

pH and Magnetism Dual-Responsive Pickering Emulsion Stabilized by Dynamic Covalent Fe₃O₄ Nanoparticles

Gaihuan Ren ^{1,*}, Zhanzhao Li ¹, Dongxu Lu ², Bo Li ¹, Lulu Ren ³, Wenwen Di ³, Hongqin Yu ¹, Jianxin He ¹, and Dejun Sun ³

- ¹ Textile and Garment Industry of Research Institute, Zhongyuan University of Technology, Zhengzhou 450007, China; 2021117608@zut.edu.cn (Z.L.); 2020110366@zut.edu.cn (B.L.); 3812@zut.edu.cn (H.Y.); 5269@zut.edu.cn (J.H.)
 - ² School of Mechanical and Electrical Engineering, Zhengzhou University of Industrial Technology, Zhengzhou 450007, China; tian543669@163.com
 - ³ Key Laboratory of Colloid and Interface Chemistry, Ministry of Education, Shandong University, Jinan 250100, China; 201912144@mail.sdu.edu.cn (L.R.); 201832281@mail.sdu.edu.cn (W.D.); djsun@zut.edu.cn (D.S.)
- * Correspondence: ghren@zut.edu.cn

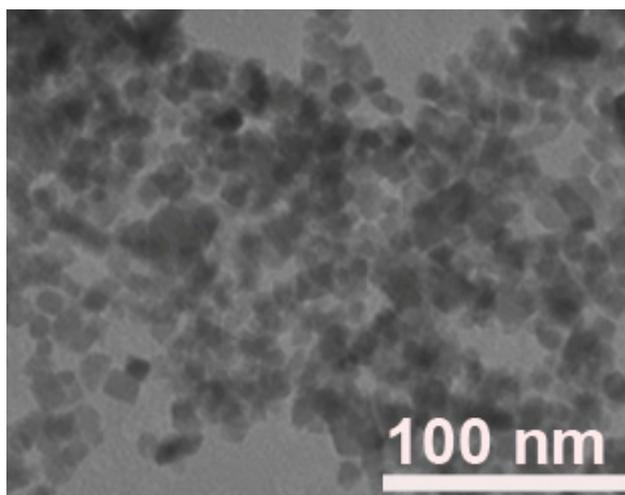


Figure S1. TEM image of DC-Fe₃O₄.



Figure S2. Photograph of DC-Fe₃O₄ nanoparticles partitioning at oil-water interface. The aqueous phase was stained with RbB.

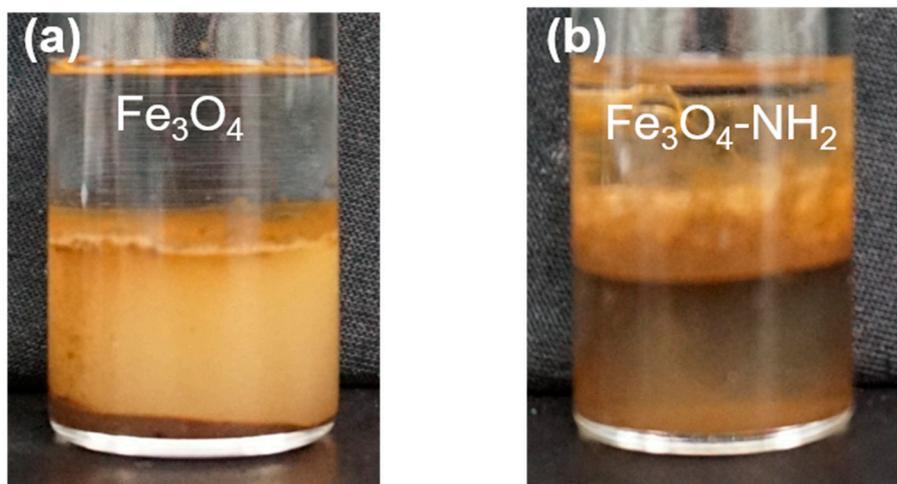


Figure S3. Photographs of liquid paraffin in water Pickering emulsions stabilized by 1.0 wt% Fe₃O₄ (a), 1.0 wt% Fe₃O₄-NH₂ (b) at pH 10, taken 30 min after preparation.



Figure S4. Photograph of the liquid paraffin and water after sonication for 2 min without DC-Fe₃O₄ nanoparticles.

25°



Figure S5. Image of contact measurement of acidic water droplet (pH = 2) on the DC-Fe₃O₄ film.

