Supporting Information

Ultrathin Fe_2O_3 Nanoflakes Prepared via Smart Chemical Stripping for High Performance Lithium Storage

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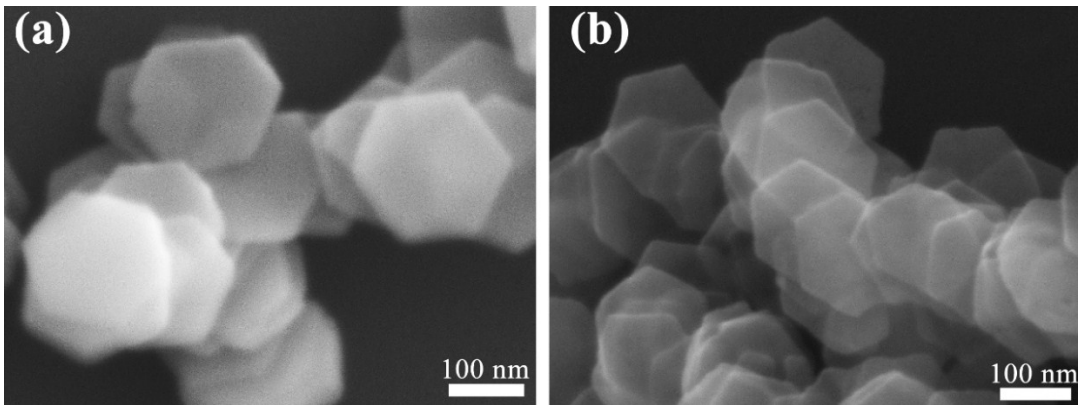

Figure S1 The SEM images of TNP-Fe_2O_3 (a) and UNF-Fe_2O_3 nanoplates with low (b) magnification.

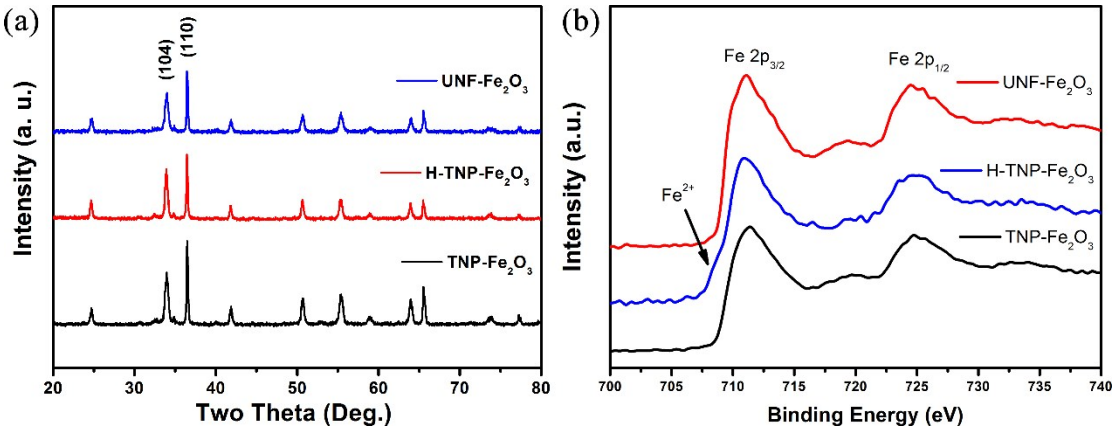

Figure S2 XRD patterns (a) and XPS spectra (b) of TNP-Fe_2O_3 sample, H-TNP-Fe_2O_3 sample and UNF-Fe_2O_3 samples. The stronger (110) peak illustrates that the nanoparticles is exposed by (001) facets.

