

Supplementary material for

Preparation of magnetic dummy molecularly imprinted mesoporous silica nanoparticles using semi-covalent imprinting approach for rapid and selective removal of bisphenols from environmental water samples

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1. Preparation of MISMS and NISMS

1.1 Preparation of MISMS

The PP-MISMS THPE-MISMS and BPA-MISMS was synthesized by a modified method based on the published literature (<https://doi.org/10.1021/jp908828q>). In a typical procedure, 1.5 g of lecithin and 0.3 g of dodecylamine in were dissolved in 28 mL ethanol, then 21 mL of water was added slowly under stirring to a solution containing until a homogeneous emulsion was formed. To this emulsion, 16.5 mmol TEOS pre-dissolved with 1.5 mmol of template-monomer complex (PP-ICPTES, THPE-ICPTES or BPA-ICPTES) were added slowly under stirring for 15 min, and then the mixture was left under static conditions for 24 h at room temperature. The as-synthesized MISMS powder was filtrated, rinsed with ethanol, and then washed free of lecithin and dodecylamine by Soxhlet extraction with ethanol for 24 h. The obtained powder was refluxed in DMSO and water (5:1, v/v) at 180 °C for more than 3 hours to remove template molecule and dried overnight under vacuum.

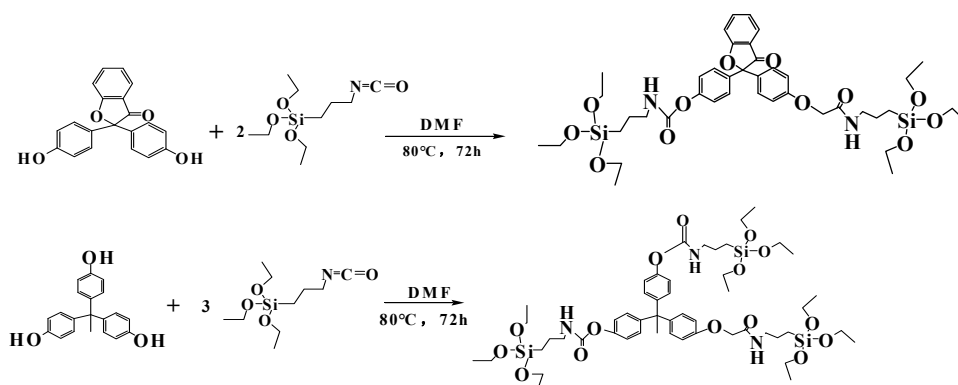


Figure S1. Reaction equation of template-monomer complex.

1.2 Preparation of NISMS

For the synthesis of NISMS, the same procedure was adopted except that APTES was used in place of the template-monomer complex. It was noting that NISMS1 was prepared with 2 mmol APTES in comparison with PP-MISMS and BPA-MISMS, while NISMS2 was prepared with 3 mmol APTES in comparison with THPE-MISMS.

