

Reusable Fe₃O₄ and WO₃ Immobilized onto Montmorillonite as a Photo-reactive Antimicrobial Agent

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Supporting Information

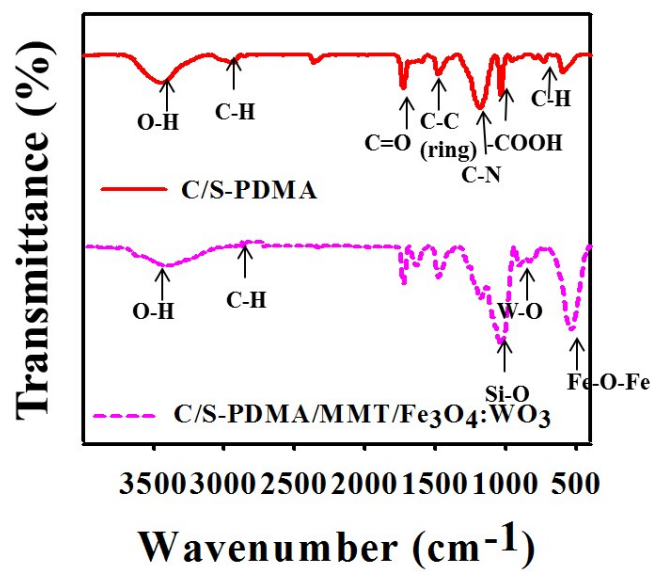


Figure S1. FT-IR spectra of C/S-PDMA, C/S-PDMA/MMT, C/S-PDMA/MMT/Fe₃O₄, and C/S-PDMA/MMT/Fe₃O₄:WO₃.

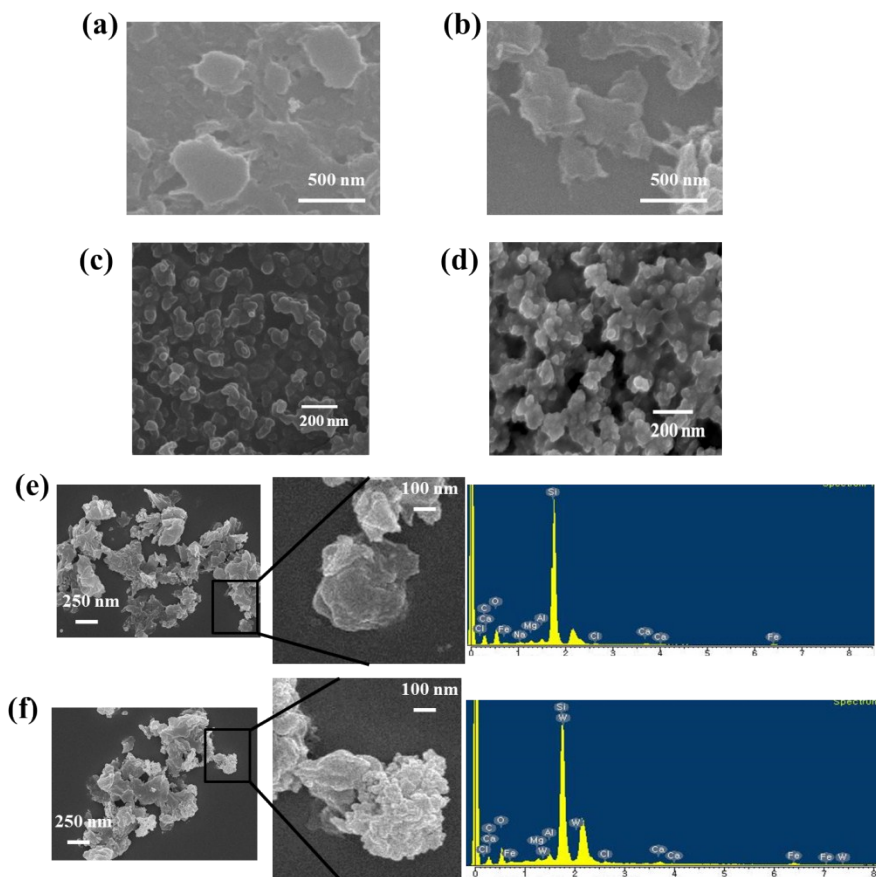


Figure S2. SEM images of **(a)** Pure MMT, **(b)** C/S-PDMA/MMT, **(c)** WO₃ metal oxide, **(d)** Fe₃O₄ metal oxide **(e)** FE-SEM – EDX spectrum of C/S-PDMA/MMT/Fe₃O₄, and **(f)** FE-SEM – EDX spectrum of C/S-PDMA/MMT/Fe₃O₄:WO₃.

