Electronic Supplementary Material (ESI) for Dalton Transactions.

A high-performance dual-function material: self-assembled super long α-Fe_2O_3 hollow tubes with multiple heteroatoms (C-, N- and S-) doping

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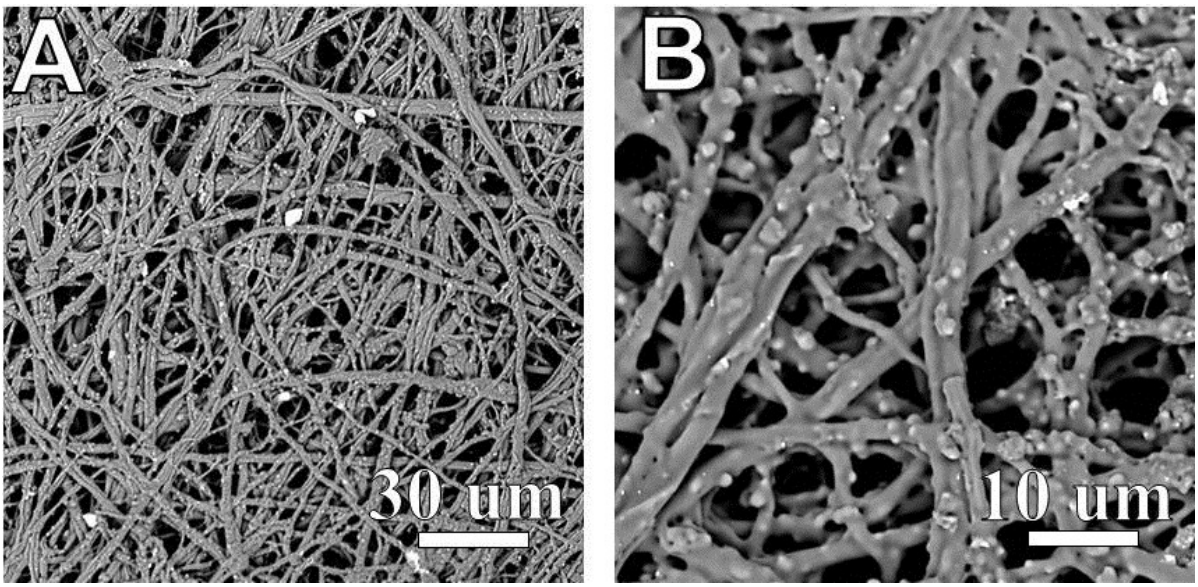

Fig. S1 (A, B) SEM images of the surface morphology and structure of CEM at different angles and magnifications.

Fig. S1 shows the SEM images of original CEM at different angles and magnifications. Fig. S1A shows the CEM is a network consisted of thick fibers. These fibers are observed at a larger magnification, and the diameters of fibers range from 1 to 4 um (Fig. S1B).

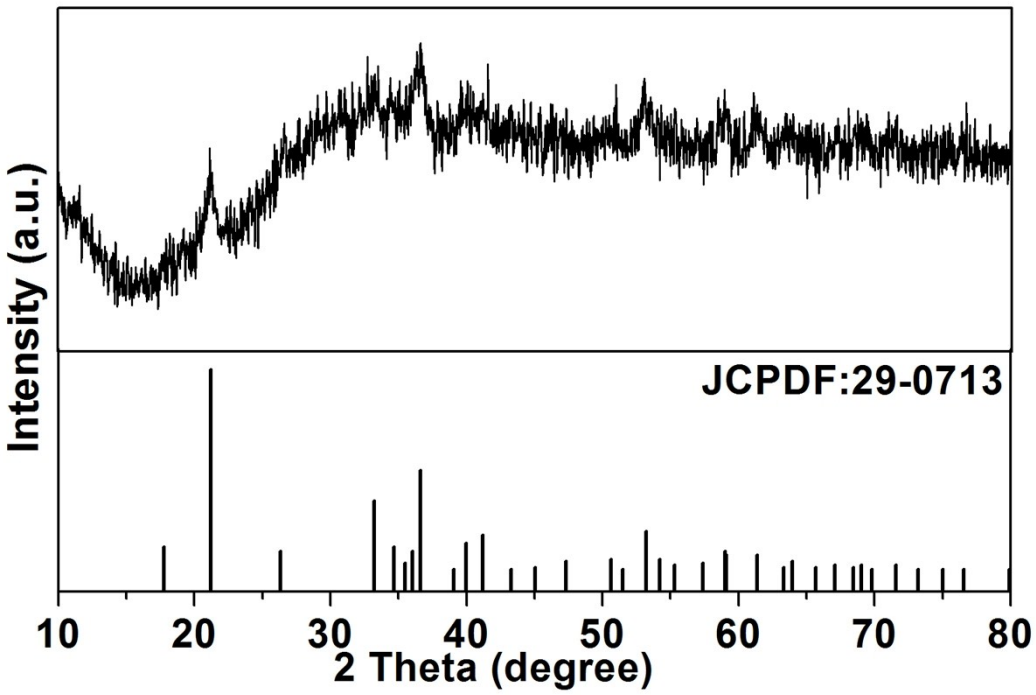

Fig. S2 X-ray diffraction pattern of ESM/FeOOH.

