Electronic Supplementary Information

Poly(2,3-diaminonaphthalene) microspheres as a novel quencher for fluorescence-enhanced nucleic acid detection

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Experimental section

All chemically synthesized oligonucleotides were purchased from Shanghai Sangon Biotechnology Co. Ltd. (Shanghai, China). DNA concentration was estimated by measuring the absorbance at 260 nm. All the other chemicals were purchased from Aladin Ltd. (Shanghai, China) and used as received without further purification. The water used throughout all experiments was purified through a Millipore system. PDANs were prepared as follows: In brief, 0.3 mL of 1 M APS was added into 4 mL of 0.025 M DAN in dimethylformamide (DMF) under stirring. After that, the resulting mixture was kept at room temperature overnight. The solution was washed

with water by centrifugation twice, and the resulting precipitates were redispersed in water and stored at 4℃ for characterization and further use.

Scanning electron microscopy (SEM) measurements were made on a XL30 ESEM FEG scanning electron microscope at an accelerating voltage of 20 kV. Fluorescent emission spectra were recorded on a PerkinElmer LS55 Luminescence Spectrometer (PerkinElmer Instruments, U.K.). All measurements were done in 20 mM Tris–HCl buffer (pH 7.4, containing 100 mM NaCl, 5 mM KCl and 5 mM $MgCl_2$). Zeta potential measurement was performed on a Nano-ZS Zetasizer ZEN3600 (Malvern Instruments Ltd., U.K.).

Oligonucleotide sequences used in the present study are listed as follows (mismatch underlined).

P_{HIV} (FAM dye-labeled ssDNA):

5’-FAM-AGT CAG TGT GGA AAA TCT CTA GC-3’

T_1 (complementary target):

5’-GCT AGA GAT TTT CCA CAC TGA CT-3’

T_2 (single-base mismatched target):

5’-GCT AGA GAT T<u>G</u>T CCA CAC TGA CT-3’

T_3 (two-base mismatched target):

5’-GCT AGA GAT TGT ACA CAC TGA CT-3’.

T_4 (three-base mismatched target):

5’-GCT A<u>T</u>A GAT T<u>G</u>T <u>A</u>CA CAC TGA CT-3’.

