

SUPPORTING INFORMATION

FIGURE

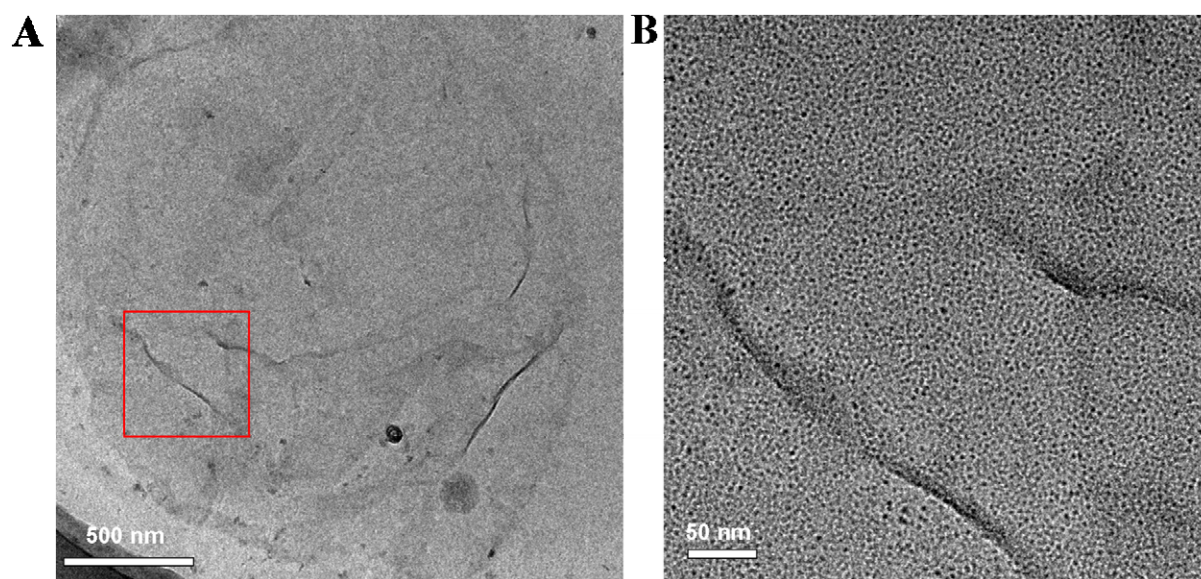


Fig. S1 A, B) TEM image of AgNCs - GO nanohybrid materials.

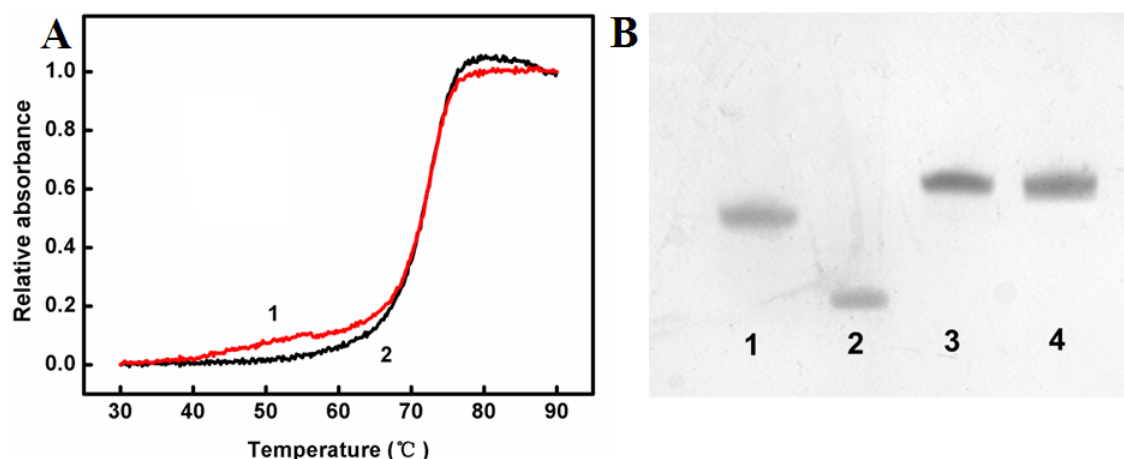


Fig. S2 (A) Thermal melting profiles of solutions containing 1) DNA1/T1 complex, 2) The DNA1-AgNCs/T1 complex ($[DNA1] = 2 \mu M$, $[DNA1-AgNCs] = 2 \mu M$, $[T1] = 2 \mu M$). The absorbance at 260 nm was measured in 20 mM PBS buffer at pH 6.6. (B) Electrophoretic analysis of the DNA structure. Lane 1: strand DNA1; lane 2: strand T1; lane 3: DNA1+T1; lane 4: DNA1-AgNCs+T1.

