Electronic Supplementary Information (ESI)

Synthesis and Application of Monodisperse Hydrophobic Magnetite Nanoparticles Using Ionic Liquid as Oil Spill Collector

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Characterization of magnetite AMO

The chemical structure of the prepared AMO and magnetite nanoparticles was elucidated by using Fourier transform infrared analysis (FTIR; model Nexus 6700 FTIR) and hydrogen nuclear magnetic resonance (^{1}HNMR) spectroscopy recorded on a 400MHz Bruker Avance DRX-400 spectrometer.

The thermal stability and chain flexibility of prepared AMO and magnetite nanoparticles were measured by thermogravimetric analysis (TGA), differential thermal analysis and differential scanning calorimetry (DSC) using Shimadzu DTG-60M, and conducted under oxygen and liquid nitrogen atmosphere, respectively, at a heating rate of 10 °C per minute.

The crystal lattice structure and diffraction pattern of magnetite capped with AMO were analysed by X-ray powder diffraction (XRD; BDX-3300 diffractometer using CuKa radiation of wavelength, $\lambda = 1.5406$ °A).

Dynamic light scattering (DLS) was used to determine the particle size hydrodynamic diameter (nm) and polydispersity index (PDI) of AMO and magnetite nanoparticles dispersed in toluene solution using(Zetasizer Nano ZS Malvern) at 25 °C.

The surface morphology of magnetite capped with AMO was confirmed by high resolution transmission electron microscopy (HR-TEM; JEOL JEM-2100F) and scanning electron microscope after drying of magnetite hexane dispersed solution.

Contact angle measurements between magnetite AMO compressed disk and sea water was determined using the sessile drop technique drop shape analyser (model DSA-100). The advancing contact angle was evaluated after depositing 3-μL sea water droplet on the surface of magnetite compact disk. The receding contact angle was read out after 1-μL volume of the 3-μL sea water droplet was sucked into the syringe. The angles were taken both on the left and right sides of the 2D sea water droplet profile. The arithmetic mean value of the contact angle between sea water droplet and compressed magnetite disk liquid was calculated from about 8– 12 readings.

The magnetic parameters of the prepared magnetite AMO were investigated at room temperature using vibrating sample magnetometer (VSM; LDJ9600 in a field of 20 000 Oe).

In order to characterize the porous structure and pore-size distribution of the magnetite AMO powder, N_2 adsorption-desorption isotherms were

performed. The Brunauer-Emmett-Teller (BET) surface area of the magnetite AMO powders was analysed by nitrogen adsorption-desorption measurement using the adsorption data in the relative pressure (P/Po) range of 0.05-0.3 using a ASAP 2020 M apparatus. Nitrogen adsorption measurements were carried out at -196^{o}C using a model ASAP 2010 volumetric adsorption analyser Micromeritics (Norcross, GA). Adsorption measurements were carried out over a relative pressure range from ca. 10^{-6} to 0.995.

