Supplementary Material for $NiO/Ni_xCo_{3-x}O_4$ porous ultrathin nanosheet/nanowire composite structures as high-performance supercapacitor electrodes

Dongkai Jiang[a], Maojun Zheng[a,b,*], Yuxiu You[a], Liguo Ma[a] , Pengjie Liu[a], Fanggang Li[a], Hao Yuan[a], Zhihao Zhai[a], Li Ma[c] and Wenzhong Shen[a]

a Key Laboratory of Artificial Structure and Quantum Control, Ministry of Education, School of Physics and Astronomy, Shanghai Jiao Tong University, Shanghai, 200240, PR China.

b Collaborative Innovation Center of Advanced Microstructures, Nanjing University, Nanjing, 210093, PR China.

c School of Chemistry and Chemical Technology, Shanghai Jiao Tong University, Shanghai, 200240, PR China.

**Corresponding author Fax: +86-021-54741040, E-mail: mjzheng@sjtu.edu.cn (M. Zheng)*

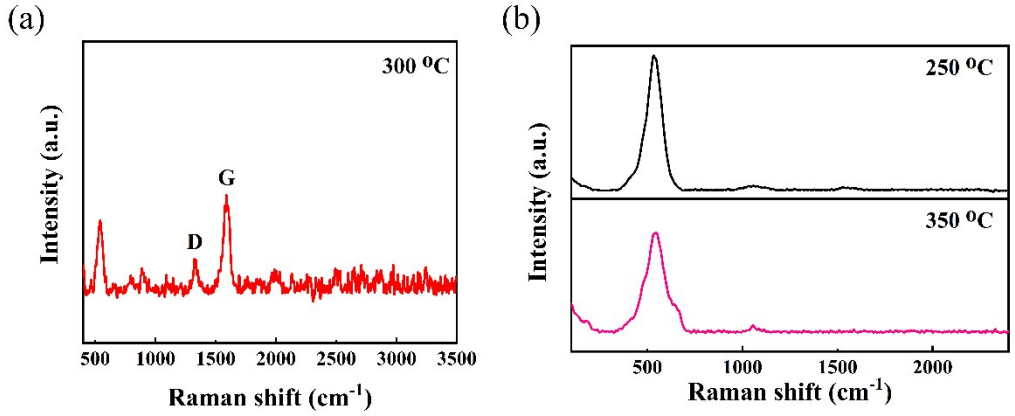

Fig.S1 a Raman spectra of the $NiO/Ni_xCo_{3-x}O_4$ nanosheet/nanowire composite annealed at 300 °C **b** Raman spectra of the $NiO/Ni_xCo_{3-x}O_4$ nanosheet/nanowire composite annealed at 250 °C and 350 °C

Table S1 The Cobalt content of the samples.

Annealing temperature (℃)	Mass percentages of Cobalt (%)
250	0.202
300	0.268
350	0.387