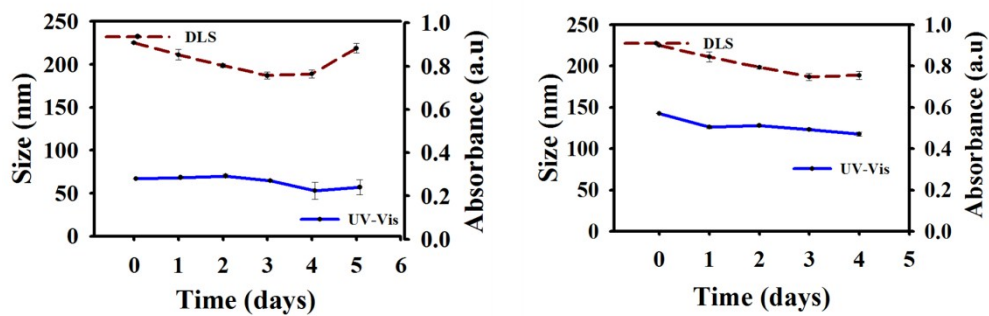
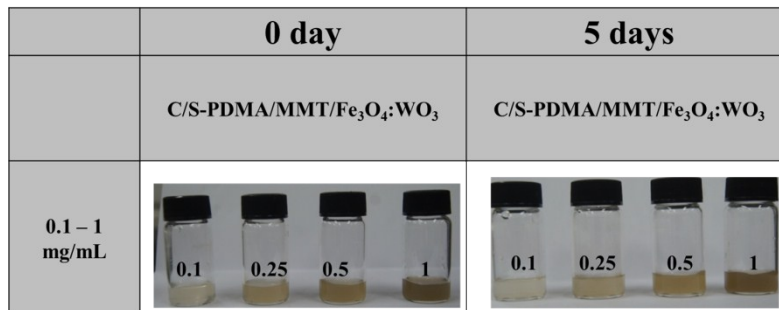


Figure S3. Time-dependent colloidal stability study of C/S-PDMA/MMT/Fe₃O₄:WO₃ in water [(0.1(left side)–0.25 mg/mL (right side))] between 1–5 days. The left axis indicate DLS measurements to evaluate the size distribution and right axis showed the UV–vis absorption at 808 nm.

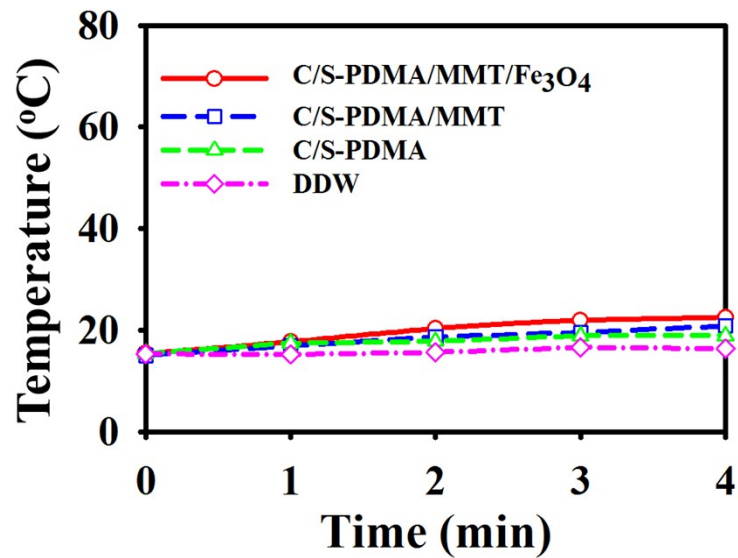


Figure S4. Photo-thermal heating curves of pure water (DDW), C/S-PDMA, C/S-PDMA/MMT, C/S-PDMA/MMT/Fe₃O₄ (1 mg/mL concentration) under 808-nm laser irradiation with a power density of 2 W/cm².

