Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting information for

Preparation of Hybrid Polymer Nanocomposite Microparticles by A Nanoparticle Stabilised Dispersion Polymerisation

Jixin Yang[a], Tom Hasell[a], Wenxin Wang[a]*, Jun Li[b], Paul D. Brown[c], Martyn Poliakoff[a], Edward Lester[b] and Steven M. Howdle[a]*

[a]School of Chemistry, University of Nottingham, Nottingham, NG7 2RD, UK. Fax: +44 115 9513058; Tel: +44 115 9513486; E-mail: steve.howdle@nottingham.ac.uk, wenxin.wang@nottingham.ac.uk
[b]School of Chemical and Environmental Engineering, University of Nottingham, Nottingham, NG7 2RD, UK. Tel: +44 115 9514974
[c]School of Mechanical, Materials and Manufacturing Engineering, University of Nottingham, Nottingham NG7 2RD, UK.

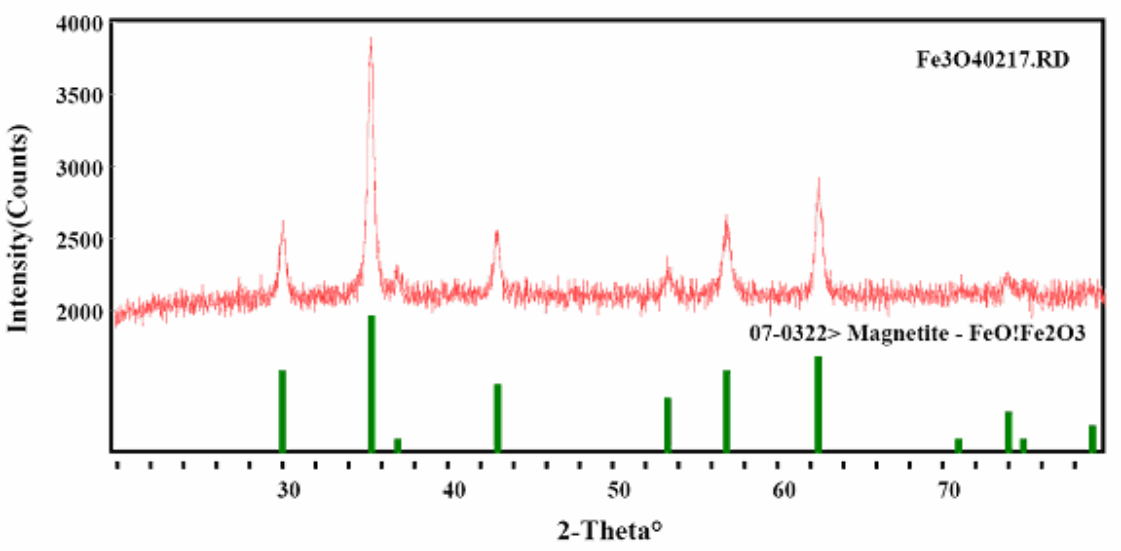

Fig. S1 X-ray diffraction (XRD) spectrum of the Fe_3O_4 nanoparticles derived from their aqueous solution which was used in this work.

A suspension containing nanoparticles was allowed to settle for 12 hours and approximately 80% of the excess water was decanted. The remaining solution was frozen by liquid nitrogen and freeze dried at a temperature of -50°C to yield powder. The powder was characterised by Phillips EXPERT 1830 diffractometer with Cu K α radiation (2θ 0.02 degree/s from 20-80°). The obtained diffraction data were compared with the Joint Committee on Powder Diffraction Standards (JCPDS) - International Centre for Diffraction Data (ICDD) [07-0322]. For the main peak, the XRD estimated size is 22 nm based on the Scherrer equation.

