

Polymer Grafted Recyclable Magnetic Nanoparticles

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Supporting Information: Table S1

Table S1. The Microemulsion Method for Preparation of Fe₃O₄/SiO₂ Magnetic Nanoparticles

Group	Microemulsion	Surfactant (Triton X-100)	Solvent (oil) cyclohexane	Cosurfactant (<i>n</i> -hexanol)	Water	TEOS	FeCl ₃ (0.15 M)	FeSO ₄ (0.1 M)	NH ₄ OH (29 wt%)
A	ME1	5.3 mL	22.5 mL	5.4 mL	620 μL	10 μL	500 μL	500 μL	
	ME2	5.3 mL	22.5 mL	5.4 mL	810 μL	10 μL			810 μL
B	ME1	5.3 mL	22.5 mL	5.4 mL	620 μL	100 μL	500 μL	500 μL	
	ME2	5.3 mL	22.5 mL	5.4 mL	810 μL	100 μL			810 μL
C	ME1	5.3 mL	22.5 mL	5.4 mL	620 μL	50 μL	500 μL	500 μL	
	ME2	5.3 mL	22.5 mL	5.4 mL	810 μL	50 μL			810 μL
D	ME1	5.3 mL	22.5 mL	5.4 mL	620 μL	10 μL	1000 μL	1000 μL	
	ME2	5.3 mL	22.5 mL	5.4 mL	810 μL	10 μL			810 μL
E	ME1	5.3 mL	22.5 mL	5.4 mL	1240 μL	10 μL	500 μL	500 μL	
	ME2	5.3 mL	22.5 mL	5.4 mL	1620 μL	10 μL			810 μL

Supporting Information: Figure S1

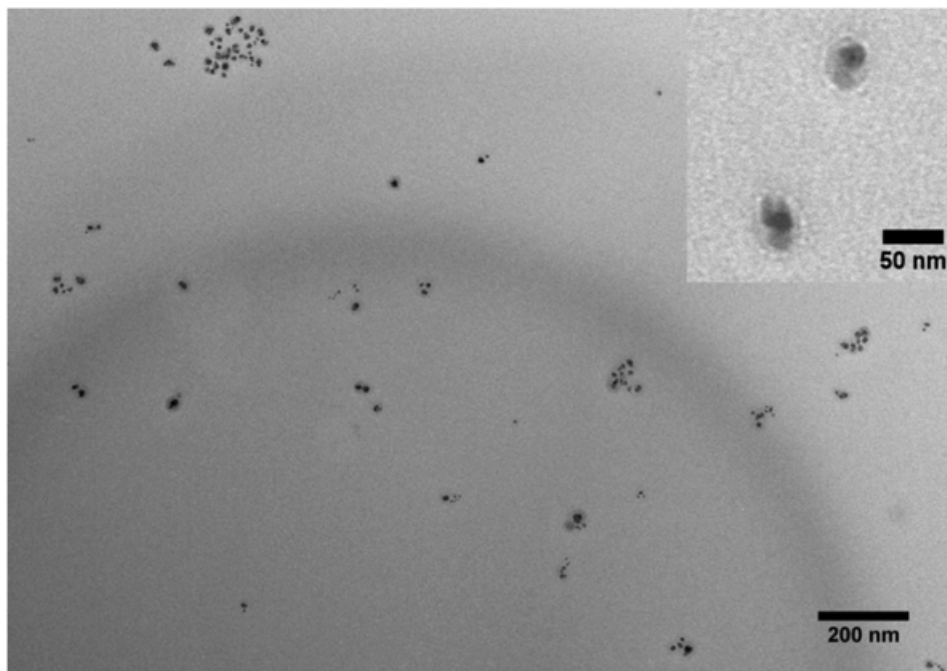


Figure S1. TEM of PMAA grafted magnetic nanoparticles.

Dynamic Light Scattering (DLS) Characterization: The PMAA grafted particles have a monomodal distribution in size with a Z-average diameter of 164 nm, and the antibiotic conjugated particles have a monomodal distribution in size with a Z-average diameter of 216 nm. TEM imaging shows that these particles were not aggregated, and the sizes measured by TEM are consistent with AFM. The larger size measured by DLS (than TEM) is ascribed to its measurement of mean hydrodynamic size of the particles included solvent layers using the Stokes-Einstein equation.¹ In addition, DLS is more precise in the measurement of soft materials (*e.g.* proteins) and usually the test of dense materials is over-estimated.² Furthermore, we used the Malvern Zetasizer Nano ZS90 instrument which is based on single angle detection. This is normally less accurate compared to DLS with multi-angle determination.³ Finally, the literature also reported similar scenarios of the disagreement on measured sizes in magnetic nanoparticles between DLS and other techniques.^{1,4,5} Our results are consistent with them. (Note: In order to avoid the influence of dust, sample solutions were passed through a filter before measurement).

Reference:

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