

Fabrication of Carbon Nanotubes Decorated with Ultra Fine Superparamagnetic Nanoparticles under Continuous Flow Conditions

Suk Fun Chin,^a K. Swaminathan Iyer,^a and Colin L. Raston*^a

Supporting Information

Synthesis of Fe₃O₄ nanoparticles using SDP

In a typical synthesis, aqueous solutions of Fe^{2+/3+} precursors were prepared by dissolving FeCl₂.4H₂O (10 mM) and (20 mM) FeCl₃.6H₂O (1:2 molar ratios) in deoxygenated ultrapure Mili-Q water. The Fe^{2+/3+} precursors were reacted with deoxygenated NH₄OH aqueous solution. The SDP was a Protensive 100 series with integrated feed pumps to direct the reactants onto the rotating disc. Grooved stainless steel disc with 100 mm diameter was used which were manufactured from 316 stainless. The above solutions were delivered onto the disc surface using feed jet both at 0.5 ml/s, using continuous flow gear pumps (MicroPumps), under an atmosphere of high purity (99.9%, BOC Gasses) argon gas, within the sealed reactor chamber. Samples were collected from beneath the disc through an exit port. The samples collected were immobilized with a permanent magnet and supernatant solutions were decanted. Samples were re-dispersed in deoxygenated ultrapure Mili-Q water. This process was repeated at least three times to remove chloride salts.

^aCentre for Strategic Nano-Fabrication, School of Biomedical, Biomolecular and Chemical Sciences, The University of Western Australia, 35 Stirling Highway, Crawley, WA 6009, Australia.
E-mail: clraston@cyllene.uwa.edu.au
Fax: (618) 64881005; Tel: (618) 64881572

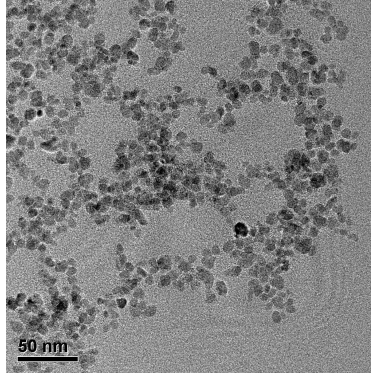


Figure S1: TEM images of Fe₃O₄ nanoparticles synthesized using SDP

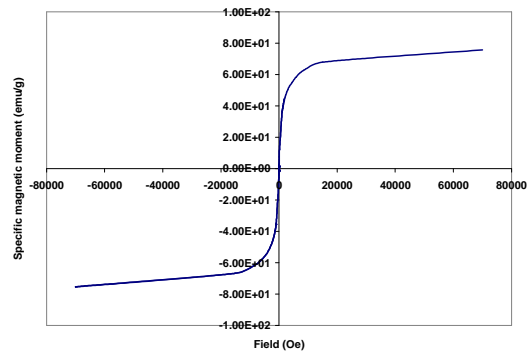


Figure S2: Magnetization curve of Fe₃O₄ nanoparticles at 300K

Figure S2, magnetization curve of Fe₃O₄ nanoparticles synthesized by SDP showed superparamagnetic behaviour at room temperature.