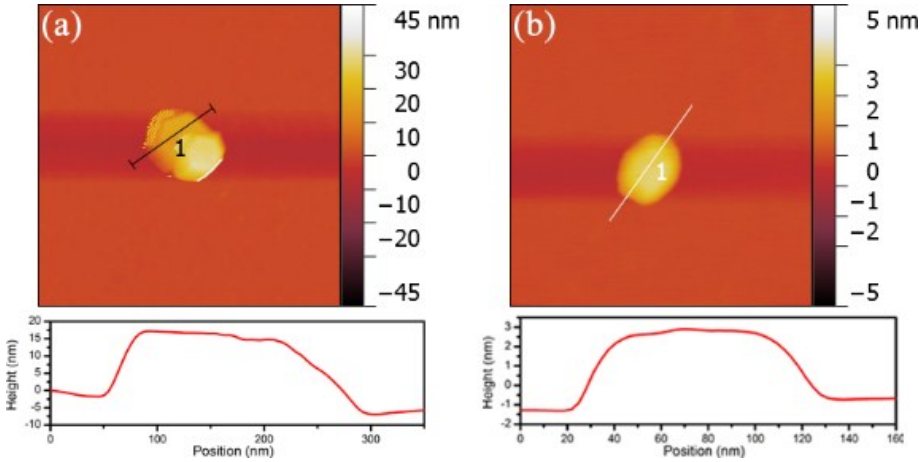

Figure S3 Tapping mode AFM of TNP-Fe_2O_3 (a) and UNF-Fe_2O_3 (b) on mica with the height cross-sectional profiles. The thickness of TNP-Fe_2O_3 is approx. 15.8 nm and the thickness of UNF-Fe_2O_3 is approx. 4.2 nm.

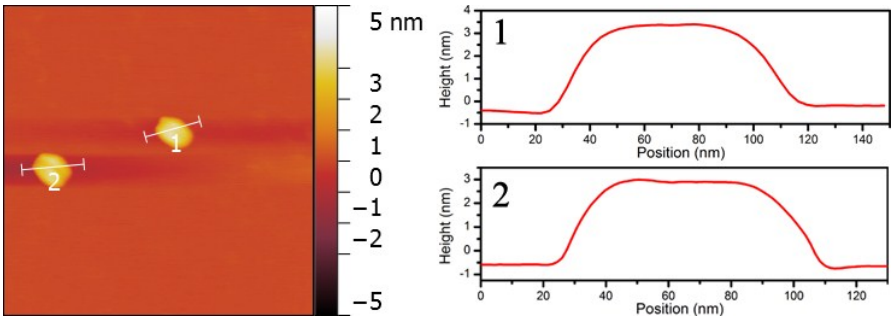

Figure S4 Tapping mode AFM of UNF-Fe_2O_3 on mica with the height cross-sectional profiles. The thickness of No.1 and No.2 UNF-Fe_2O_3 are approx. 4.1 nm and 3.5 nm, respectively.

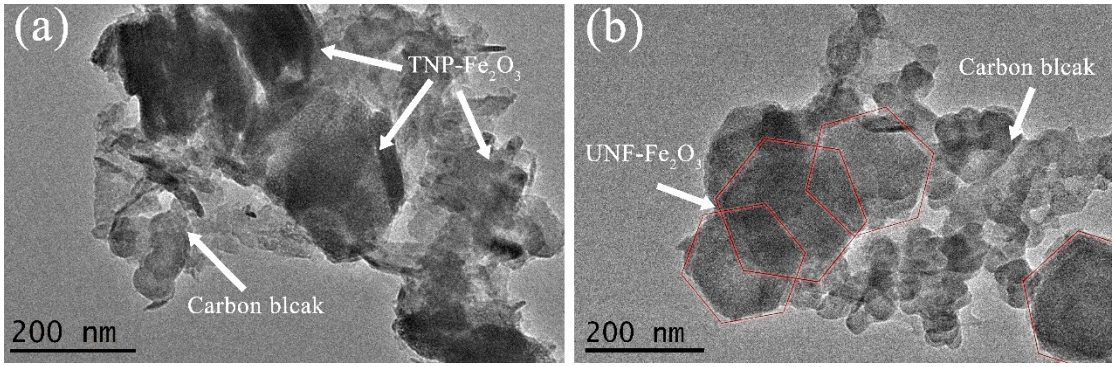

Figure S5 The TEM images of TNP-Fe_2O_3 (a) and UNF-Fe_2O_3 (b) after 100 cycles at 5 A g^{-1}.

