

Article

Supplementary Materials: Oligonucleotide Detection and Optical Measurement with Graphene Oxide in the Presence of Bovine Serum Albumin Enabled by Use of Surfactants and Salts

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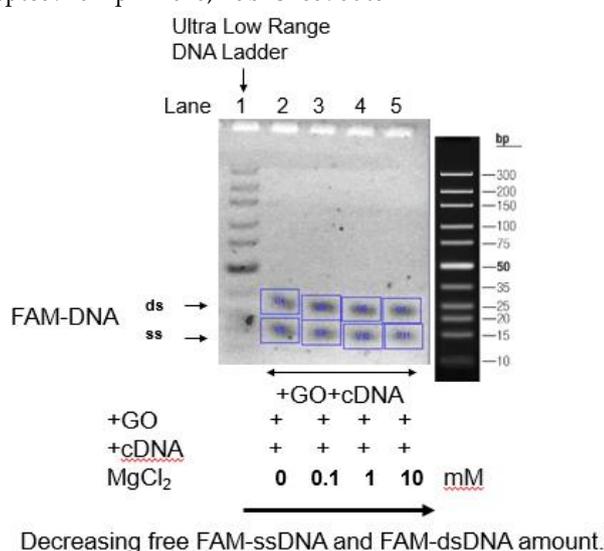


Figure S1. FAM-ssDNA and FAM-dsDNA separation by electrophoresis on 5% agarose gel. The FAM-ssDNA concentration during hybridization was $100 \text{ nM} \times \text{L}^{-1}$, the buffer: 10 mM Tris-HCl, pH 8.0, 10 $\mu\text{g}/\text{mL}$ graphene oxide, 23 °C, 1 h incubation time for hybridization, then 1 hour incubation with GO. FAM-ssDNA: cDNA molar ratio 1:1. At concentrations higher than 0.1 mM MgCl_2 , both single stranded FAM-ssDNA and double stranded FAM-dsDNA were bound to GO.

Table S1. FAM-ssDNA and FAM-dsDNA relative quantitation by densitometry. Quantity One software from Bio-Rad, (data from Figure S1).

FAM-DNA	MgCl ₂ (mM)	Area (mm ²)	Volume INT × mm ²	Adj. Vol. INT × mm ²	% Adj. Vol	ds band + ss Band Total Amount
2 ds band	0	2390	211,820.6	44,424.2	10.96	–
3 ds band	0.1	2390	208,765.4	41,369.0	10.20	–
4 ds band	1	2390	199,616.2	32,219.8	7.95	–
5 ds band	10	2390	193,285.2	25,888.8	6.38	–
2 ss band	0	2390	210,297.9	42,901.5	10.58	21.54
3 ss band	0.1	2390	198,728.4	31,332.0	7.73	17.93
4 ss band	1	2390	190,127.5	22,731.1	5.61	13.55
5 ss band	10	2390	183,833.2	16,436.8	4.05	10.44
Background	–	2390	167,396.4	0.0	N/A	–

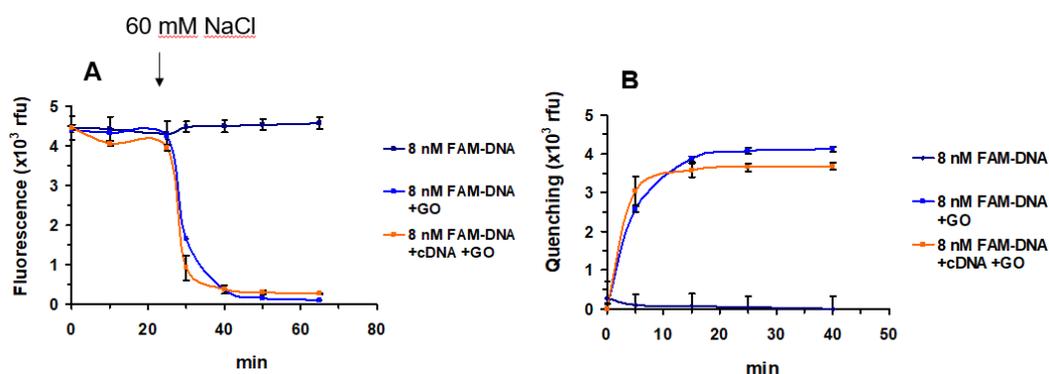


Figure S2. FAM-DNA binding to GO in the presence of SDS, BSA and NaCl. (A) Plot of relative fluorescence units when using 8 nM L⁻¹ FAM-ssDNA, (FAM-ssDNA:cDNA, probe:target molar ratio = 1:1) initially in the presence of 6 mM NaCl, 0.065% SDS, 0.1% BSA, 1 mM EDTA, 10 mM Tris-HCl, pH 8.0 and 5 µg/mL GO. Arrow indicates time point of addition of 60 mM NaCl (B) Plot of fluorescence quenching as FAM-DNA binds GO upon addition of 60 mM NaCl. Data for B after t = 0 min equivalent to values in (A) after t 30 min.

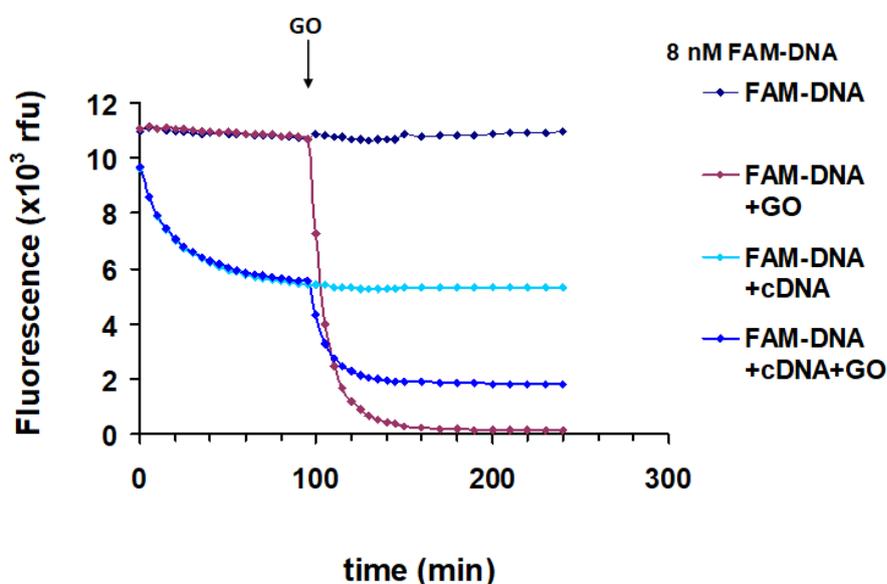


Figure S3. FAM-DNA binding to GO in the presence of SDS, BSA and NaCl, FAM-DNA+cDNA hybridization control. Plot of relative fluorescence units when using 8 nM L⁻¹ FAM-ssDNA (FAM-ssDNA:cDNA, probe:target molar ratio = 1:1), in the presence of 40 mM NaCl, 0.1% SDS, 0.1% BSA, 1 mM EDTA, 10 mM Tris-HCl, pH 8.0 and 5 µg/mL GO, at 23 °C. Arrow indicates time point when GO was added. Prior reduction of fluorescence reflected oligonucleotide hybridization detected by photoinduced electron transfer (PET).