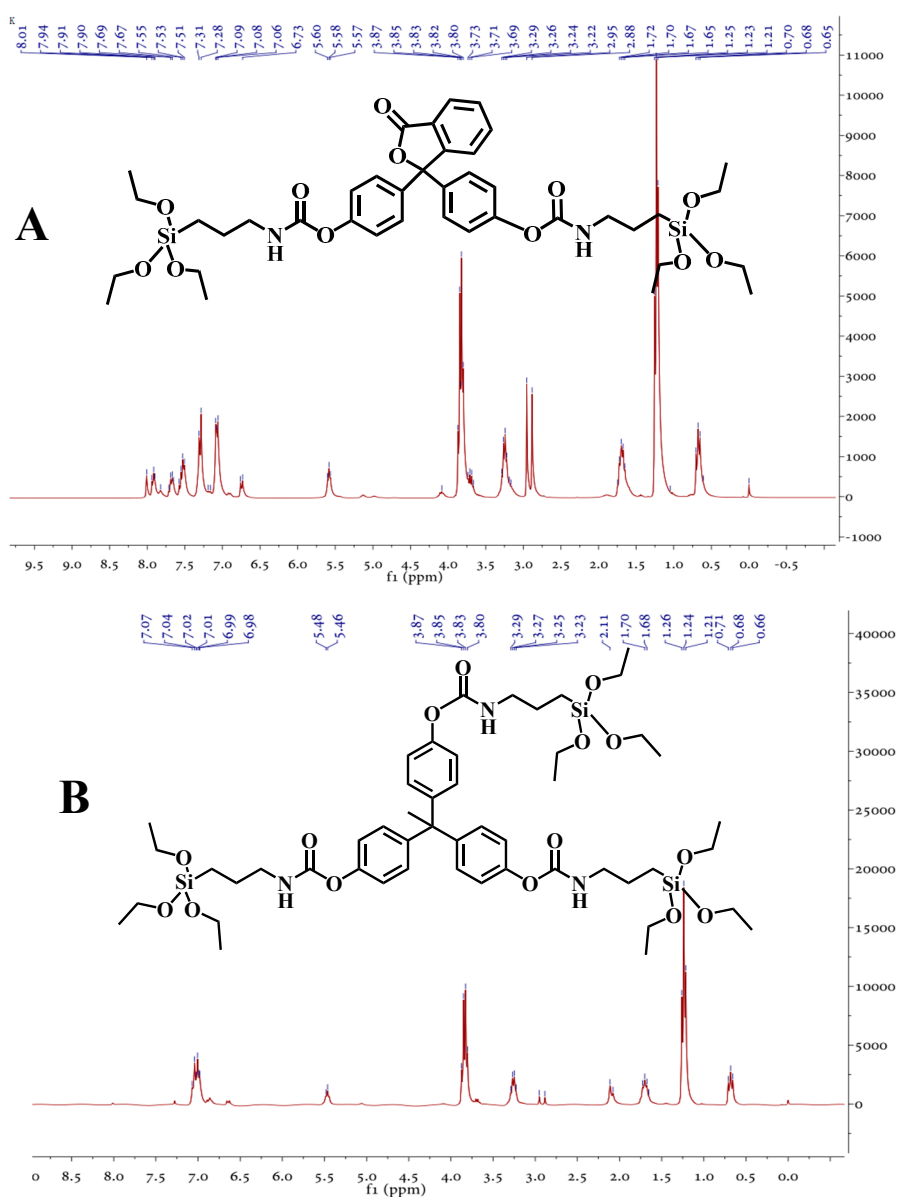


Figure S2. the ¹H NMR spectrometry of template-monomer A) PP-ICPTES B) THPE-ICPTES.

Table S1. The results of nitrogen sorption measurement.

Samples	Specific surface area ($\text{m}^2 \text{g}^{-1}$)	Pore volume ($\text{m}^3 \text{g}^{-1}$)
PP-MISMS	718.6	0.7177
THPE-MISMS	690.9	0.8119
BPA-MISMS	700.1	0.8223
NISMS1	772.7	0.8672
NISMS2	750.4	0.8554