Table S1 Pore characteristics of FN-3, FN-4 and FN-5.

Samples	S_{BET} [m^2 g^{-1}]	$S_{langmuir}$ [m^2 g^{-1}]	V_{pore} [cm^3 g^{-1}]	D_{aver} [nm]
FN-3	70	99	0.15	8.7
FN-4	41	56	0.18	18.2
FN-5	27	38	0.11	17.5

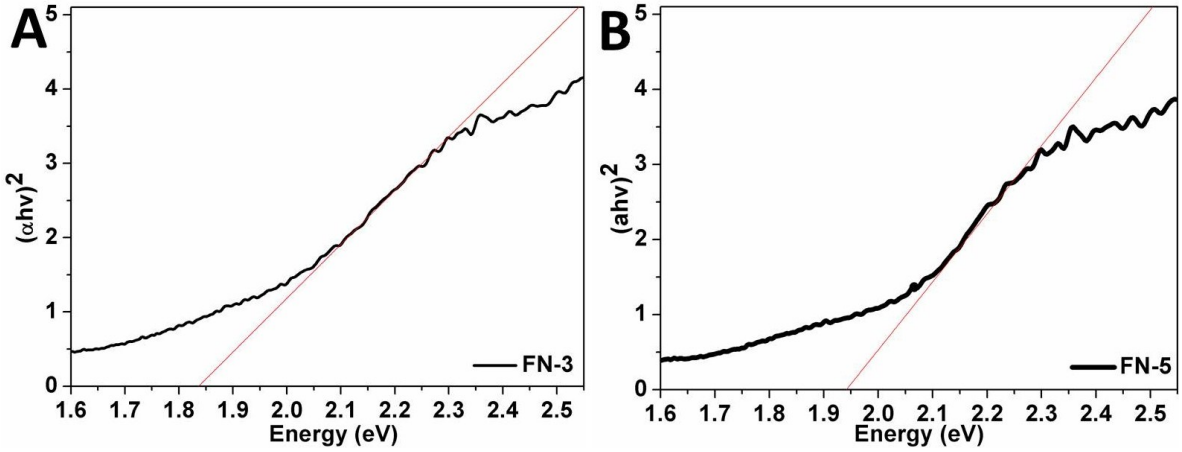

Fig. S3 $(\alpha hv)^2$ versus energy plot for the calculation of the band gap of FN-3 (A) and FN-5 (B).

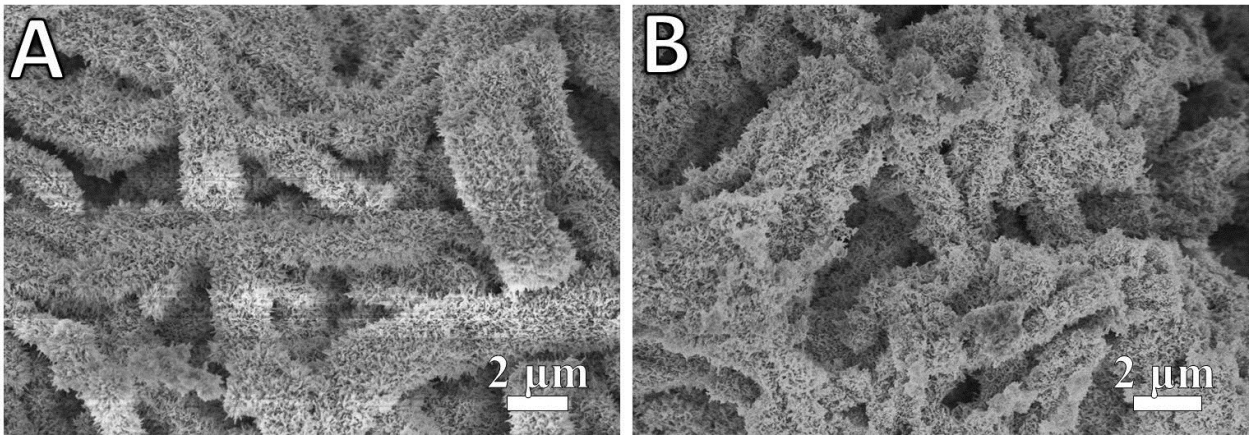

Fig. S4 FESEM images of FN-3 (A) and FN-5 (B).

