Supporting Information

Spontaneously Grown $Ni(OH)_2$ on Iron Oxide nanoparticles with Enhanced Energy Storage Performance for Electrode of Asymmetric Supercapacitors

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KEYWORDS

$Ni(OH)_2$; Asymmetric Supercapacitors; Electrochemical energy; Intercalates; Iron oxides; Specific capacitance

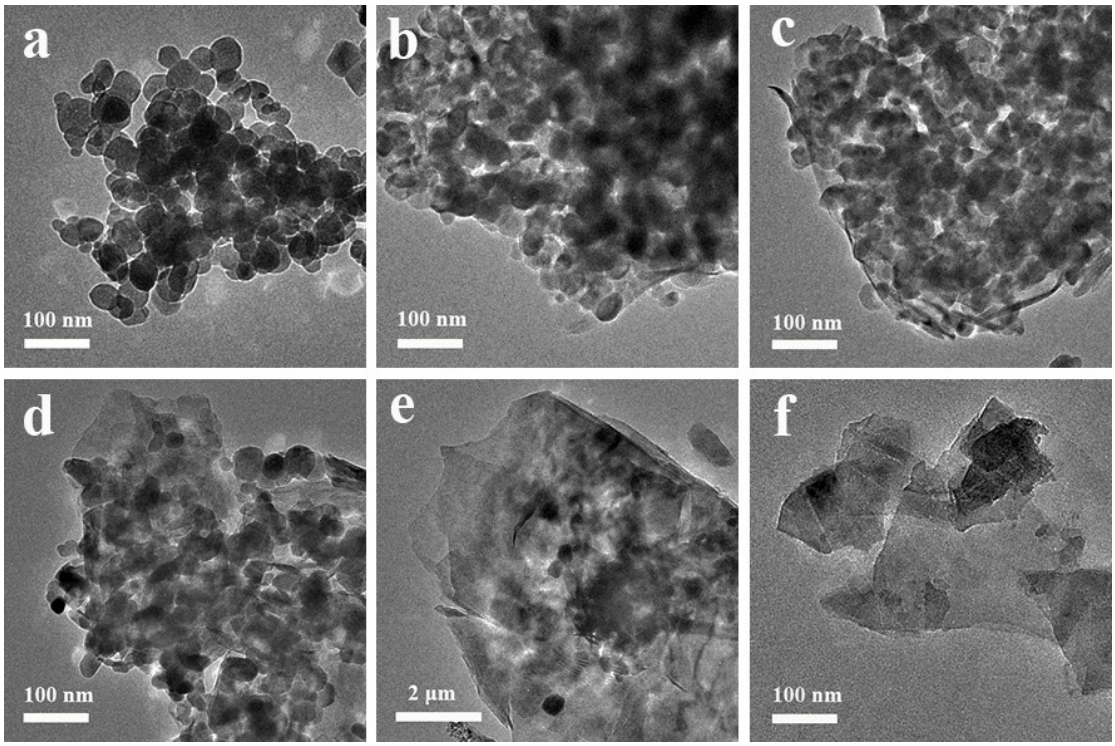

Figure S1.The TEM images of (a) Fe_2O_3 and (b) 5-NF, (c) 10-NF, (d) 20-NF, (e) 50-NF, and (f) $Ni(OH)_2$.

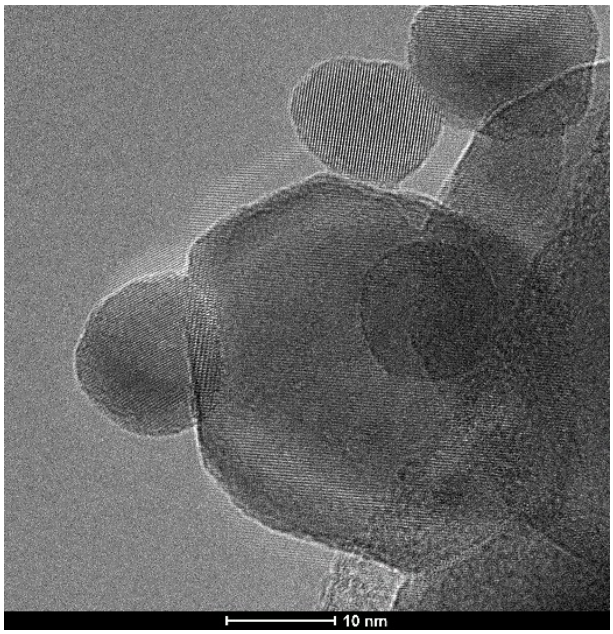

Figure S2. The HRTEM image of 10-NF.

