Supporting Information

Multifunctional Magnetic Oleic Acid-Coated MnFe₂O₄/Polystyrene

Janus Particles for Water Treatment

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Supporting Figures



Figure S1. The (A) TEM image and (B) XRD pattern of the oleic acid coated $MnFe_2O_4$ nanoparticles (MnFe₂O₄@OA NPs).



Figure S2. SEM images of the $MnFe_2O_4@OA/PS$ Janus particles after treated in an aqueous solution with pH of (A) 5 and (B) 10 for 10 h under stirring.



Figure S3. SEM images of the $MnFe_2O_4@OA/PS$ Janus particles after different stirring times of (A) 0.5, (B) 2, (C) 10 and (D) 24 h in a neutral aqueous solution. (E) XRD patterns of the $MnFe_2O_4@OA/PS$ Janus particles (a) before and (b) after a 24 h stirring process in a neutral aqueous solution.



Figure S4. Contact angles (ϑ) for water on substrates with spin-coated (A) MnFe₂O₄@OA NPs and (B) PS, and ϑ for (C) *n*-octane on substrates with spin-coated PS. MnFe₂O₄@OA NPs are completely miscible with *n*-octane, and thus ϑ for *n*-octane on the MnFe₂O₄@OA NPs is estimated to be 0°.



Figure S5. (A) Digital images of the water-in-*n*-octane emulsion; top: *n*-octane, bottom: water droplets encapsulated by the MnFe₂O₄@OA/PS Janus particles. (B, C) Optical microscopy images of the water-in-*n*-octane emulsion. (D) the separation of *n*-octane from the water-in-*n*-octane emulsion stabilized by the MnFe₂O₄@OA/PS Janus particles (JPs).



Figure S6. (A) The SEM image of the recovered $MnFe_2O_4@OA/PS$ Janus particles after the oil separation. (B) The magnified SEM image of a recovered Janus particle, revealing that its Janus structure almost remains unchanged.



Figure S7. (A, B) SEM images of the $MnFe_2O_4@OA/PS$ Janus particles after the catalytic RhB degradation for 10 h. (C) XRD patterns of the $MnFe_2O_4@OA/PS$ Janus particles before (a) and after (b) the catalytic RhB degradation for 10 h. (D) Repeated runs for the degradation of RhB using the $MnFe_2O_4@OA/PS$ Janus particles.

Supporting Videos

ESI-Video 1: The transformation of the volatile oil droplet containing $MnFe_2O_4@OA$ NPs and PS into the $MnFe_2O_4@OA/PS$ Janus particle.

ESI-Video 2: Magnetically manipulation of the emulsion droplets encapsulated by the MnFe₂O₄@OA/PS Janus particle.