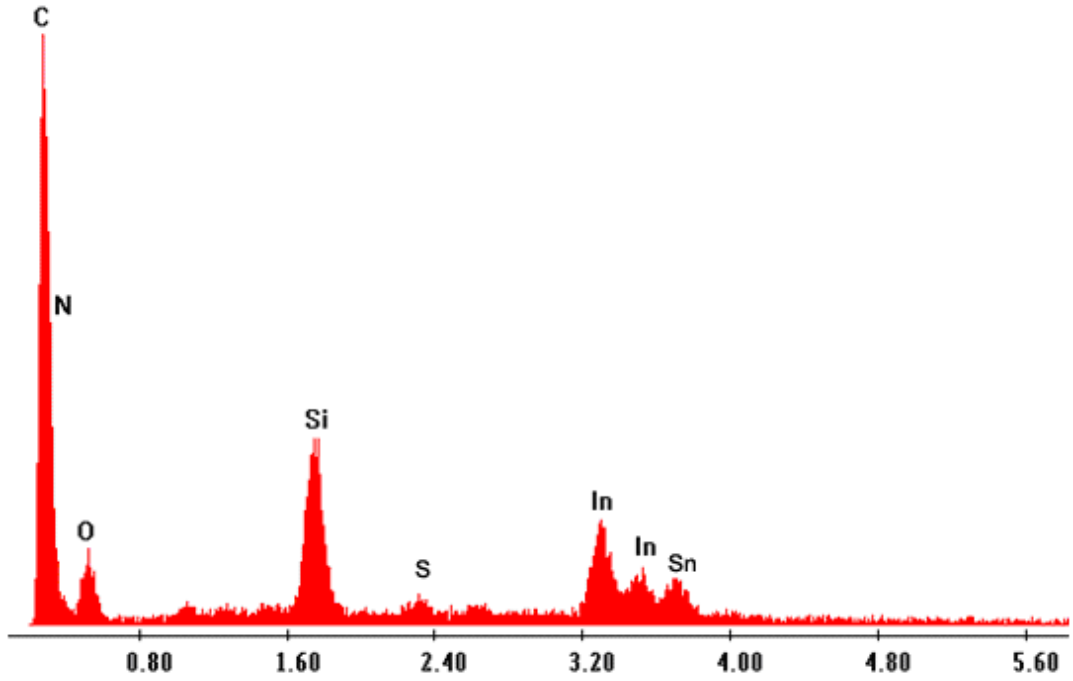

Fig. S1 EDS of the microspheres thus formed.

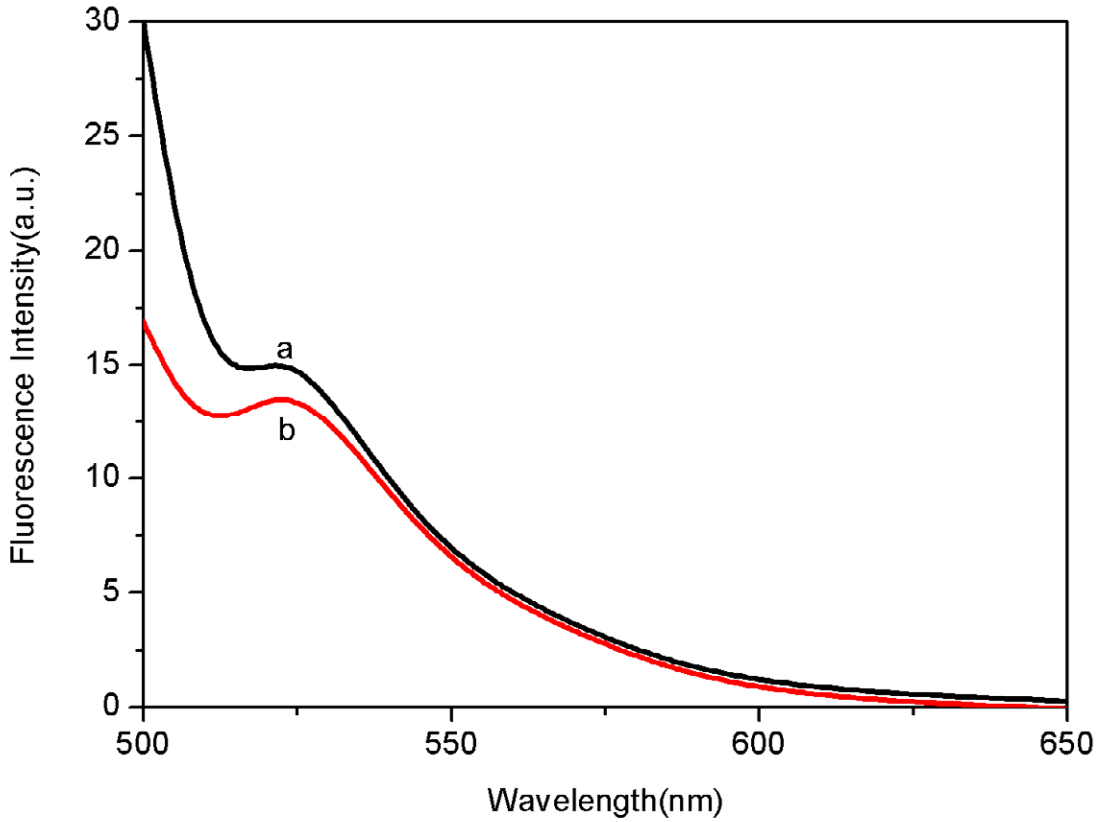

Fig. S2 Fluorescence spectra of (a) PHIV-PDAN complex + T1 and (b) the supernatant of (a) after removing PDAN colloids by filtration and centrifugation. ([PHIV]=50 nM; [T1]=300nM). Excitation was at 480 nm, and the emission was monitored at 526 nm. All measurements were done in 20 mM Tris–HCl buffer (pH 7.4, containing 100 mM NaCl, 5 mM KCl and 5 mM $MgCl_2$).