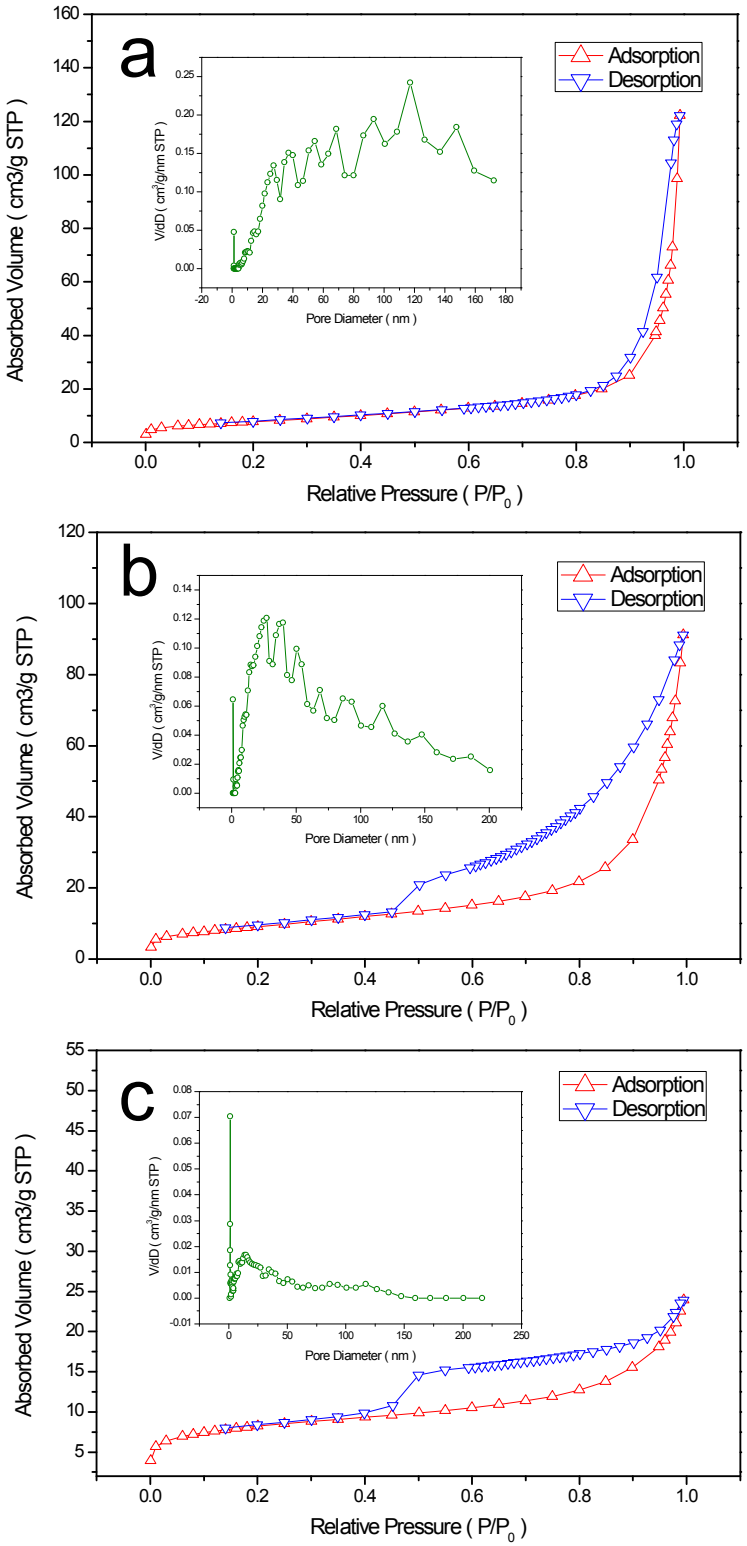

Figure S3. N_2 absorption and desorption isotherm plots of (a) α-Fe_2O_3, (b) 50-NF, and (c) $Ni(OH)_2$, the insets are the pore size distribution patterns for the corresponding samples.

