Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

Nanocrystal-constructed mesoporous $CoFe_2O_4$ nanowire arrays aligned on flexible carbon fabric as integrated anodes with enhanced lithium storage properties

Bo Wang, Songmei Li,* Xiaoyu Wu, Bin Li, Jianhua Liu, and Mei Yu

Key Laboratory of Aerospace Advanced Materials and Performance of Ministry of Education, School of Materials Science and Engineering, Beihang University, Beijing, 100191, P. R. China

* Corresponding author. Tel: +86 10 82317103; fax: +86 10 82317103.
E-mail address: songmei_li@buaa.edu.cn.

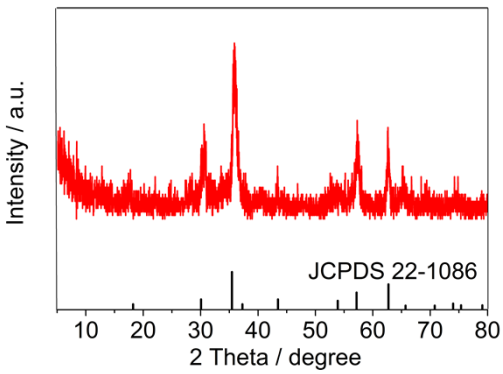

Fig. S1 The XRD pattern of the $CoFe_2O_4$ powders.

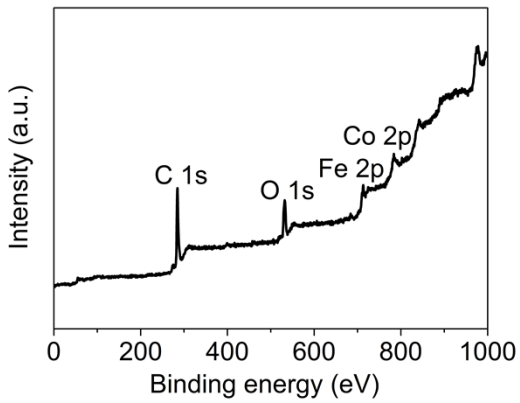

Fig. S2 XPS survey spectra of $CoFe_2O_4$/carbon fabric composite.

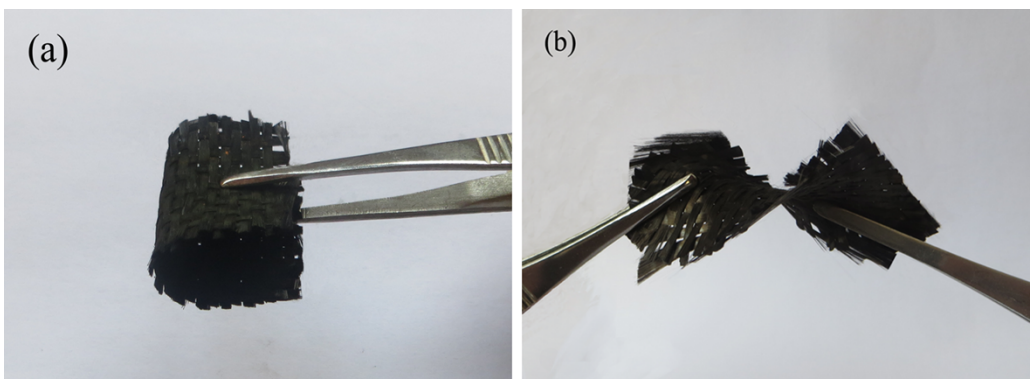

Fig. S3 The as-synthesized electrodes under bending.

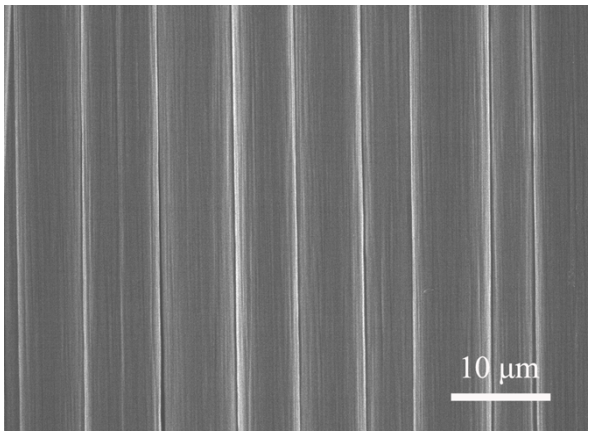

Fig. S4 SEM images of the carbon fabric.

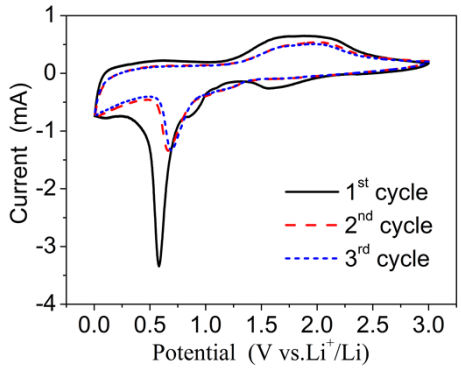

Fig. S5 Cyclic voltammograms of the $CoFe_2O_4$ powder pasted electrode for the initial three cycles at a scan rate of 0.1 mV s^{-1} in the voltage range of 0.005-3.0 V.

