

Supporting Information

Supercritical Fluid Synthesis of Magnetic Hexagonal Nanoplatelets of Magntite

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Preparation of Fe₃O₄ Nanoplatelets

A flow through system was established by connecting the inlet and outlet valves of a CO₂ reservoir, which included a piston, to a 260-ml ISCO syringe pump (Lincoln, NE) and the reaction vessel respectively. In a typical SCF experiment, a quartz boat containing 0.5 g of ferrocene was placed in the centre of a high pressure stainless steel reactor (Inconel 625 GR2-Snap-tite, Inc.). The reactor was then charged with sc-CO₂ (T_c = 31 °C, P_c = 7.38 MPa) at 40 °C and 10.34 MPa, and heated to a temperature between 650-750 °C under sc-CO₂, with an outlet flow rate of 200 ml min⁻¹ for 2 h.

Characterization of Synthesized Materials

Transmission electron microscopy (TEM) was conducted on a JEOL 2010 operating at 200 kV. The TEM sample was prepared by placing drops of nanoparticle solution onto a carbon coated copper TEM grid. XRD measurements were performed on a Philips Xpert X-ray diffractometer using Cu K_α radiation (1.5414 Å). XPS measurements were performed using a high performance AXIS 165 X-ray photoelectron spectrometer. The magnetic measurements were carried out on a Quantum Design, MPMS XL5, SQUID (Superconducting quantum interference device) magnetometer.

Figures

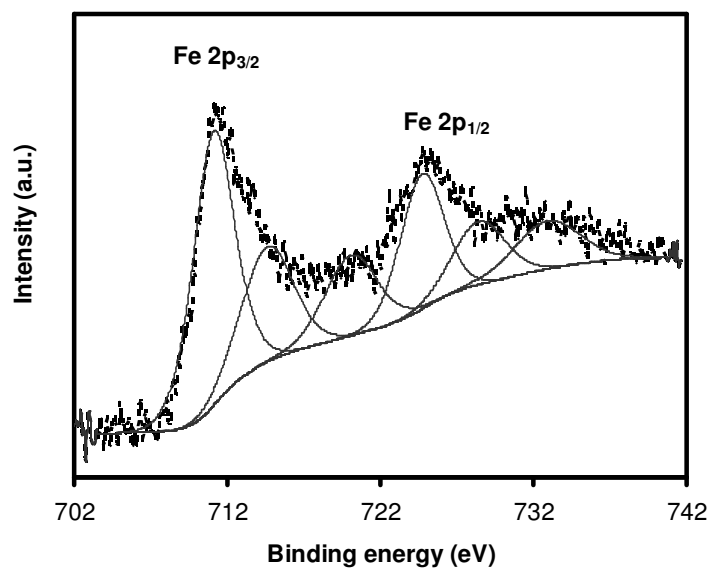


Figure S1. XPS spectrum of iron oxide (Fe_3O_4) nanoplatelets prepared at 750 °C and 10.34 MPa.

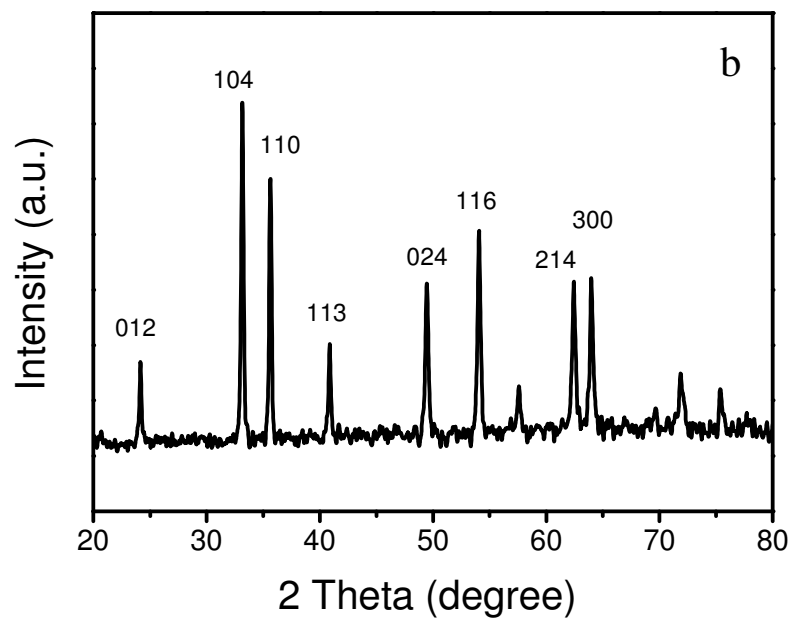
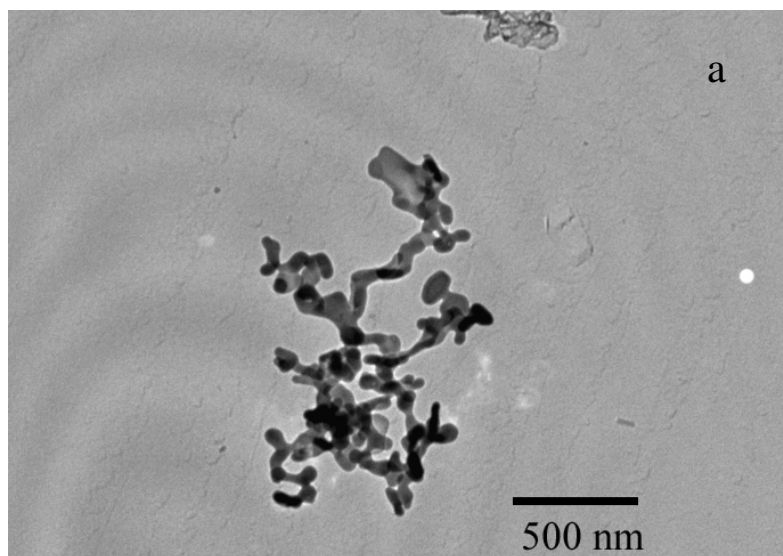


Figure S2. (a) TEM image and (b) XRD pattern (JCPDS, 01-1053) of α -Fe₂O₃ prepared by sintered γ -Fe₂O₃ at 450 °C for 3 h in air.