Table S1 Comparison of the performance of the UNF-Fe_2O_3 in this work with some reported 2D-Fe_2O_3 anodes.

2D- Fe_2O_3 nanostrucuture	Thicknes s (nm)	Specific Capacity (mAh g^{-1})			Cycling performance (mAh g^{-1})	Ref.
		0.1 C	1 C	5 C		
UNF-Fe_2O_3	~3-4	1251.2	734.1	599.9	100 cycles 1100@ 0.1 C 500 cycles, 472.5@ 5 C	this work
nanoflakes	~20	800			80 cycles, 680@ 0.1 C	[1]
nanoflakes	20-30	1030			20 cycles, 600@ 0.1 C	[2]
micro-flowers constructed by nanoplates	~20	1250			10 cycles, 929@ 0.1 C	[3]
nanowall arrays	~20	1230	570	440	50 cycles, 518@ 0.1 C	[4]
microboxes constructed by nanoplates	~10	945			30 cycles, ~960@ 0.2 C	[5]
nanoplates	10	1320			100 cycles, 762.5 @ 0.1 C	[6]
nanodiscs	27	650	450		150 cycles, 530 @ 0.1 C	[7]
porous nanodiscs	5-20	~1000	512	~0	50 cycles, 89 @ 0.1 C	[8]
mesoporous flakes	~10	910	610		120 cycles, 1080 @ 0.1 C	[9]
interconnected nanosheet arrays	~25	952.5	750.2	575.2	100 cycles, 900.9 @ 0.5 C	[10]

Reference

[1] M. V. Reddy, T. Yu, C. H. Sow, Z. X. Shen, C. T. Lim, G. V. Subba Rao, B. V. R. Chowdari, *Adv. Funct. Mater.* **2007**, *17*, 2792.

[2] L. Chun, X. Wu, X. Lou, Y. Zhang, *Electrochim. Acta* **2010**, *55*, 3089.

[3] Y. Han, Y. Wang, L. Li, Y. Wang, L. Jiao, H. Yuan, S. Liu, *Electrochim. Acta* **2011**, *56*, 3175.

[4] D. Lei, M. Zhang, B. Qu, L. Chen, Y. Wang, E. Zhang, Z. Xu, Q. Li, T. Wang, *Nanoscale* **2012**, *4*, 3422.

[5] L. Zhang, H. B. Wu, S. Madhavi, H. H. Hng, X. W. Lou, *J. Am. Chem. Soc.* **2012**, *134*, 17388.

[6] F. Lu, Q. Wu, X. Yang, L. Chen, J. Cai, C. Liang, M. Wu, P. Shen, *Phys. Chem. Chem. Phys.* **2013**, *15*, 9768.

[7] J. Lu, Q. Peng, Z. Wang, C. Nan, L. Li, Y. Li, *J. Mater. Chem. A* **2013**, *1*, 5232.

[8] J. Qu, Y.-X. Yin, Y.-Q. Wang, Y. Yan, Y.-G. Guo, W.-G. Song, *ACS Appl. Mater. Interfaces* **2013**, *5*, 3932.

[9] J. Wang, M. Gao, H. Pan, Y. Liu, Z. Zhang, J. Li, Q. Su, G. Du, M. Zhu, L. Ouyang, C. Shang, Z. Guo, *J. Mater. Chem. A* **2015**, *3*, 14178.

[10] D. Cai, D. Li, L.-X. Ding, S. Wang, H. Wang, *Electrochim. Acta* **2016**, *192*, 407.