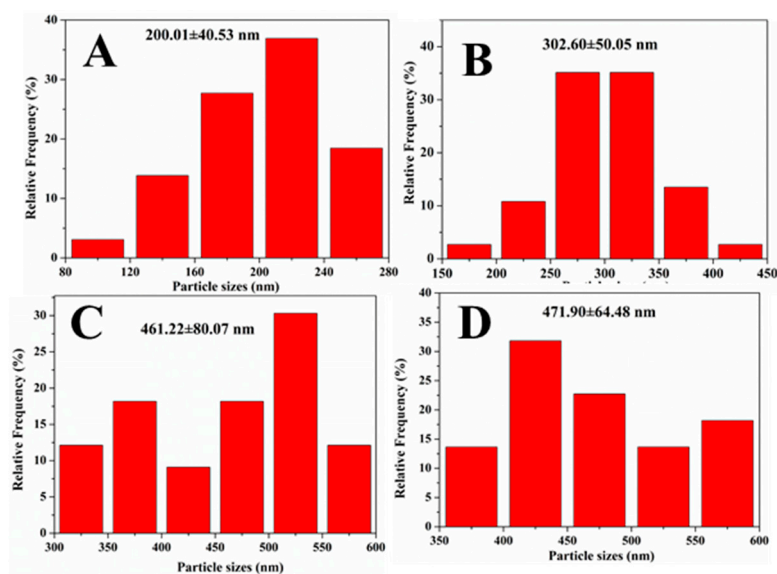


Figure S3. size distribution histogram TEM image (A) Fe_3O_4 ; (B) $\text{Fe}_3\text{O}_4@\text{SiO}_2$; (C) m-NI-MSNPs; (D) m-DMI-MSNPs.

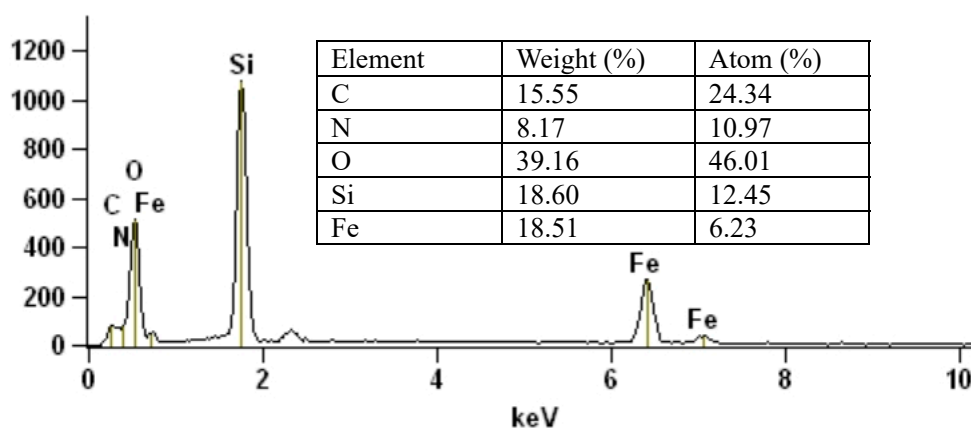


Figure S4. EDX spectrum of m-DMI-MSNPs.

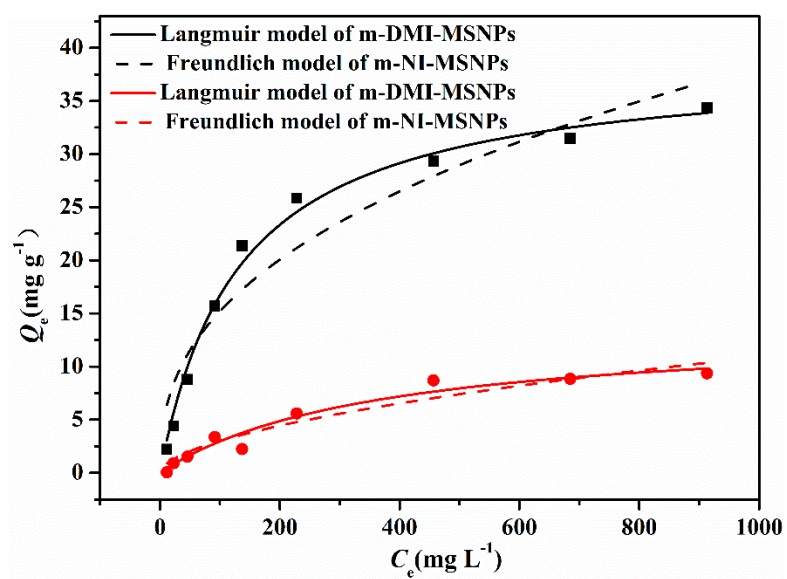


Figure S5. Adsorption isotherms of BPA on m-DMI-MSNPs and m-NI-MSNPs.