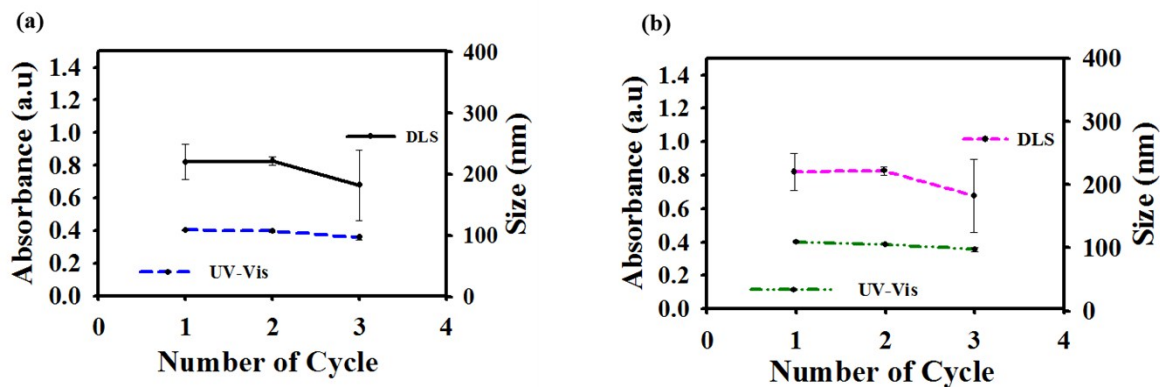


Figure S5. The colloidal stability study of C/S-PDMA/MMT/Fe₃O₄:WO₃ in water (1 mg/mL) in each step number of cycle towards (a) *E. coli* (b) *S. aureus*. The left axis indicate DLS measurements to evaluate the size distribution and right axis showed the UV-vis absorption at 808 nm.

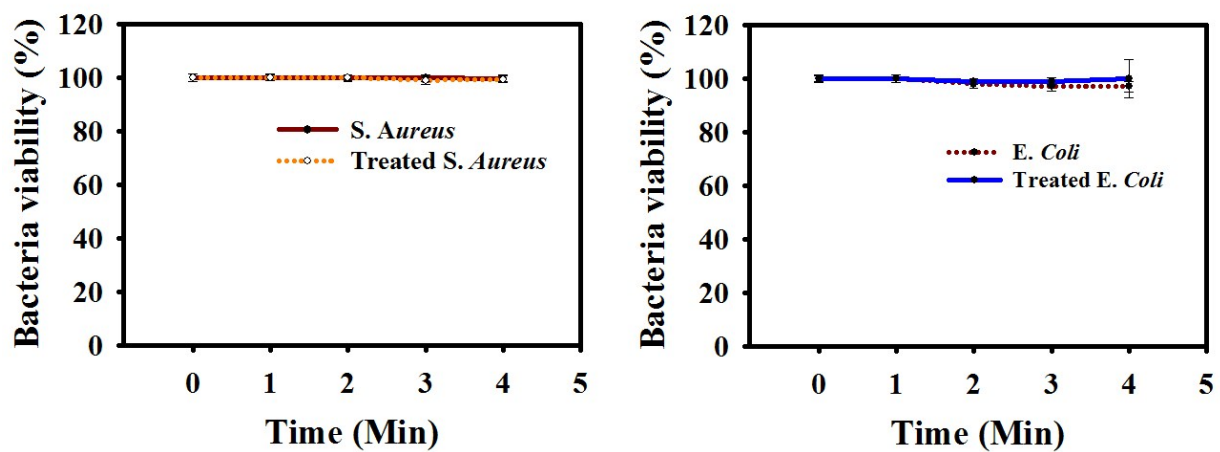


Figure S6. MTT bacteria cells treated C/S-PDMA/MMT/Fe₃O₄:WO₃ at 1 mg/mL concentration in solution. Right side is *S. aureus* and left is *E.coli*.

		Fe		W	
Bacteria type		Gram positive	Gram negative	Gram positive	Gram negative
sample	0 cycle	0.146	0.142	0.45	0.45
	After 3 cycle	0.1261	0.1251	0.4036	0.3924
Percentage		91%	90.10%	89.70%	89.20%

Table S1. The identification and the quantification of F and W component determined by the ICP-MS analysis.