Supporting information

Hydrothermal route to crystallization of FeOOH nanorods via FeCl₃·6H₂O:
effect of Fe³⁺ concentration on pseudocapacitance of iron-based materials

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Experimental method

Synthesis and characterization: FeOOH samples were synthesized by hydrolysis of
FeCl₃·6H₂O with hydrothermal method. Firstly, different concentrations of
FeCl₃·6H₂O solutions with the range from 0.1 to 1.0 M were prepared. Then, the
solutions were transferred into Teflon vessel and carried out by hydrothermal
treatment at 100 °C for 9 hours. Afterwards, the samples prepared were washed by
deionized water, filtered and dried. As-obtained samples were washed, filtered and
dried. Field-emission scanning electron microscopy (FESEM, Hitachi-S4800) was
carried out to investigate the morphology of samples. The composition of as-obtained
samples were examined using a powder X-ray diffraction (XRD) with CuKa radiation
(λ = 0.15418 nm) on a Bruker D8 Focus.

Electrochemical performance test: As-prepared samples, acetylene black and
polyvinylidene fluoride (PVDF) with weight ratio of 70:20:10 were mixed and
grounded. Then, the above mixture was pressed on porous nickel foil in order to form
working electrode. Three electrode set was used to carry out electrochemical tests.
The Pt wire was used as a counter electrode and the saturated calomel electrode (SCE)
was used as a reference electrode. In order to study supercapacitive performance,
 cyclic voltammetry (CV) and galvanostatic charge-discharge measurements were
carried out by an electrochemical workstation (CHI 660D). All of the electrodes were
tested in 2 M KOH aqueous electrolyte.
Fig S1 Optical color of as-obtained products synthesized by using FeCl₃·6H₂O procure with different concentration from 0.1 (a), 0.2 (b), 0.3 (c), 0.4 (d), 0.5 (e), 0.6 (f), 0.7 (g), 0.8 (h), 0.9 (i) to 1.0 M (j).

Fig S2 XRD pattern of as-synthesized β-FeOOH prepared in 0.1, 0.4 and 0.8M FeCl₃ solution.
Fig S3 SEM image of the as-prepared FeOOH rods using FeCl₃·6H₂O solution with different concentration from 0.1 (a), 0.2 (b), 0.3 (c), 0.4 (d), 0.5 (e), 0.6 (f), 0.7 (g), 0.8 (h), 0.9 (i) to 1.0 M (j).
Fig. S4 Cycling performance of FeOOH electrodes synthesized in 0.2M FeCl$_3$·6H$_2$O solution at different current densities 0.5 and 5 A/g.