiO/nanoporous graphene [57]	Atomic layer deposition	1005.8 at 1 A g^{-1}	94%, (1500) at 2 A g^{-1}
NiO/3D graphene [58]	CVD + electrochemical deposition	745 at 1.4 A g^{-1}	100%, (2000) at 80 mV s^{-1}