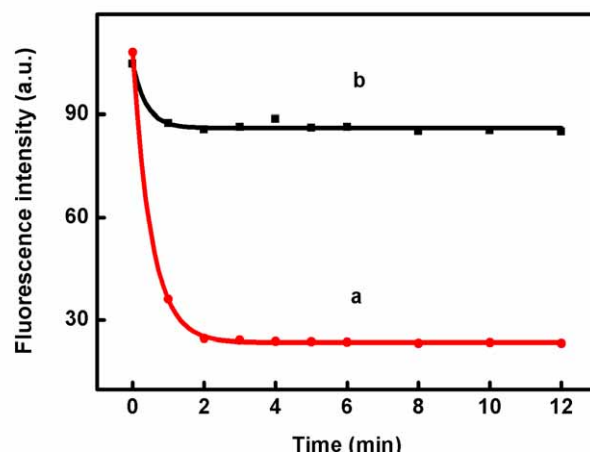


Fig. S3 Kinetic study for the fluorescence change of (a) probe DNA P1 (1 μM) and (b) P1 (1 μM) and target DNA T1 (1 μM) in the presence of GO. The excitation and the emission wavelengths are 560 and 600 nm, respectively.

Table S1 Performance comparison between homogeneous fluorescent DNA sensors.

Type	Sensitivity	Assay time	Probe synthesis	Multicolor analysis	Ref.
Molecular beacons	~60 nM	Rapid (~10 min)	Difficult (dual labeling)	Yes	1
AuNP–DNA–dye conjugates (stem loop probe)	67 pM	Rapid (a few minutes)	Difficult (dual labeling)	Yes	2
Unmodified AuNP-based DNA detection	10 nM	Slow (> 30min)	Difficult (dual labeling)	NR [a]	3
SWNT-based DNA detection	4 nM	Slow (several hours)	Convenient (single labeling)	NR	4
Carbon nanoparticles-based DNA detection	~33 nM	Slow (40 min)	Convenient (single labeling)	NR	5
Mesoporous carbon microparticles-based DNA detection	2.5 nM	Rapid (30 min)	Convenient (single labeling)	NR	6
GO-based DNA detection (premixing)	~10 nM	Slow (0.5 h)	Convenient (single labeling)	NR	7
GO-based DNA detection (postmixing)	100 pM	Rapid (~1min)	Convenient (single labeling)	Yes	8
AgNCs based DNA detection	14 nM	Slow (45 min)	Convenient (no labeling)	NR	9
AgNCs-GO nanohybrid materials-based DNA detection	1 nM	Rapid (10 min)	Convenient (no labeling)	Yes	TW [b]

[a] NR stands for “Not reported”. [b] TW stands for “this work”.

As shown in table 1, the silver nanoclusters – graphene oxide nanohybrid materials are the first examples that can be used in multicolor analysis without labeling.

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[2] B. Dubertret, M. Calame, A. J. Libchaber, *Nat. Biotechnol.*, 2001, **19**, 365.

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[7] C. Lu, H. Yang, C. Zhu, X. Chen, G. Chen, *Angew. Chem. Int. Ed.*, 2009, **48**, 4785.
[8] S. He, B. Song, D. Li, C. Zhu, W. Qi, Y. Wen, L. Wang, S. Song, H. Fang, C. Fan, *Adv. Funct. Mater.*, 2010, **20**, 453.
[9] G.-Y. Lan, W.-Y. Chen, H.-T. Chang, *Biosens. Bioelectron.*, 2011, **26**, 2431.

Oligonucleotide sequences are listed below (mismatch underlined):

DNA 1:

5'-AGT CAG TGT GGA AAA TCT CTA GC CCC CCC CCC CCC -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'

T3 (two-base mismatched target):

5'-GCT AGA GAT TGT ACA CAC TGA CT-3'

T4 (non-complementary target):

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

DNA2:

5'-CCC ACC CAC CCT CCC AAT ACA GAG GCA GAC CA-3'

T5 (complementary target):

5'-TGG TCT GCC TCT GTA T-3'

DNA3:

5'-CCC CCC CCC CCC CCC CCT ATA AGG AGA CCC ACG-3'

T6 (complementary target):

5'-CGT GGG TCT CCT TAT A-3'