

Electronic Supporting Information

Nucleic acid detection using carbon nanoparticles as a fluorescent sensing platform

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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.

CNPs were prepared as follows: In brief, 3-mg candle soot obtained using well-established method¹ was suspended in 12-mL water/ethanol mixture (1:1) with the help of ultrasonication. After that, the black solution was centrifuged at 3000 rpm for 2 min to separate out large carbon soot particle. The supernatant was collected and then subjected to centrifugation at 6000 rpm for 2 min. The black precipitate was collected and redispersed in 12 mL of water/ethanol mixture (1:1) for further

characterization and sensing application.

Scanning electron microscopy (SEM) measurements were made on a XL30 ESEM FEG scanning electron microscope at an accelerating voltage of 20 kV. Transmission electron microscopy (TEM) measurements were made on a HITACHI H-8100 EM (Hitachi, Tokyo, Japan) with an accelerating voltage of 200 kV. Fluorescent emission spectra were recorded on a PerkinElmer LS55 Luminescence Spectrometer (PerkinElmer Instruments, U.K.). Zeta potential measurements were performed on a Nano-ZS Zetasizer ZEN3600 (Malvern Instruments Ltd., U.K.).

Oligonucleotide sequences are listed as follows:

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

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

T₁ (complementary target):

5'-GCT AGA GAT TTT CCA CAC TGA CT-3'

T₂ (single-base mismatched target):

5'-GCT AGA GAT TGT CCA CAC TGA CT-3' (mismatch underlined).

T₃ (non-complementary target):

5'-TTT TTT TTT TTT TTT TTT TT-3'

Reference

- 1 H. Liu, T. Ye and C. Mao, *Angew. Chem. Int. Ed.*, 2007, **46**, 6473.

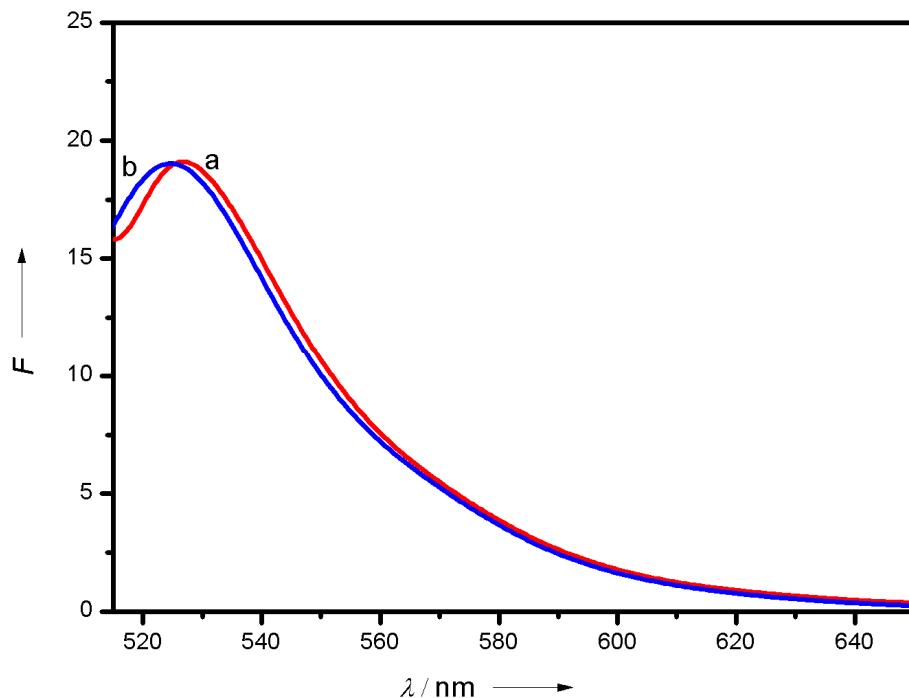


Fig. S1 Fluorescence spectra of (a) P_{HIV}-CNP complex + T₁ and (b) the supernatant of (a) after removing CNPs by centrifugation. ([P_{HIV}]=50 nM; [T₁]=300 nM; $\lambda_{\text{ex}}=480$ nm). All measurements were done in Tris-HCl buffer in the presence of 5 mM Mg²⁺ (pH: 7.4).

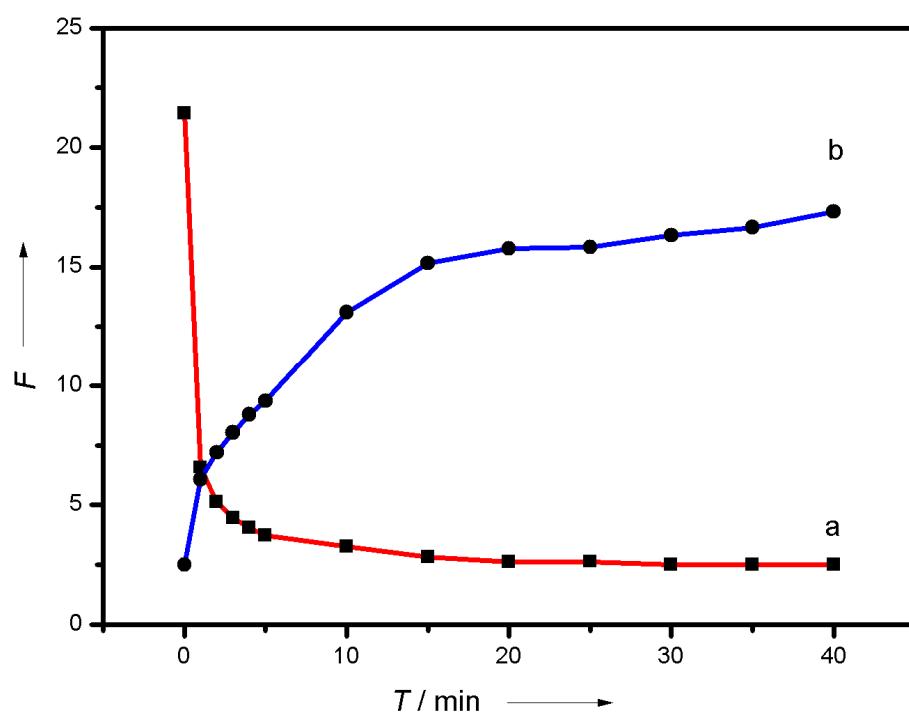


Fig. S2 (a) Fluorescence quenching of P_{HIV} (50 nM) by CNPs and (b) fluorescence recovery of P_{HIV}-CNP complex by T₁ (300 nM) as a function of incubation time ($\lambda_{\text{ex}}=480$ nm) in Tris-HCl buffer in the presence of 5 mM Mg²⁺ (pH: 7.4).