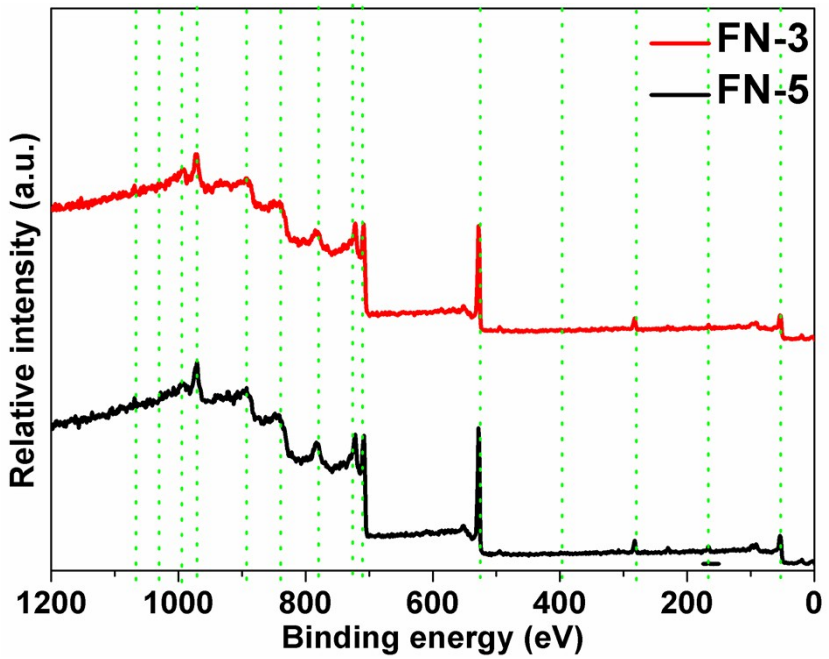

Fig. S5 The XPS pattern of FN-3 and FN-5.

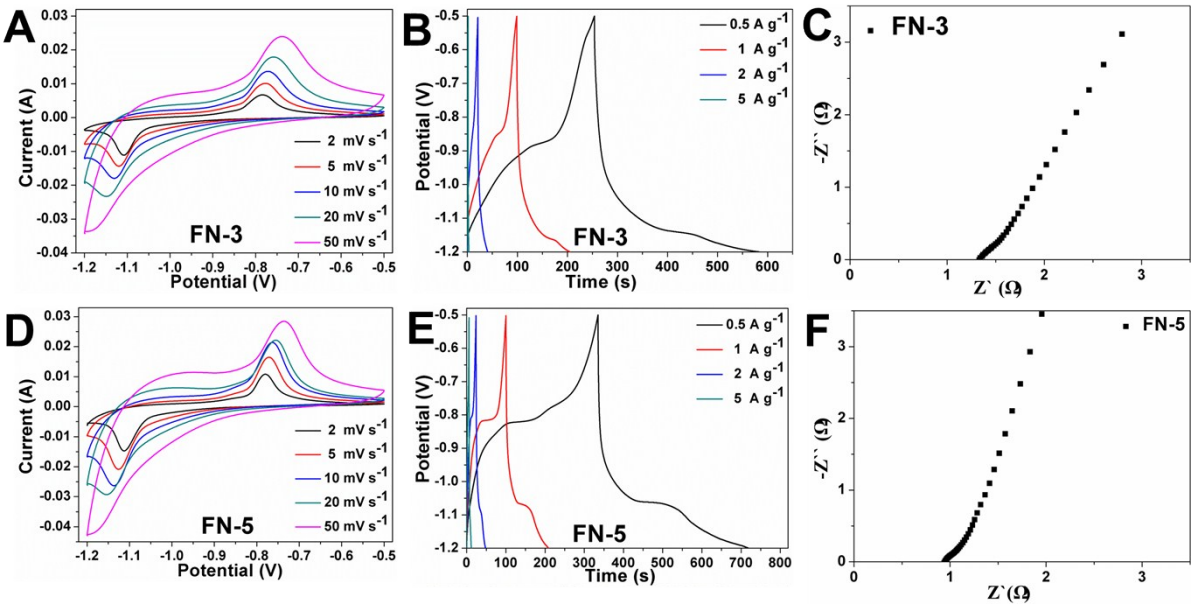

Fig. S6 Electrochemical performances of FN-3 and FN-5 based electrode measured in three-electrode system in 6 M KOH electrolyte. (A and D) CV curves at different scan rates. (B and E) GCD curves at different current densities. (C and F) Nyquist plots in the frequency range from 10^{-1} to 10^{6} Hz.