

Supporting Information

Magnetic Composite Microspheres with Controlled Mesoporous Shell for Highly Efficient DNA Extraction and Fragment Screening

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TABLES

Table S1 Synthetic recipes of magnetic MSP@mTiO₂ microspheres with different pore sizes.

Sample	EtOH (mL)	H ₂ O (mL)	NH ₃ ·H ₂ O (mL)	T (°C)	t (h)	Pore size (nm)	Surface area (m ² ·g ⁻¹)
MSP@mTiO ₂	40	20	0	80	18	2.8	455
	40	20	0	120	18	7.6	160
	40	20	0	160	18	11.2	122
	40	20	1	160	18	16.0	88
	40	20	2	160	18	23.6	47
	40	20	3	160	18	28.7	44

Table S2 Surface zeta potential of MSP@mTiO₂ magnetic spheres with different pore sizes.

Pore size (nm)	MSP@mTiO ₂					
	2.8	7.6	11.2	16.0	23.6	28.7
Zeta potential (mV)	+3.7	+4.1	+4.2	+4.7	+3.5	+3.0

FIGURES

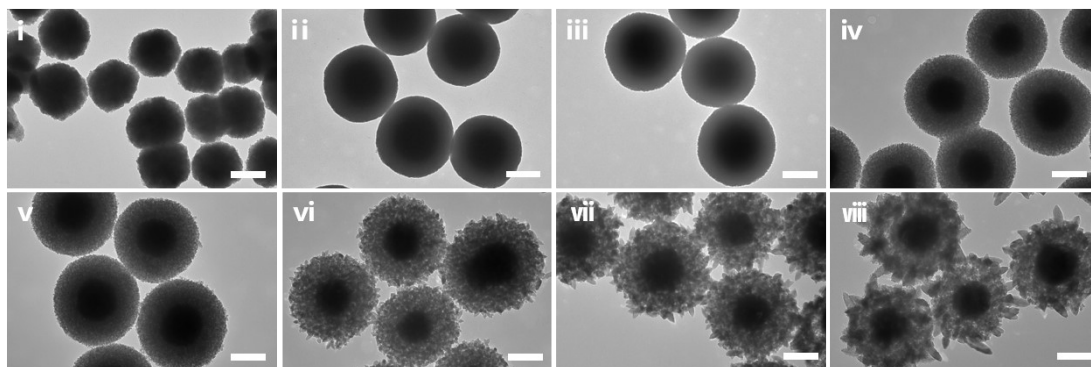


Fig. S1 TEM images of (i) MSP, (ii) MSP@TiO₂ and (iii to viii) MSP@mTiO₂ microspheres with different pore size (the scale bars are 200 nm).

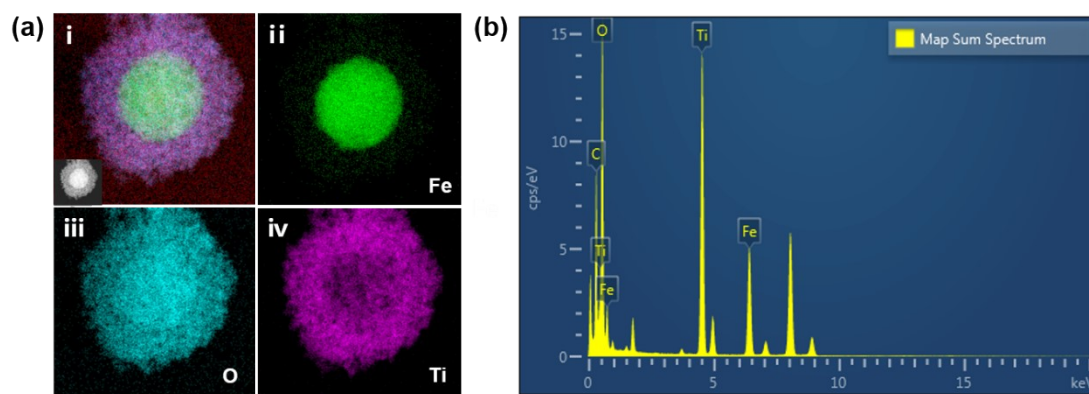


Fig. S2 (a) TEM-EDS images of MSP@TiO₂ microspheres. (b) EDS and the content of each element for MSP@TiO₂ microspheres.

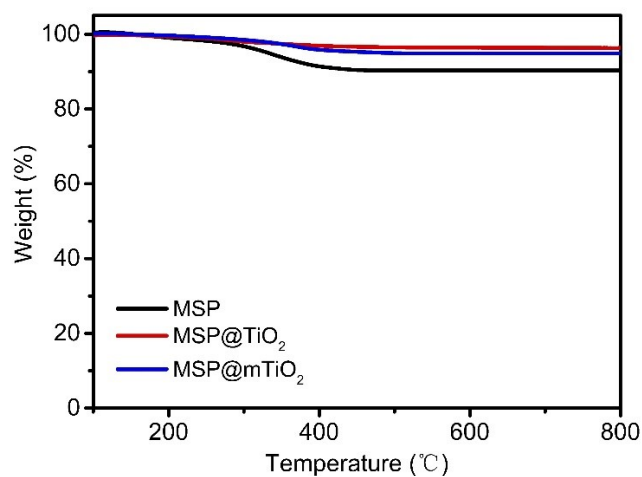


Fig. S3 TGA curves of MSP, MSP@TiO₂ and MSP@mTiO₂ microspheres.