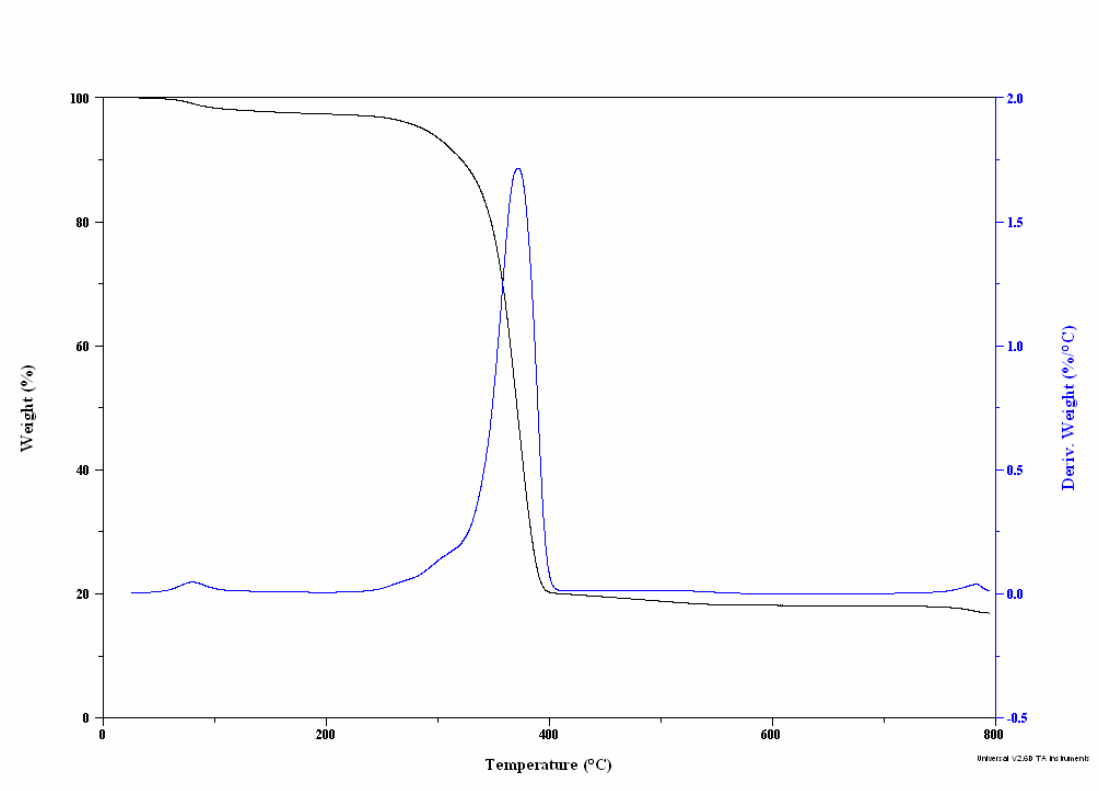

Fig. S2 TGA data of the Fe_3O_4-polystyrene nanocomposite synthesized in this work. The measurement was taken under flowing nitrogen at a heating rate of 5°C/min. The data clearly show the nanocomposite decomposes at 300-400°C and the total Fe_3O_4 uptake is ca. 20%.

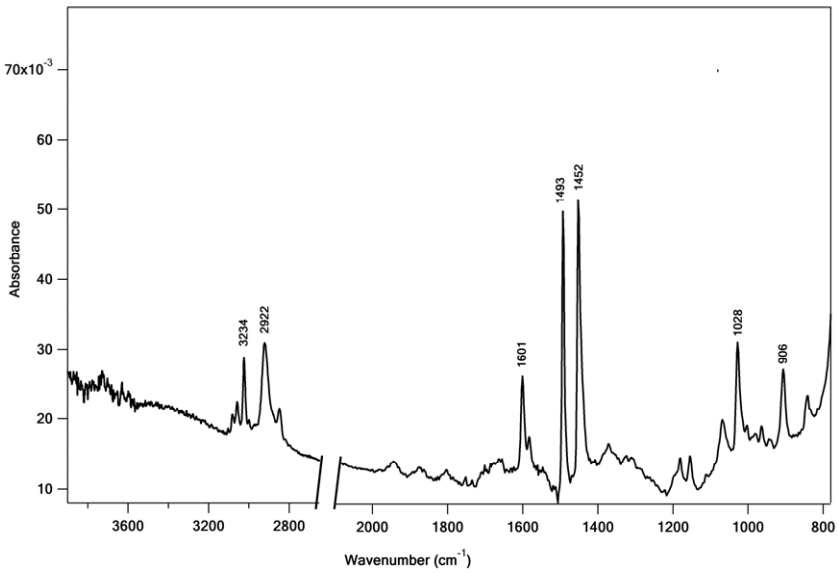

Fig. S3 ATR-FTIR spectrum of the Fe_3O_4-polystyrene nanocomposite powder synthesized in this work. The major characteristic bands are labelled on the spectrum. The existence of Fe_3O_4 nanoparticles capped on polystyrene partly impairs its infrared signal. However, the main peaks of the nanocomposite are not at all shifted from those of pure polystyrene, supporting strongly that there is no chemical interaction between Fe_3O_4 and polystyrene.