Polydopamine-derived Porous Nanofibers as Host of ZnFe$_2$O$_4$ Nanoneedles: Towards High-performance Anodes for Lithium-Ion Batteries

Junhua Kong, Xiayin Yao, Yuefan Wei, Chenyang Zhao, Jia Ming Ang, Xuehong Lu

* School of Materials Science and Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798

b School of Mechanical and Aerospace Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798

* E-mail: asxhlu@ntu.edu.sg

**Fig. S1.** TGA curves of pure PS porous nanofibers (PNFs) and PDA-coated PS PNFs from 2-time coating. The TGA test conditions are the same as that for annealing of PDA-coated PS PNFs: heating from room temperature in N$_2$ environment at heating rate of 5 °C/min to 700 °C and keeping at 700 °C for 60 min. It is indicated that the PS PNFs fully decompose while there is about 8.4 wt% residue from PDA-coated PS PNFs, which is due to the conversion of PDA to carbon that doped with N and O.
Fig. S2. TGA curve of the introduction of ZnFe$_2$O$_4$ nanoneedles into PNFs-2 (ZnFe-PNFs-2), showing the low ZnFe$_2$O$_4$ content of 6.4 wt%.

Fig. S3. The morphology of the Zn complexes/Fe(OH)$_3$ nanoneedles on the C-PDA porous nanofibers before annealing.
**Fig. S4.** Galvanostatic discharge/charge profiles (1\textsuperscript{st}, 2\textsuperscript{nd} and 3\textsuperscript{rd} cycle) of the C-PDA porous nanofibers (PNFs-6) as a LIB anode, indicating the metallic lithium plating mechanism for the lithiation/de-lithiation.