Electronic supplementary information (ESI)

Plastic antibody for DNA damages: Fluorescent imaging of BPDE-dG adducts in genomic DNA

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1. Rebinding assay

Rebinding experiment was carried out for investigation of binding properties of nanoMIP. The synthetic nanoMIP (10 mg) was immersed into 1.0 mL of a series of known concentration of BPDE-DNA adduct solutions in polypropylene vials. These vials were continuously shaken at 25°C for 6 h, and then centrifuged at 3000 × g for 10 min. The concentration of free BPDE-DNA adduct in the supernatant was determined by HPLC-FL detection (λ_{ex} = 343 nm, λ_{em} = 400 nm). The amount of BPDE-ssDNA adducts bound to nanoMIP, *Q*, was calculated from multiplying the concentration difference by solution volume. Binding isotherms were measured for BPDE-16merG16 (probe **6**) in the concentration range of 0.05 - 2.5 μM, and for BPDE-16merG9 (probe **7**) in the concentration range of 0.1 - 2.5 μM.

Binding kinetic profiles were investigated according to our previous work (*Chem. Commun.*, 2010, 46, 7688). The prepared nanoMIP (10 mg) was suspended in 1.0 mL DNA solutions containing either BPDE-16merG16 adduct or the unmodified 16merG16 oligonucleotides (initial concentration, 1.0 μM). Aliquots of 10 μL of DNA solutions were taken out and subjected to HPLC analysis at different intervals (0 - 240 min), then the binding amounts could be calculated. Plotting the binding amount of BPDE-16merG16 adduct (or 16merG16) versus the binding time, the binding kinetic profiles could be obtained.

2. MALDI-TOF/MS analysis

The captured BPDE-16merDNA was desorbed from the Fe_3O_4@MIP nanocomposites with PBS buffer (containing 5% methanol), and then identified by MALDI-TOF/MS. DNA samples (1.0 μL) were mixed with 2.0 μL of AA/NA/DHC (anthranilic acid/nicotinic acid/diammonium hydrogen citrate) matrix solution, and then deposited onto a 384-well AnchorChip MALDI plate (Bruker Daltonics, Billerica, MA, USA) immediately, which was allowed to stand for 15 min to dry and crystallize naturally. AA/NA/DHC matrix consists of 3.0 mg (20 μmol) AA, 1.5 mg (10 μmol) NA and 6 μL DHC (10 mM) in 80 mL

acetonitrile/water (50:30, v/v), with the final molar ratio of AA/NA/DHC = 2:1:0.003. Mass spectra were acquired on a Bruker Autoflex III Smartbeam MALDI-TOF MS (Bruker Daltonics, Germany) equipped with a nitrogen laser operating at 337 nm. Linear positive-ion mode was employed. The total acceleration voltage was 20 kV. In the range of m/z 100-6000, the mass spectra were obtained with 70%-80% laser energy, 70%-90% laser attenuation, 2×10^{-6} mbar vacuum and 200 Hz trigger frequency. Spectra were accumulated from 200 laser shots, and 200 ns extraction delay time was used for data acquisition.

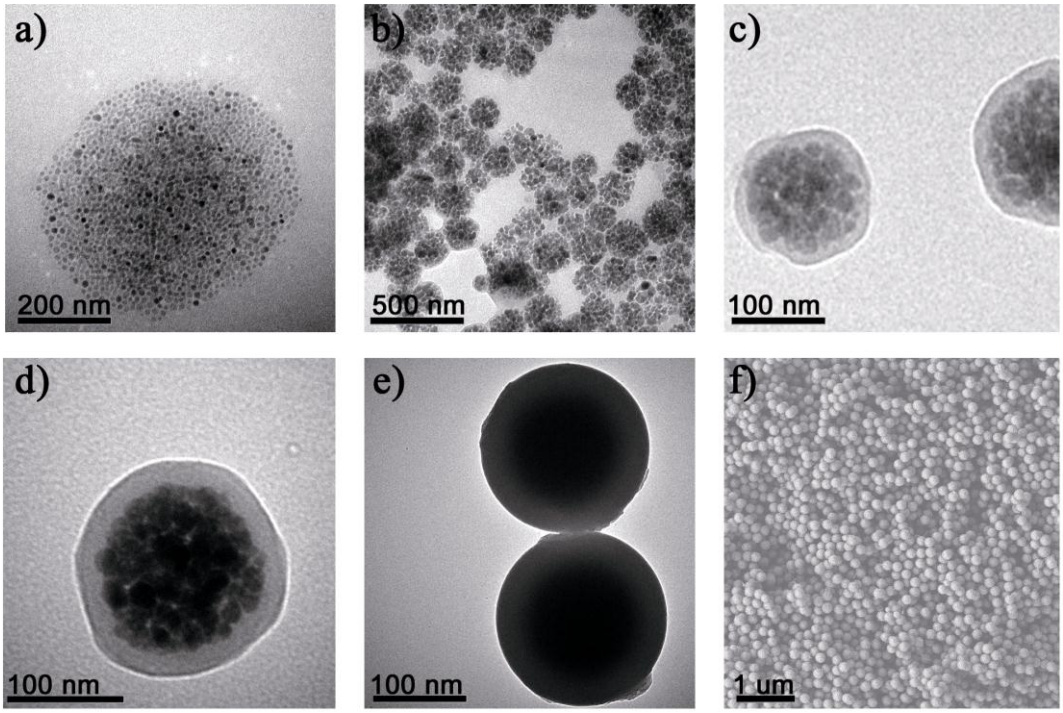

Figure S1. TEM images for a) magnetic Fe_3O_4 nanoparticles (10 nm) in Span 80 miniemulsion, b) $nFe_3O_4@SiO_2$ nanocomposites, and nanoMIP with a shell thickness of c)10 nm, d) 20 nm and e) 40 nm, and f) SEM image for the fabricated nanoMIP (the diameter is ca.160 nm).

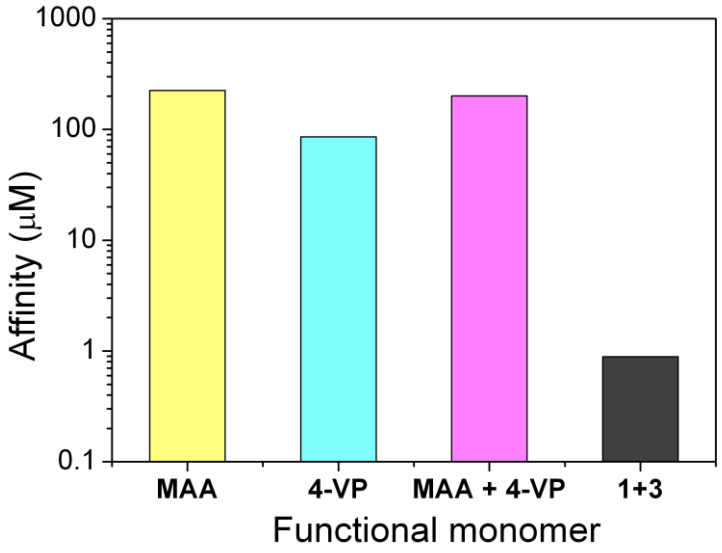

Figure S2. Different functional monomers produce different affinities of the fabricated nanoMIP towards BPDE-16merG16 adduct. Abbreviations for these functional monomers are: MAA, methacrylic acid; 4-VP, 4-vinylpridine; ***1***, the allylated guanine (G-=); ***3***, the allylated *p-tert*- butylcalix[6]arene (calix[6]arene-=).