Supplementary Information:

Self-Assembling of NiO Nanoparticles in Lignin-Derived Mesoporous Carbons for Supercapacitor Application

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The NiO@MPC sample of TEM was also analyzied by EDX and shown in Fig. S1.

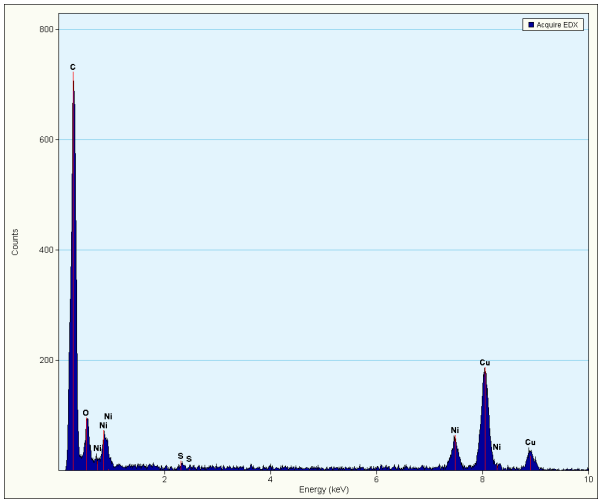

Figure S1 The EDX figure of G-NiO@-1 sample.

The size of NiO nanoparticles was increased in higher NiO-containing sample. The crystalline structure was also analyszed.

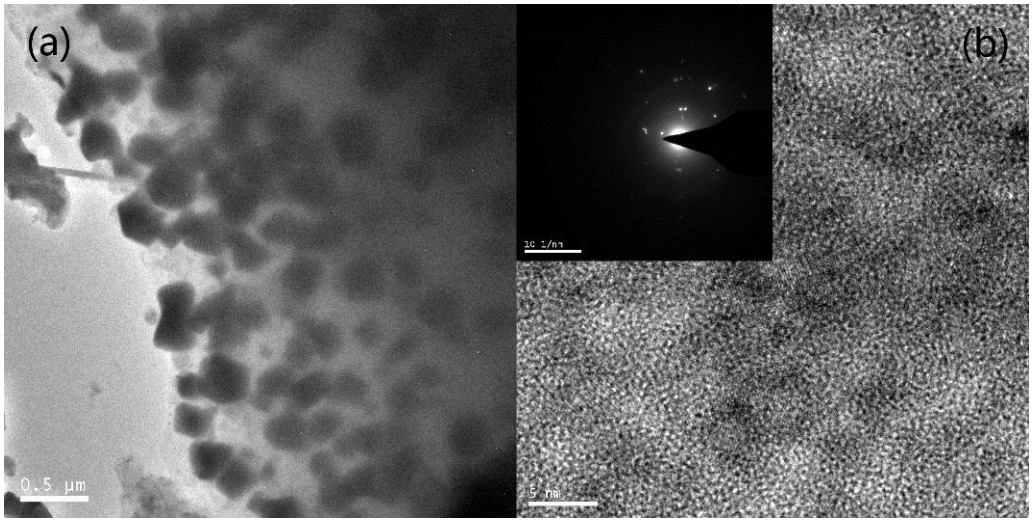

Figure S2 TEM image of higher NiO-containing samples: (a) G-NiO-5; (b) lattice spacings and Debay rings of NiO nanoparticles.

The effect of mesoporouse carbon for electro transfer was calculated.

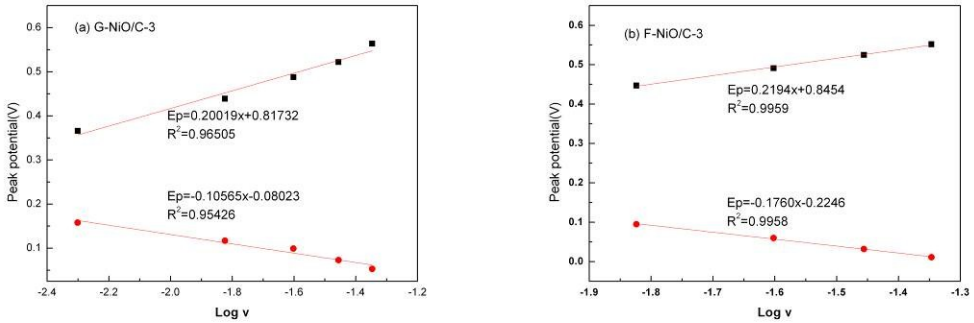

Figure S3 Electron transfer rates of (a) G-NiO@-3 and (b) F-NiO@-3 electrode.

In comparison, pure carbon sample was synthesized using sodium lignosulphonate and formaldehyde as carbon sources and Pluronic F127 as a template agent. The mesoporous structure was confirmed by N_2 adsorption-desorption test.

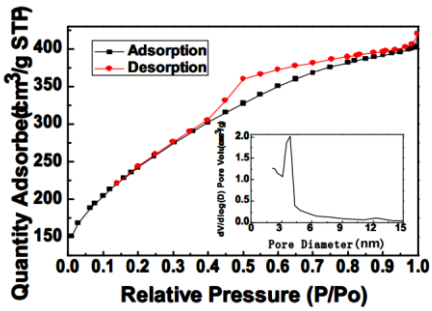

Figure S4 N_2 adsorption-desorption isotherms and pore size distribution curves(inset) of pure carbon sample.

Pure NiO samples was prepared by a simple sol-gel method. In a typical synthesis, 3 g $Ni(NO_3)_2 \cdot 6H_2O$ was dissolved in 100 mL of water, then 60 mL aqueous ammonia (25 wt%) was added to the above solution. After that, the solution was heated at refluxing temperature under continuous magnetic stirring. The refluxing period was set at 2 h and HMT would be hydrolyzed to synthesize α-$Ni(OH)_2$ precursors. After the reaction, the solution was cooled naturally to room temperature. The precursors were separated by centrifugation, followed by washing with deionized water and ethanol. At last, the yellow precipitate was dried over night at room temperature under a vacuum condition. NiO nanostructures were obtained by calcination of powder in air at 450 ^oC for 3 h.

The specific capacitance of pure carbon and NiO samples were calculated by galvanostatic constant-current charge-discharge test.

Table S1 Specific capacitance of pure carbon and NiO samples at different discharge current densities.

Sample	Current density (A/g)			
	1	2	5	10
Pure carbon	107.76	64.45	47.46	16.61
Pure NiO	344.53	281.78	232.55	177.25

Notes and references

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