

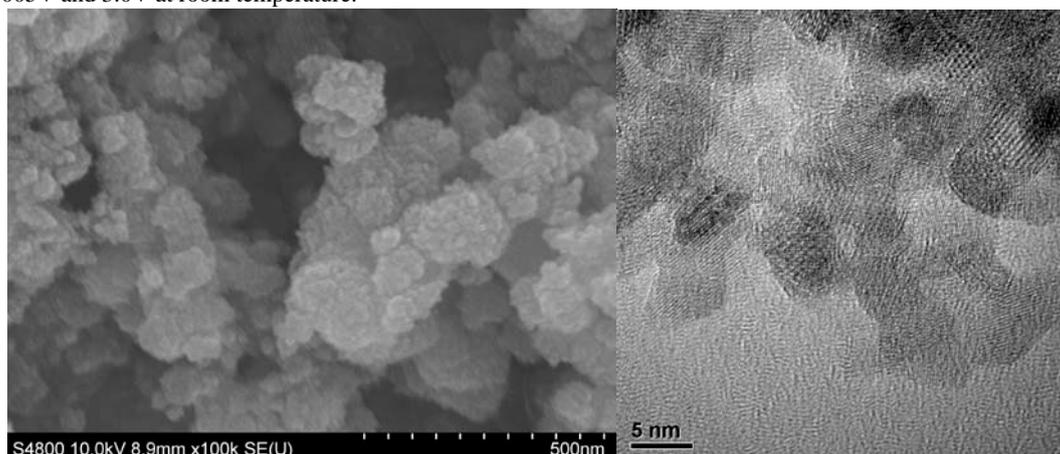
Experimental

Synthesis of porous α -Fe₂O₃ xerogel

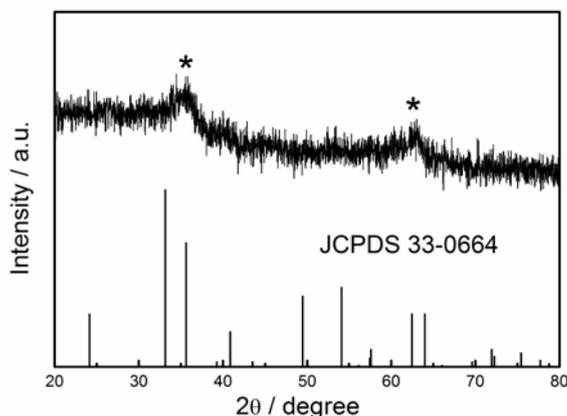
Porous α -Fe₂O₃ xerogel was synthesized by a one-step hydrothermal method. In a typical procedure, 0.75mmol of iron citrate was dissolved into 150ml distilled water to form a transparent solution. Then, the obtained solution was transferred and sealed into a 200 mL Teflon-lined autoclave, heated at 170°C for 12h, and then cooled to room temperature naturally. The as-prepared precipitate was filtered, washed, and dried in vacuum at 60°C for 12h. X-ray diffraction (XRD, Philips X'pert Pro Super X-ray diffractometer, Cu K α radiation) and X-ray photoelectron spectroscopy (XPS) were used to identify the product. Textural properties of the sample were obtained by nitrogen adsorption-desorption isotherms. Nitrogen adsorption-desorption isotherms were measured at 77 K with a TriStar 3000. The crystal structure and surface morphologies were characterized by high resolution transmission electron microscopy (HRTEM, F30) and scanning electron microscopy (SEM, HITACHI S-4800).

Measurement of electrochemical properties.

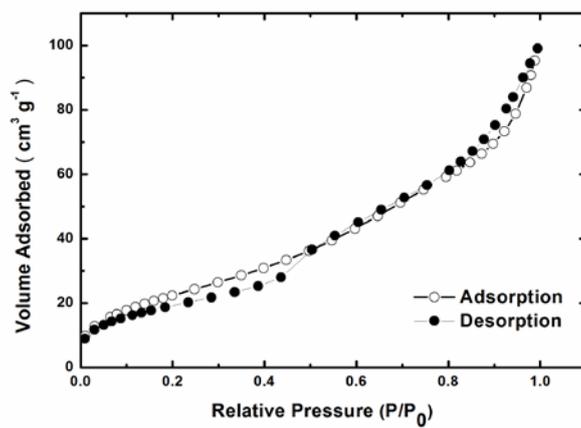
To fabricate the anodes, 70wt% of the as-prepared Fe₂O₃ was mixed with 20wt% acetylene black, 10wt% water soluble polymer n-lauryl acrylate (LA, Chengdu, China) and distilled water which was served as dispersant. The mixture was ball milling for 4h, and the obtained slurry was casted on Cu foil by doctor blade method to form electrode film. Then the film was dried in vacuum at 60°C over 12 h. The testing cells, CR2016-type coin cells, used lithium slice as the counter electrode, Cellgard 2400 microporous membrane as separator and 1 M LiPF₆/ethylene carbonate (EC) + dimethyl carbonate (DMC) + ethyl methyl carbonate (EMC) (1:1:1 by volume) as electrolyte, were assembled in an Argon-filled glove box. Charge and discharge performances of the batteries were investigated with a Neware BT5-5V5mA Tester (Neware Co., Ltd, Shenzhen, China) within voltage range of 0.005V and 3.0V at room temperature.



S1: (left) SEM image and (right) HRTEM image of α -Fe₂O₃ xerogel.



S2: XRD of α -Fe₂O₃ xerogel.



S3: N₂ adsorption-desorption isotherm of α-Fe₂O₃ xerogel.