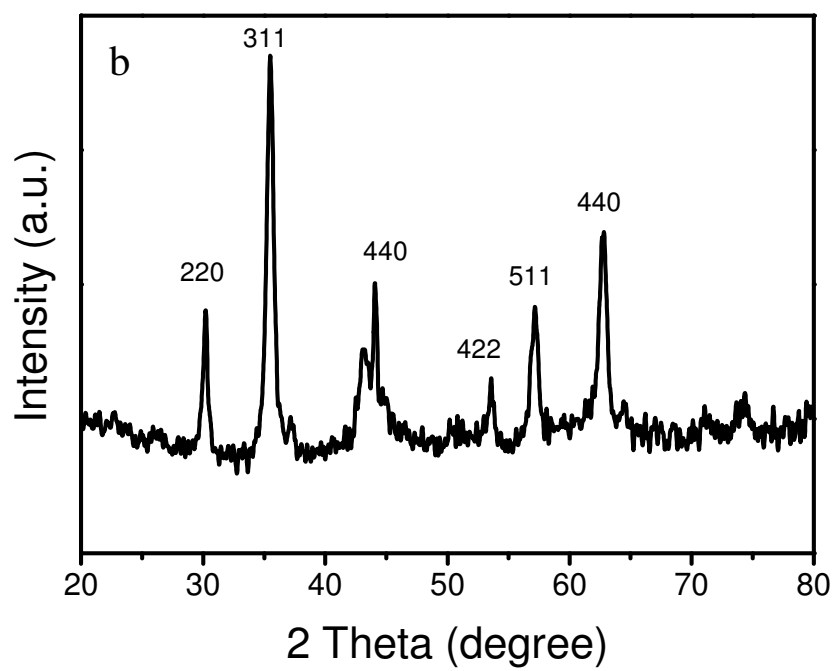
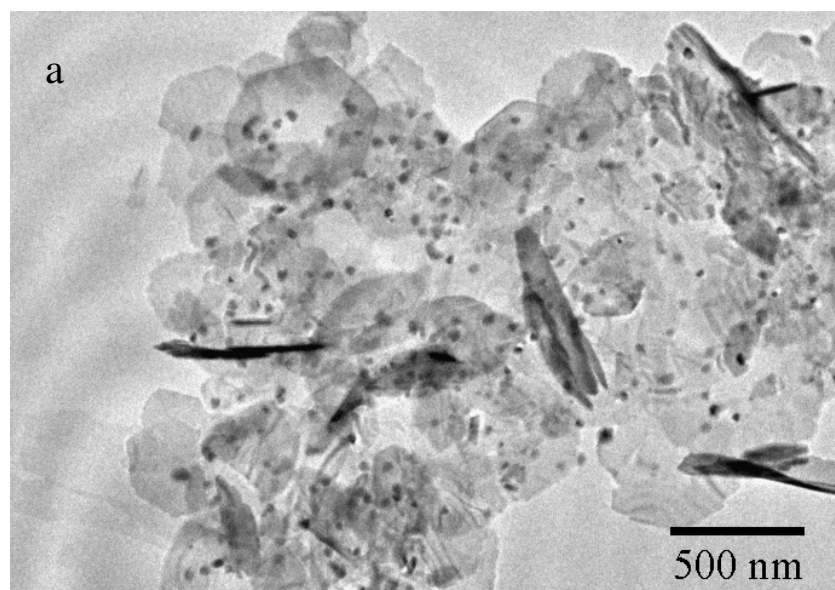


Figure S3. (a) TEM image and (b) XRD pattern of iron oxide (Fe_3O_4) prepared at 650 °C and 10.34 MPa.

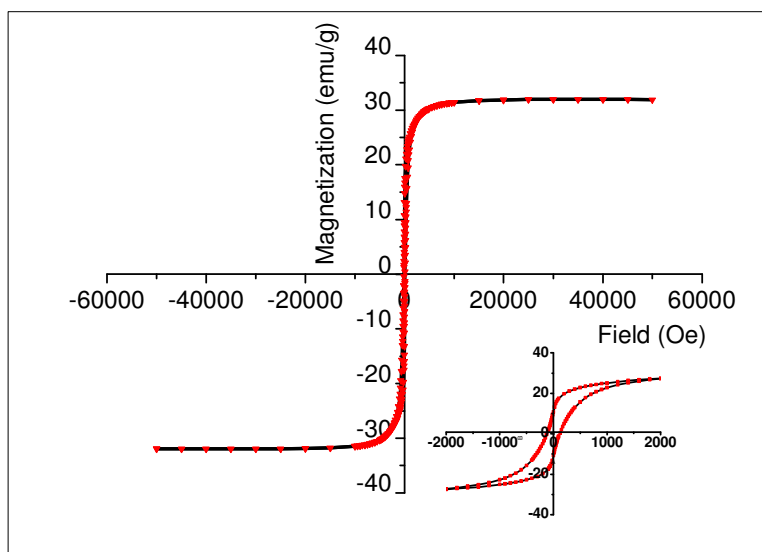


Figure S4. Magnetic hysteresis curve of iron oxide (Fe_3O_4) nanoplatelets prepared at 650 °C and 10.34 MPa (inset showing the hysteresis loop zoomed in at the origin).