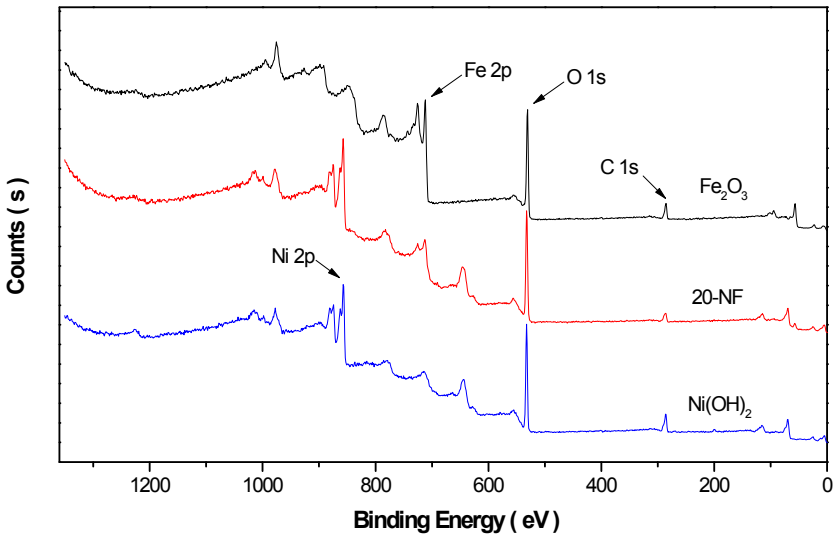

Figure S4. XPS survey spectra of Fe_2O_3, 20-NF, $Ni(OH)_2$

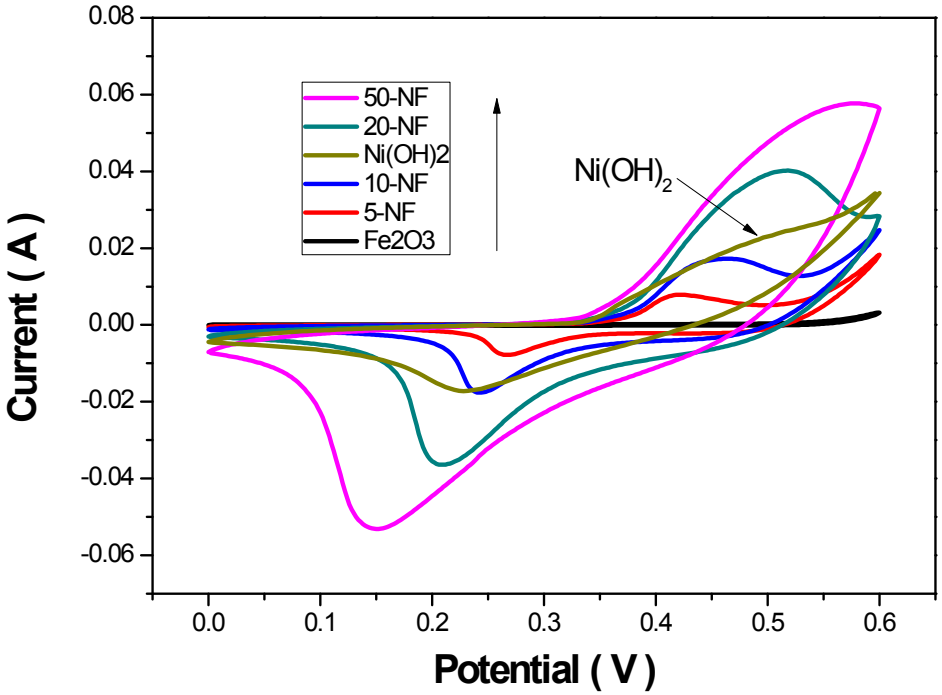

Figure S5. CV curves of α-Fe_2O_3, 5-NF, 10-NF, 20-NF, 50-NF and $Ni(OH)_2$ at the scan rate was 20 mV s^{-1};

