Supporting Information

Morphological and structural evolution from akaganeite to hematite of nanorods monitored by ex-situ synchrotron X-ray powder diffraction

Allan M. Xavier, Fabio F. Ferreira and Flavio L. Souza*

Centro de Ciências Naturais e Humanas (CCNH), Universidade Federal do ABC (UFABC), Av. dos Estados, 5001, 09210-580, Santo André, SP, Brazil

Corresponding authors: *fleandro.ufabc@gmail.com and flavio.souza@ufabc.edu.br

Phone: +55 11 49968353

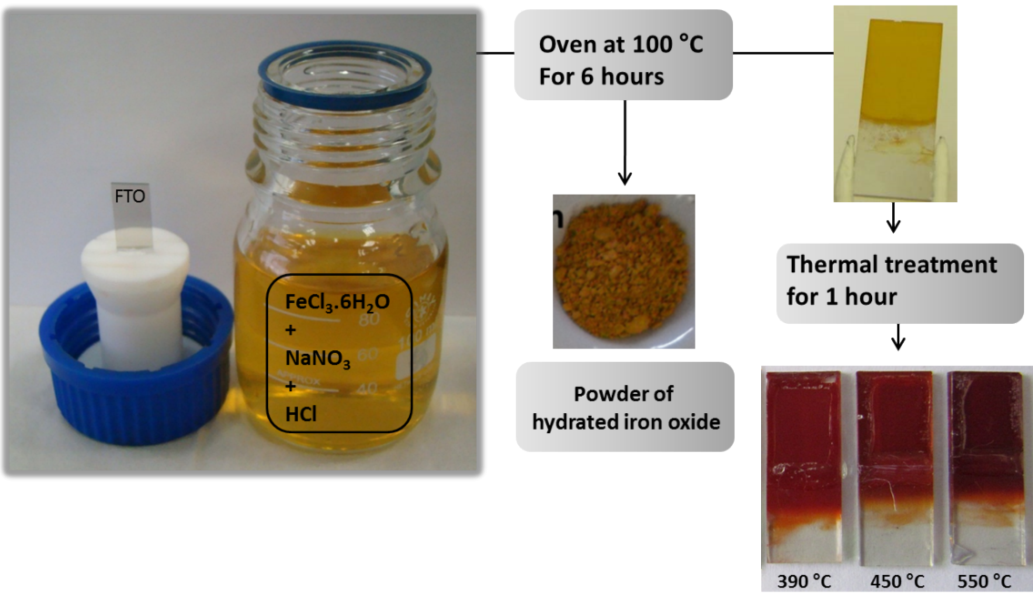

Figure S1. Scheme of synthetic route for simultaneous preparation of nanorods iron oxide films and powder in hydrated phase. For the preparation of films a glass substrate modified with fluorine doped tin oxide layer (FTO) was immersed on an aqueous solution and subjected to a conventional oven at 100 ºC for 6 hours (yellow color). Subsequently, films and powder were transferred to a conventional oven for additional thermal treatment at different temperatures (films become red, which is the typical color of the hematite phase).

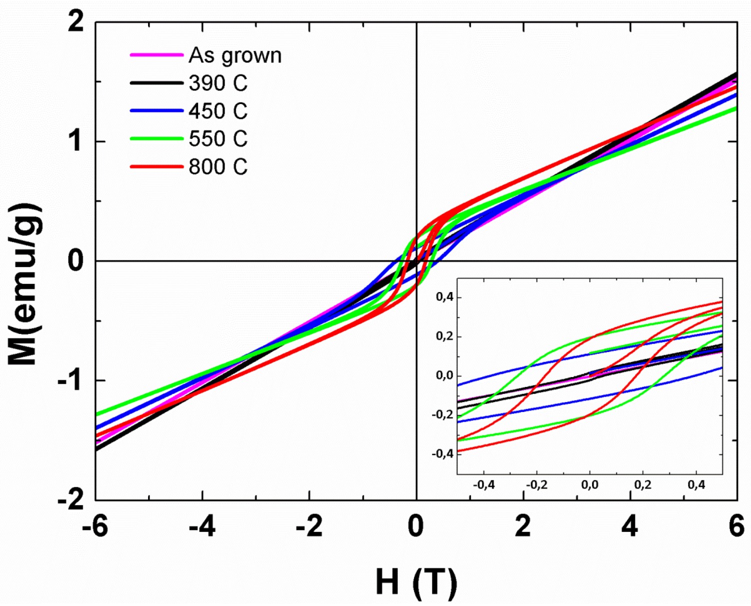

Figure S2. *M-H* plots at 300 K, Magnetic behavior of as-prepared and thermal treated samples heat treated at different temperatures. A Zommed of M-H plot of all samples illustrates hysteresis with increasing the temperature of thermal treatment.