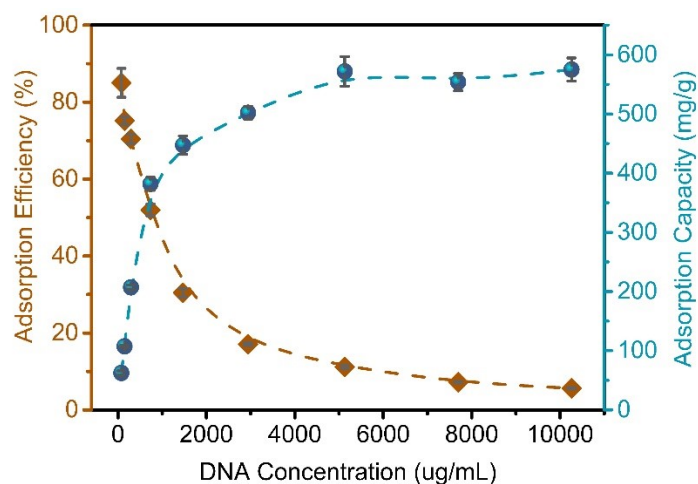


Fig. S4 Adsorption efficiency and adsorption capacity at equilibrium state as a function of initial DNA concentration.

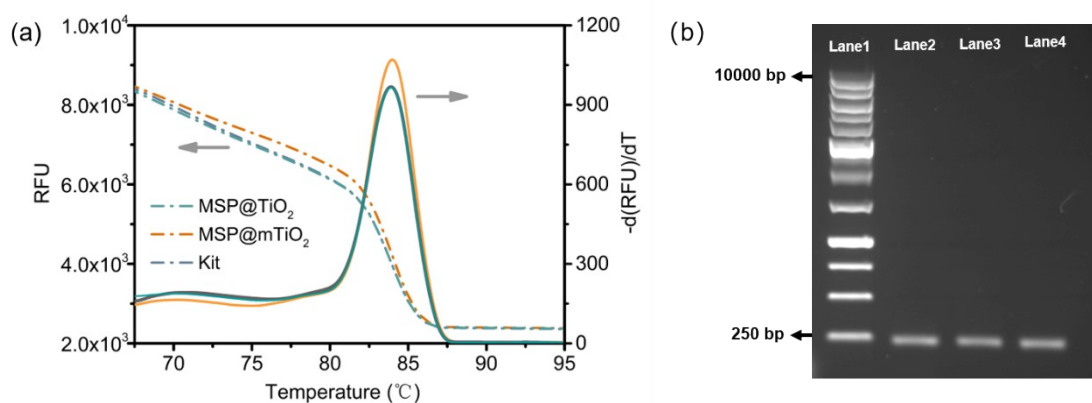


Fig. S5 (a) Melting curves of a specific DNA sequences in arabidopsis plants extracted by MSP@TiO₂, MSP@mTiO₂ and Kit after PCR. (b) Images of agarose gel electrophoresis of a specific DNA sequences in arabidopsis plants extracted by MSP@TiO₂ (Lane 2), MSP@mTiO₂ (Lane 3), Kit (Lane 4) after PCR.

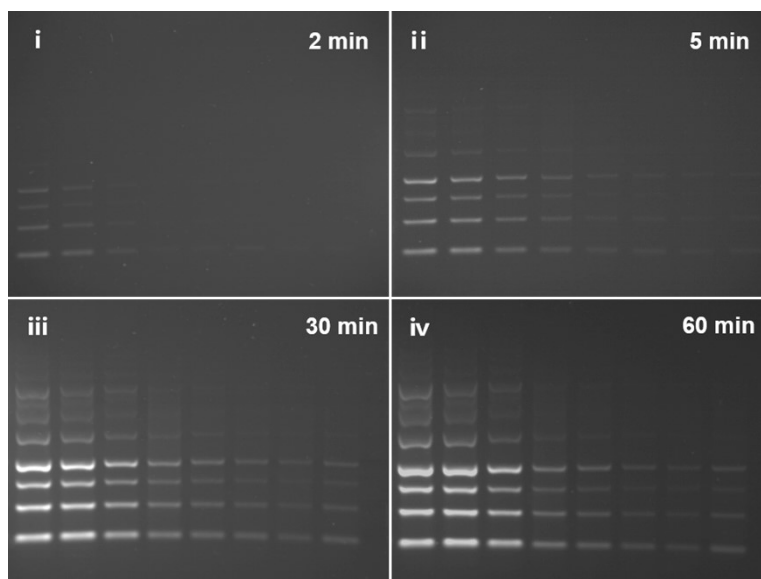


Fig. S6 Gel electrophoresis images of DNA fragments (250~10000 bp) over time when eluted in different Na₃PO₄ solutions (The concentrations of Na₃PO₄ solutions in order from left to right are 50 mM, 5 mM, 2.5 mM, 1 mM, 0.1 mM, 0.05 mM, 0.025 mM and 0.01 mM).