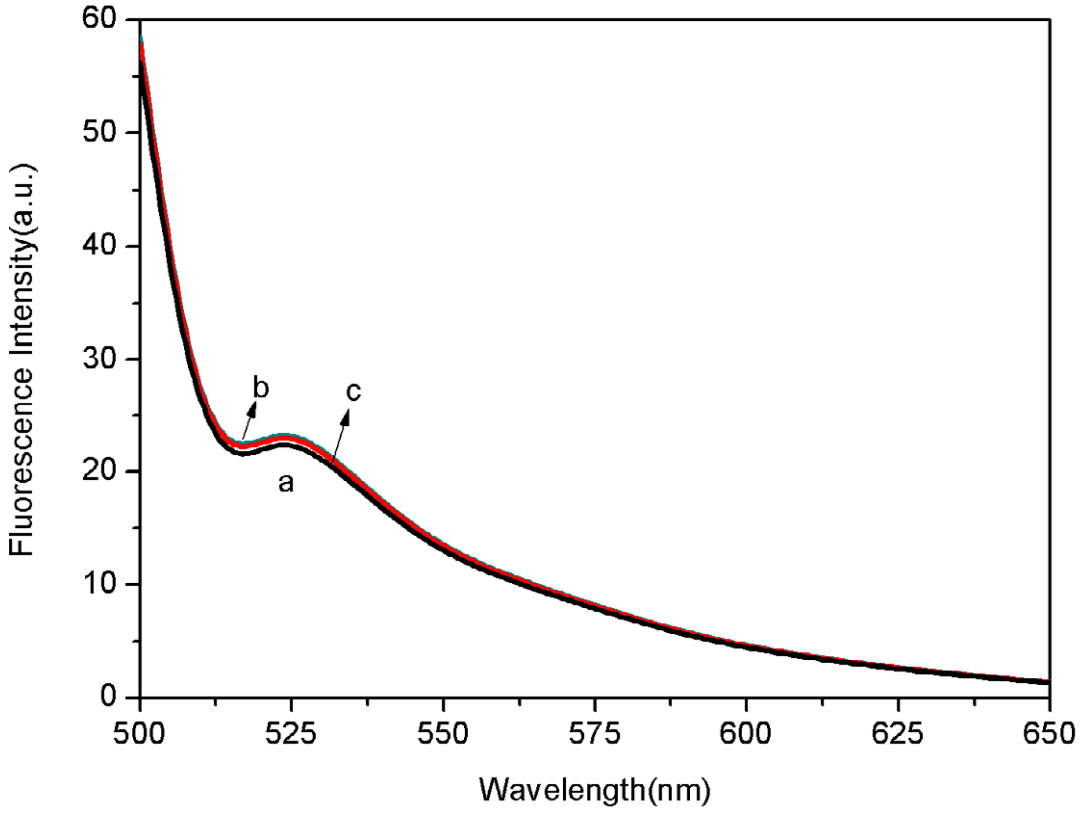

Fig. S3 Fluorescence emission spectra of P_{HIV} (50 nM) at different conditions: (a) P_{HIV}- PDAN complex; (b) P_{HIV}-PDAN complex + 300 nM T_3; (c) P_{HIV}- PDAN complex + 300 nM T_4. Excitation was at 480 nm, and the emission was monitored at 526 nm. All measurements were done in 20 mM Tris–HCl buffer (pH 7.4, containing 100 mM NaCl, 5 mM KCl and 5 mM $MgCl_2$).