

Supporting Information

Synthesis of Iron Oxide Nanoparticles with Control over Shape Using Imidazolium-Based Ionic Liquids

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General.

Unless otherwise noted all reagent and solvents were commercially available. To characterize the shape of the nanoparticles, transmission electron microscopy (TEM, JEOL JEM-2010 located at Center for University-Wide Research Faculty in Chonbuk National University) was carried out at 200 kV. To prepare the samples for the TEM observations, small droplets were placed on carbon-coated copper TEM grids. X-ray photoelectron spectroscopy (XPS) was performed using a VG Multilab 2000 (Thermo VG Scientific, U.K.). The saturation magnetization (M_s) value was measured using a superconducting quantum interference device (SQUID) at 300 K in a magnetic field from 10 000 Oe to -10 000 Oe. To confirm the signal enhancement effect of the IONs, the IONs (1.0 mg/mL) were suspended in water and MR phantom imaging was performed using a clinical 1.5 T MR scanner (GE Signa Exite Twin-speed, GE Health Care, Milwaukee, WI).

Typical procedure for the synthesis of Fe_2O_3 @[omim][BF_4] nanobars.

The IONs were synthesized using a slight modification of the method elsewhere.¹ 1.0 mL of [omim][BF₄] and 1.0 mL were added to a vial. The mixture solution of [omim][BF₄] and DMF was maintained by stirring at 60 °C for 30 min. 0.1 mL of Fe(CO)₅ in 0.9 mL of DMF was added to the mixture solution at 60 °C. The reaction mixture was stirred at 90 °C for 1 h. The color of the reaction solution changed from bright-orange to dark-black. A magnet was applied to the reaction mixture solution to collect the nanoparticles. The supernatant was discarded with fresh ethanol and distilled water. The crude nanoparticles were washed with ethanol and water three times, and the isolated IONs were obtained as a dark black solid.

Characterization of Fe₂O₃@[omim][BF₄] nanobars with XPS.

X-ray photoelectron spectroscopic (XPS) analysis was performed using a VG Multilab 2000 model (Thermo VG Scientific, U. K.) to confirm atomic composition and characterize the surface of Fe₂O₃@[omim][BF₄] nanobars.

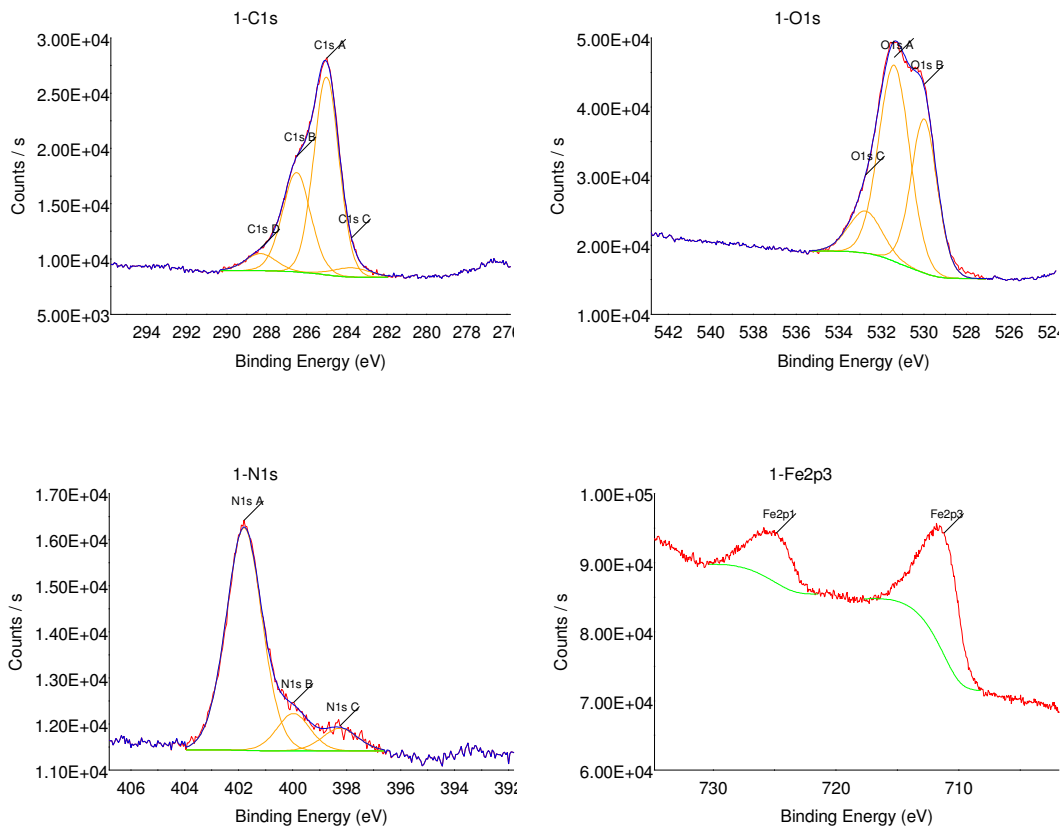


Figure S1. XPS data of Fe₂O₃@[omim][BF₄] nanobars.

Procedure for the synthesis of wirelike Fe₂O₃@[omim][BF₄] nanoparticles (Figure 4b).

1.0 mL of [omim][BF₄] and 2.0 mL were added to a vial. The mixture solution of [omim][BF₄] and DMF was maintained by stirring at 60 °C for 30 min. 0.1 mL of Fe(CO)₅ in 0.9 mL of DMF was added to the mixture solution at 60 °C. The reaction mixture was stirred at 90 °C for 1 h. The color of the reaction solution changed from bright-orange to dark-black. A magnet was applied to the reaction mixture solution to collect the nanoparticles. The supernatant was discarded with fresh ethanol and

distilled water. The crude nanoparticles were washed with ethanol and water three times, and the isolated IONs were obtained as a dark black solid.

References

- (1) Lee, C. M.; Hwan, H. J.; Kim, S. L.; Kim, E. M.; Kim, D. W.; Lim, S. T.; Jang, K. Y.; Jeong, Y. Y.; Nah, J. W.; Sohn, M. H. *Int. J. Pharm.* **2009**, *371*, 163-169.