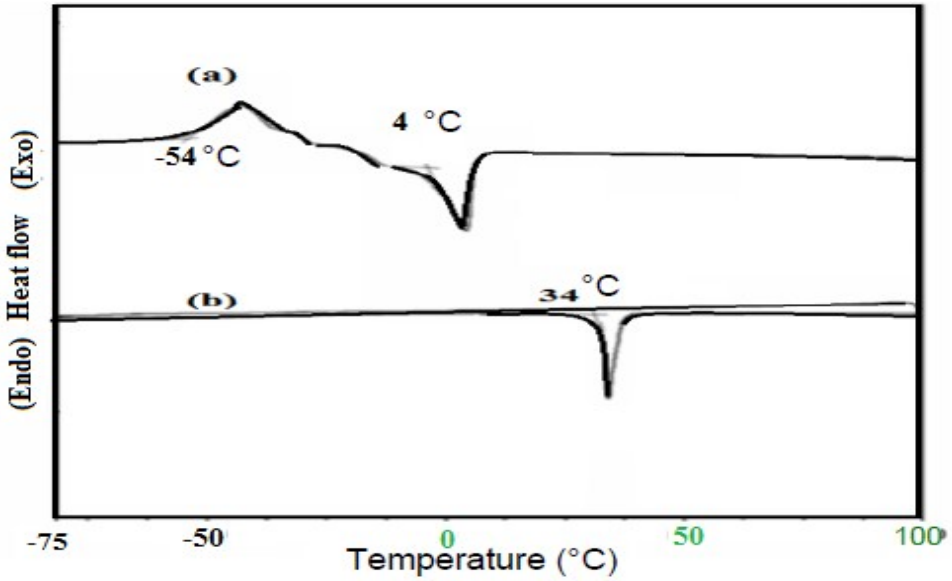

Figure S1: DSC thermograms of a) AMO and b)AMC

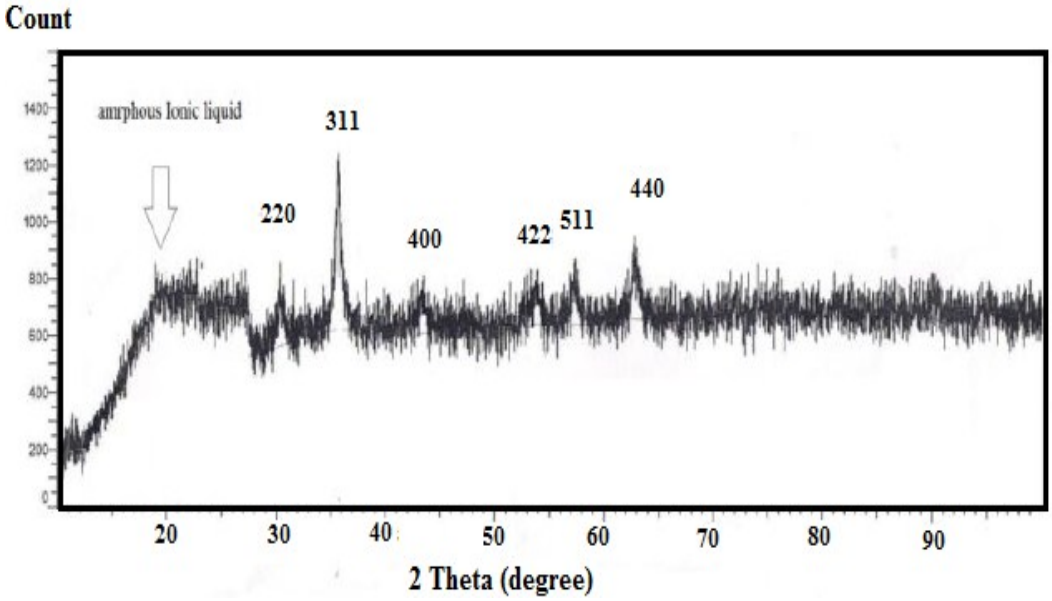

Figure S2: XRD diffraction patterns of magnetite capped with AMO.

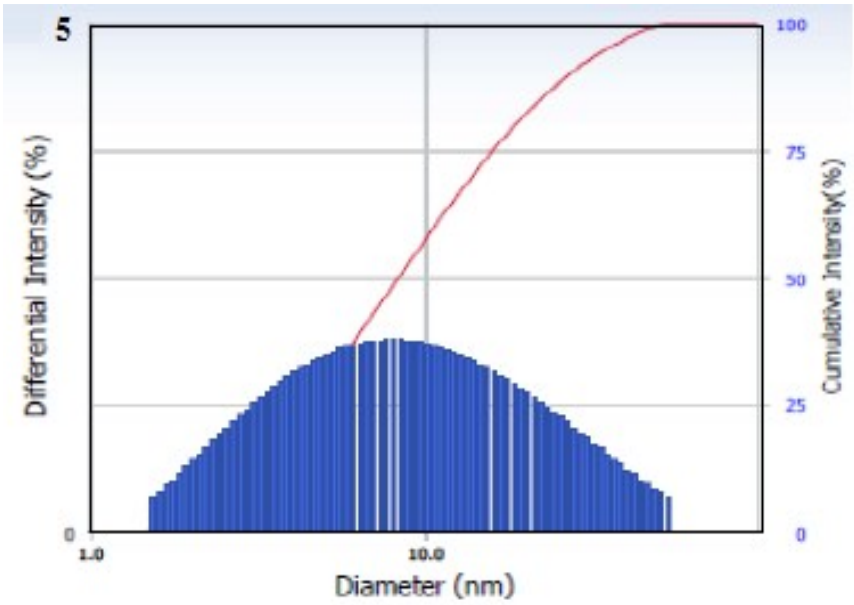

Figure S3: DLS data of magnetite capped with AMO in toluene.

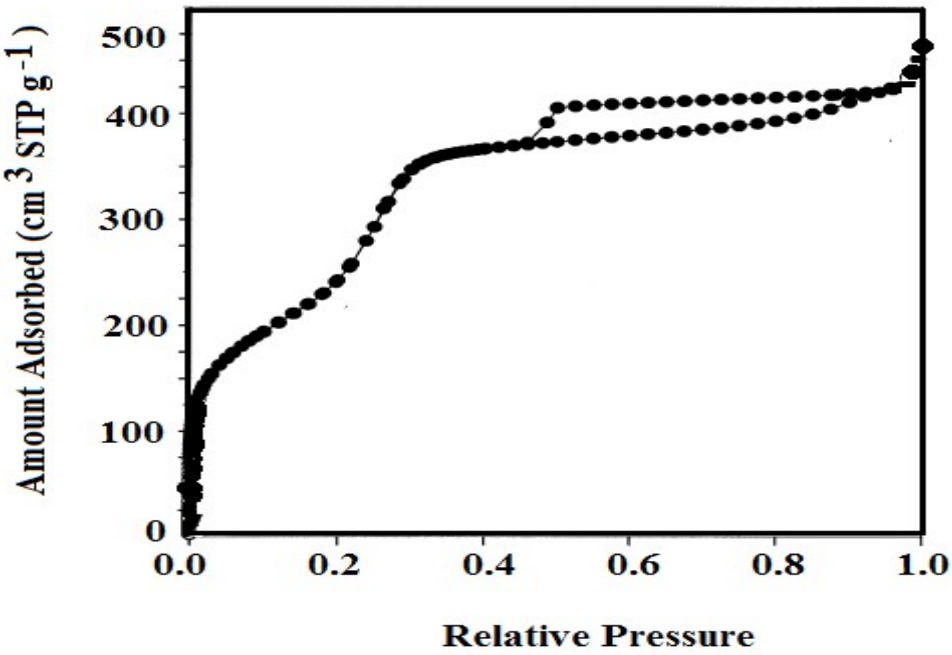

Figure S4: Nitrogen adsorption desorption of magnetite capped with AMO.