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Magnetic/Catalytic Properties and Strain Induced Structural Phase Transformation from β-FeOOH to Porous α-Fe_2O_3 Nanorods

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ABSTRACT

Revealing detailed catalytic and magnetic properties and the corresponding structural changes of Fe oxide materials are extremely important for their diverse applications. For this, magnetic properties of thermally phase transformed β-FeOOH nanorods (NRs) (to porous α-Fe_2O_3) were examined in the temperature up to 550 °C. The thermal treatment enhances the lattice strain (ε) that facilitates in creating pore structures. Fundamental physicochemical properties were examined by X-ray diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM), diffuse reflectance UV–visible absorption spectroscopy, and X-ray photoelectron spectroscopy (XPS). An average size of pores and pore-size distribution were characterized by Brunauer-Emmett-Teller (BET) surface area analysis. Temperature and field dependent magnetic properties of calcination samples were