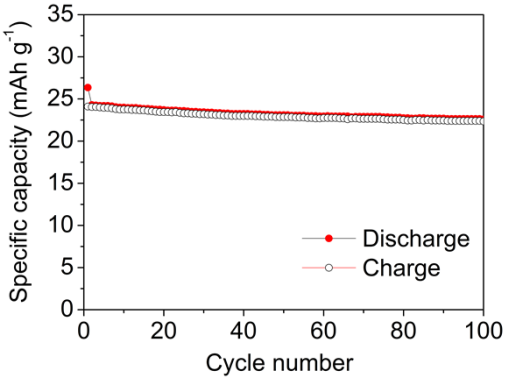

Fig. S6 Cycling performance of carbon fabric at a current density of 200 mA g^{-1}.

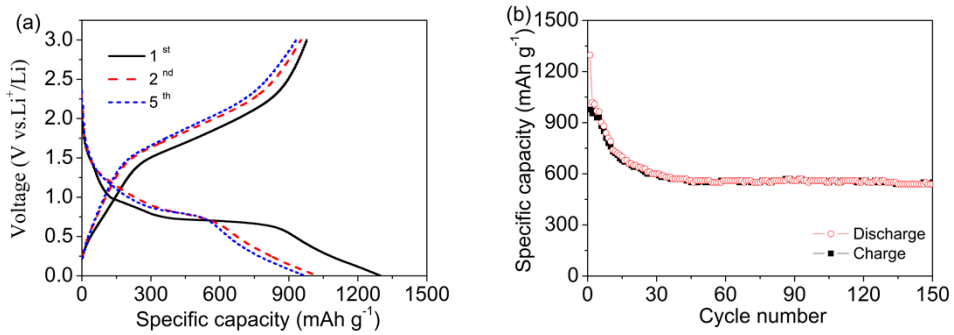

Fig. S7 (a) Charge-discharge voltage profiles for the first five cycles and (b) cycling performance of $CoFe_2O_4$ powder pasted electrode at a current density of 200 mA g^{-1}.

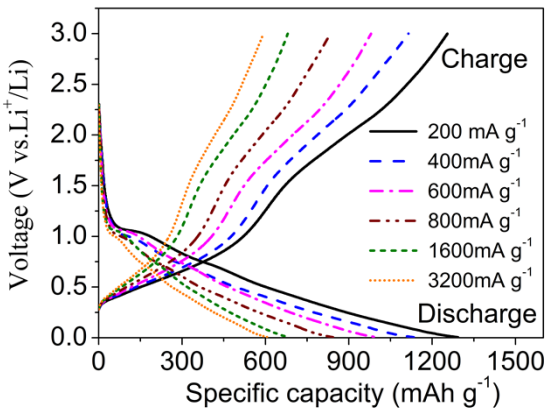

Fig. S8 The charge-discharge voltage profiles of $CoFe_2O_4$/carbon fabric electrode at different current densities.

Table S1. Electrochemical performance of the $CoFe_2O_4$ NWAs/carbon fabric in this work, compared with some other $CoFe_2O_4$-based electrodes reported in recent literature.

Type of material	Initial Specific capacity	Capacity decay after cycling	Capacity retention	Referance
$CoFe_2O_4$ NWAs/ carbon fabric	1398.74 mAh g^{-1} at 200 mA g^{-1}	31.7% after 150 cycles	47% from 200 to 3200 mA g^{-1}	This work
Porous $CoFe_2O_4$ octahedral	1076 mAh g^{-1} at 100 mA g^{-1}	35.3% after 50 cycles	——	1
$CoFe_2O_4$ hierarchical flower-like microspheres	1179.0 mAh g^{-1} at 200 mA g^{-1}	22.1% after 50 cycles	~44% from 100 to 1000 mA g^{-1}	2
Mesoporous $CoFe_2O_4$ nanospheres cross-linked by carbon nanotubes	1517.4 mAh g^{-1} at 200 mA g^{-1}	31.1% after 100 cycles	54.6% from 200 to 2000 mA g^{-1}	3
$Co_3O_4/CoFe_2O_4$ nanocomposite	1353.9 mAh g^{-1} at 64 mA g^{-1}	33.8% after 60 cycles	55.8% from 64 to 1924 mA g^{-1}	4
Carbon-encapsulated $CoFe_2O_4$/graphene	1453.1 mAh g^{-1} at 100 mA g^{-1}	36.3% after 60 cycles	39.5% from 200 to 1600 mA g^{-1}	5
$CoFe_2O_4$/graphene sandwich	1174 mAh g^{-1} at 200 mA g^{-1}	11% after 50 cycles	34.1% from 50 to 1600 mA g^{-1}	6

References

1 X. N. Fu, D. Chen, M. Wang, Y. S. Yang, Q. Z. Wu, J. M. Ma, and X. S. Zhao, *Electrochim. Acta,* 2014, **116,** 164.

2 Q. Q. Xiong, J. P. Tu, S. J. Shi, X. Y. Liu, X. L. Wang, and C. D. Gu, *J. Power Sources,* 2014, **256,** 153.

3 Z. L. Zhang, Y. H. Wang, M. J. Zhang, Q. Q. Tan, X. Lv, Z. Y. Zhong, and F. B. Su, *J. Mater. Chem. A.,* 2013, **1,** 7444.

4 A. K. Rai, J. Gim, T. V. Thi, D. Ahn, S. J. Cho, and J. Kim, *J. Phys. Chem. C.,* 2014, **118,** 11234.

5 M. Zhang, X. Yang, X. F. Kan, X. Wang, L. Ma, and M. Q. Jia, *Electrochim. Acta,* 2013, **112,** 727.

6 S. Y. Liu, J. Xie, C. C. Fang, G. S. Cao, T. J. Zhu, and X. B. Zhao, *J. Mater. Chem.,* 2012, **22,** 19738.