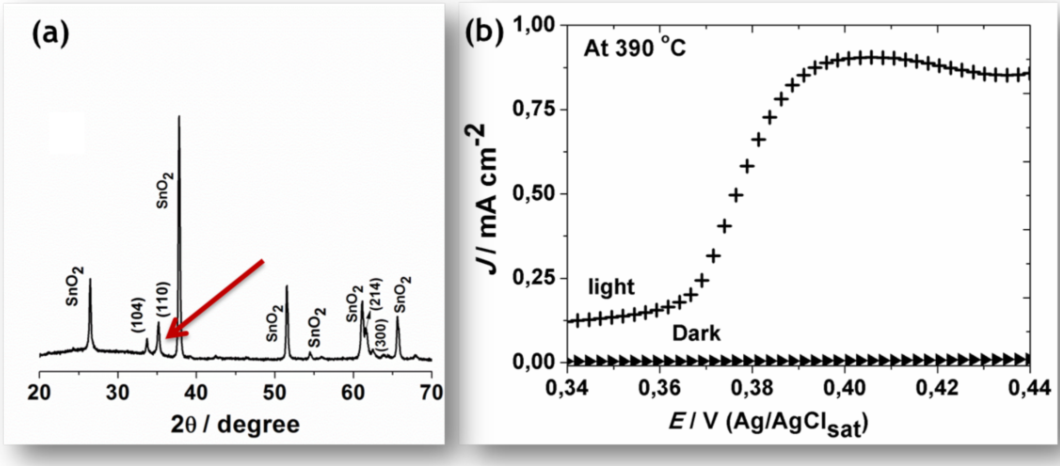

Figure S3. (a) X-ray diffractogram of the nanorod iron oxide film (prepared following the Scheme of Figure S1) heat treated at 390 °C; (b) Current density *versus* Potential measured for a film using a conventional electrochemical cell with three electrodes under dark and illuminated conditions using a sunlight simulator coupled to the AM 1.5 global filters. Film was measured in an aqueous electrolyte environment adjusted at pH 13.6 by addition of 1M of NaOH.

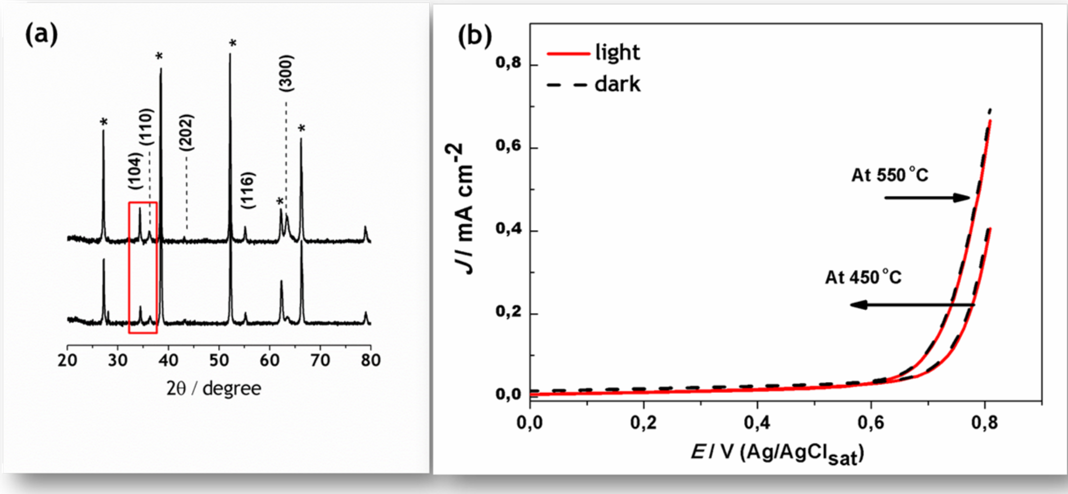

Figure S4. (a) X-ray diffractogram of the nanorod iron oxide film (prepared following the Scheme of Figure S1) heat treated at 450 and 550 ºC, respectively. Current density *versus* Potential measured for films using a conventional electrochemical cell with three electrodes under dark (dashed black line) and illuminated (solid red line) conditions using a sunlight simulator coupled to the AM 1.5 global filters. Films were measured in an aqueous electrolyte environment adjusted at pH 13.6 by addition of 1M of NaOH.