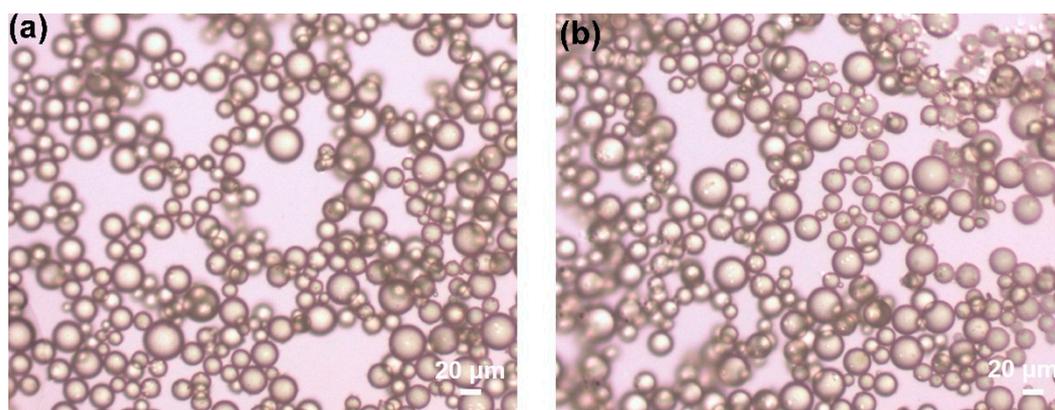


Figure S6. Optical micrographs of initial Pickering emulsion and after 3 cycles are shown in (a) and (b), respectively. Pickering emulsion was prepared with 1.0 wt% DC-Fe₃O₄ at pH 10. The liquid paraffin and water were in an equal volume ratio.

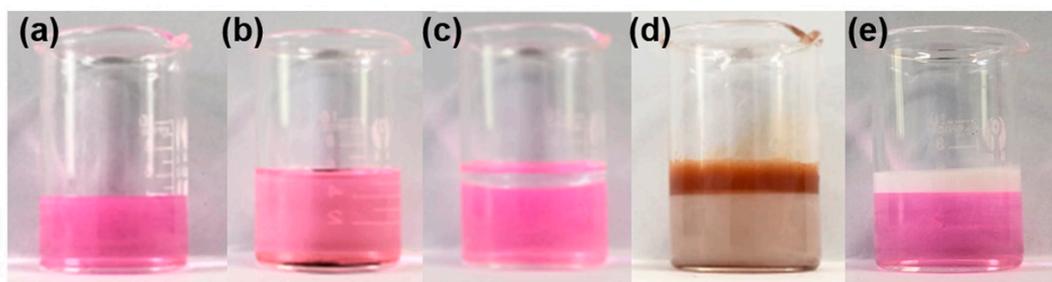


Figure S7. Photographs of 4 mg/L rhodamine B solution (a), the extraction of rhodamine B solution with DC-Fe₃O₄ nanoparticles (b), the extraction rhodamine B solution with liquid paraffin (c), extraction of rhodamine B solution with DC-Fe₃O₄ stabilized oil in water Pickering emulsion (d), and extraction of rhodamine B solution with AES stabilized oil in water emulsion (e).

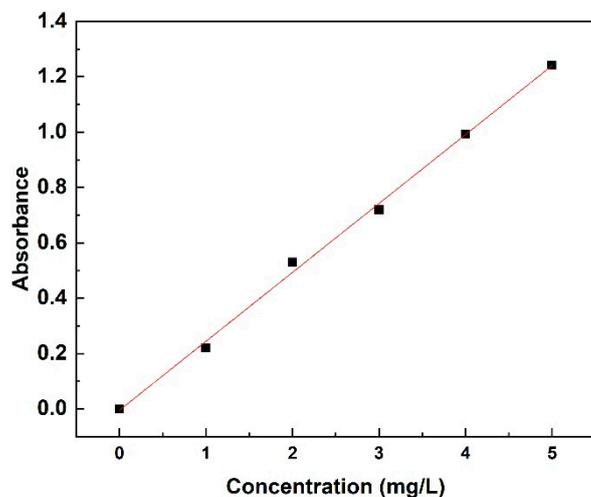


Figure S8. Standard curve of rhodamine B.

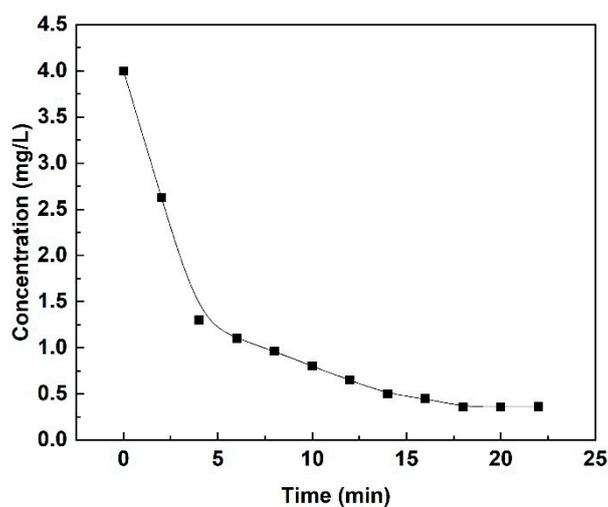


Figure S9. The change of RhB concentration with standing time after adding 1 mL Pickering emulsion into 4 mL RhB aqueous solution. The initial concentration of RhB is 4 mg/L. The Pickering emulsion was stabilized by 1 wt% DC-Fe₃O₄ and the volume ratio of liquid paraffin and water is 1:1.