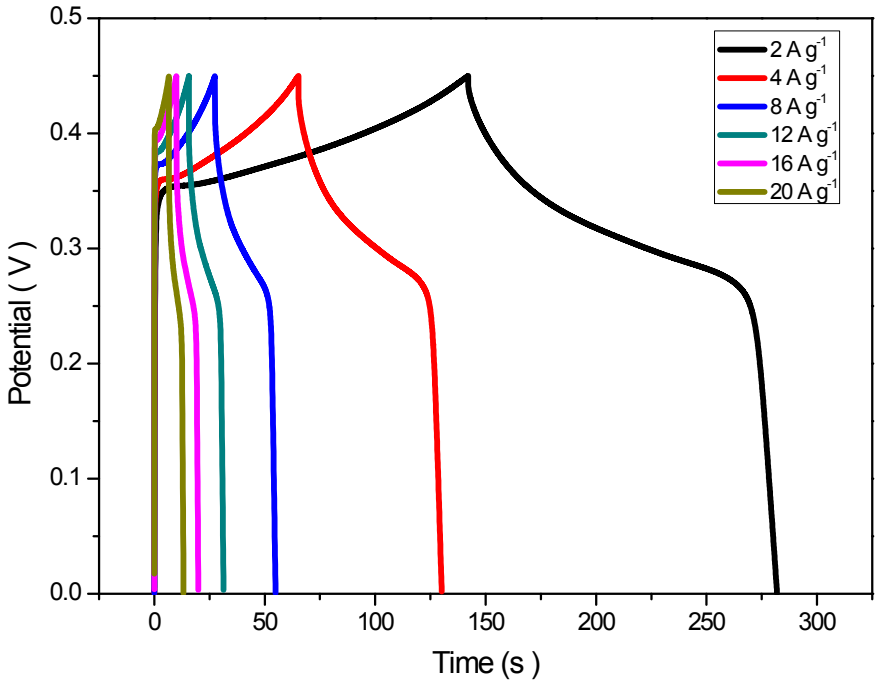

Figure S6. The GCD curves of 50-NF at different current density

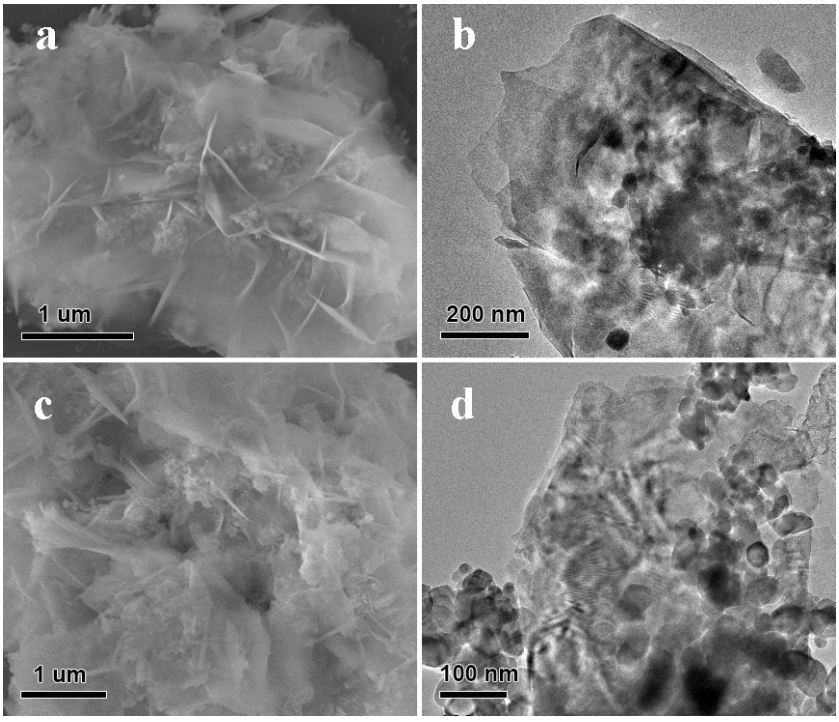

Figure S7. The SEM images of 50-NF (a) and (b) The TEM images of 50-NF, (c) The SEM images of 50-NF after 5000 charge/discharge cycle, (d) The TEM images of 50-NF after 5000 charge/discharge cycle

Table S1. Comparison of electrochemical performance with other electrodes materials comprised of Fe_2O_3- $Ni(OH)_2$.

Sample	Experiment method	Electrochemical test	Electrochemical performance	Capacitance retention (cycle numbers)	Ref.
α-Fe_2O_3@ $Ni(OH)_2$	hydrothermal 80℃	CV:0-0.6V ; GCD: 0-0.6V	356 F/g (16 A/g)	93.3% (500)	S1
NiO//a-Fe_2O_3	hydrothermal 120℃	Fe_2O_3:-0.8-0V; NiO:0-0.8V; ASC: 0 - 1.25 V	1.3 F/cm^2 (4 mA/cm^2); ASCs: energy densities 12.4 Wh /kg, power 951 W/kg	85% (10,000)	S2
α-Fe_2O_3@NiO	hydrothermal 120℃	CV:-0.2-0.8V;GCD :-0.2-0.8 V	557 mF/cm^2 (1mA/cm^2)	96.2% (3000)	S3
$Ni(OH)_2$-Fe_2O_3	solvothermal 140℃	CV:0-0.45V; GCD: 0-0.4V	1745.33 F/g (2 A /g)	84.28% (3000)	S4
$Ni(OH)_2$-Fe_2O_3	hrdrothermal 85℃	CV:0-0.6V; GCD: 0-0.6V	390 F/g (54.6 A/g)	85.7%(5000)	S5
$Ni(OH)_2$-α-Fe_2O_3	evaporation solvent method 60℃	CV:0-0.6V; GCD: 0-0.45V; ASCs : -1-1.4V	1107 F/g (20 mV/s); ASCs:energy densities 31.6 Wh /kg, power 474 W/kg	ASCs:89.6%(5000)	This work

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