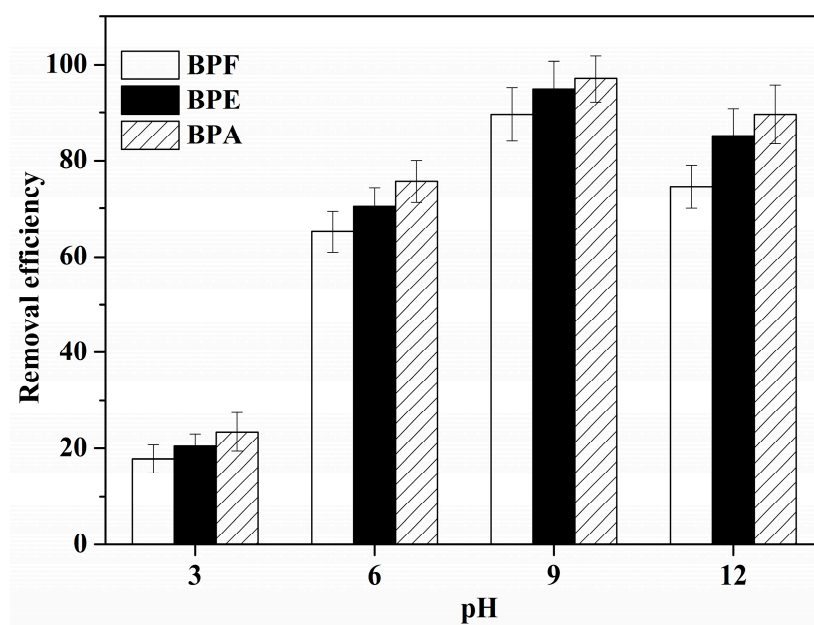


Figure S6. Effect of pH on adsorption of BPs.

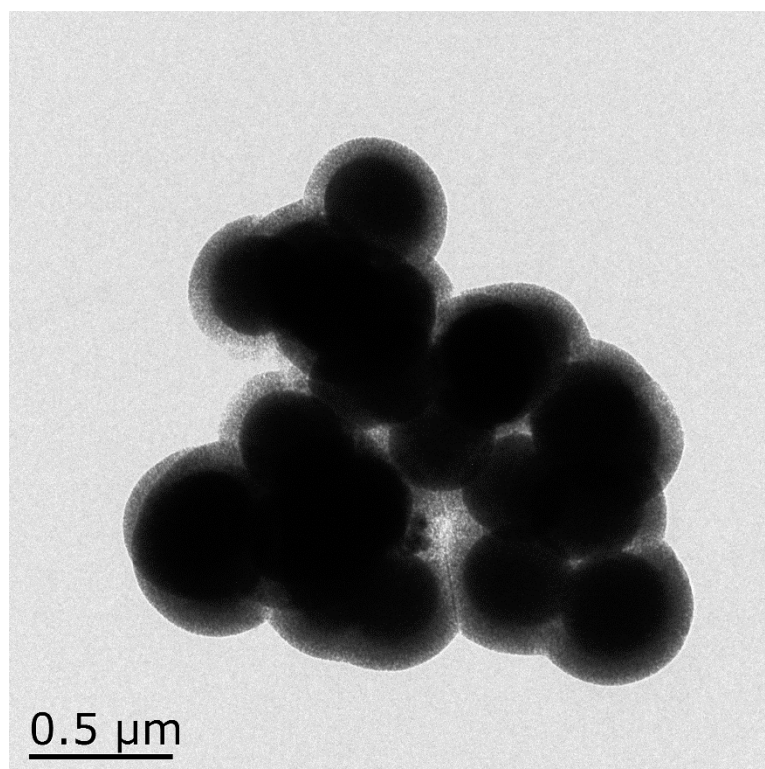


Figure S7. TEM images of particle after adsorption and regeneration of m- DMI-MSNPs.