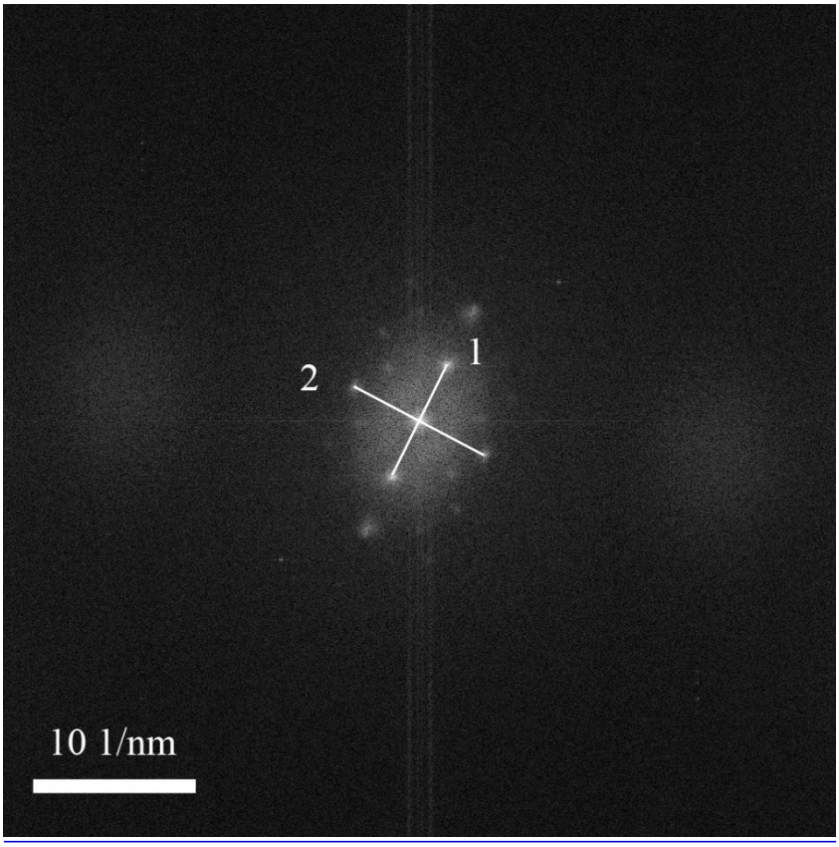

Fig.S2 FFT pattern corresponding to the HRTEM image of the $NiO/Ni_xCo_{3-x}O_4$ porous nanosheets

Table S2 The lattice spacing calculated from FFT pattern(nanosheet)

Line Number	Calculated Spacing	Lattice Plane
1	**2.639 Å**	**（220）2.882 Å**
2	**2.213 Å**	**（222）2.350 Å**

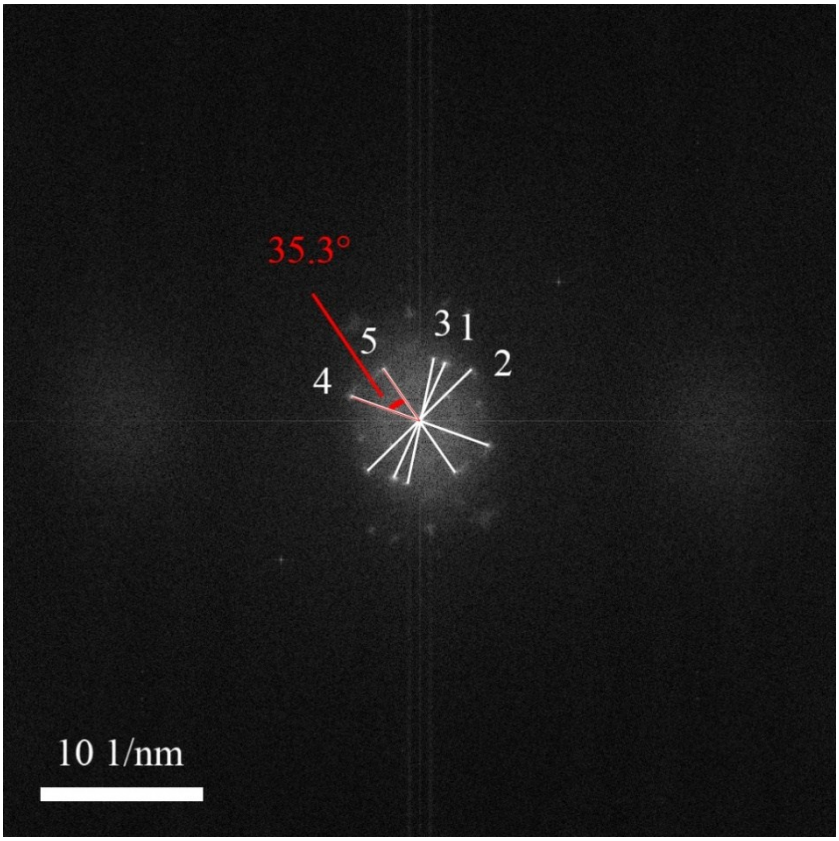

Fig.S3 FFT pattern corresponding to the HRTEM image of the NiO/$Ni_xCo_{3-x}O_4$ porous nanowires

Table S3 The lattice spacing calculated from FFT pattern(nanowire)

Line Number	Calculated Spacing	Lattice Plane
1	**2.577 Å**	**(220) 2.882 Å**
2	**2.238 Å**	**(222) 2.350 Å**
3	**2.548 Å**	**(220) 2.882 Å**
4	**2.246 Å**	**(222) 2.350 Å**
5	**2.585 Å**	**(220) 2.882 Å**

For cubic crystals, we have

$$\cos \Phi = \frac{h_1h_2 + k_1k_2 + l_1l_2}{\sqrt{h_1^2 + k_1^2 + l_1^2}\sqrt{h_2^2 + k_2^2 + l_2^2}} \quad \text{(S1)}$$

where Φ is the angle between two crystal faces (h_1, k_1, l_1) and (h_2, k_2, l_2).

Therefore, the angle between two crystal faces (220) and (222) is equal to 35.26°which is fit well with the measured value 35.3°.