Electronic Supplementary Information (ESI)

Label-free DNA detection based on oligonucleotide-stabilized silver nanoclusters and exonuclease III-catalyzed target recycling amplification

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Table S1 Sequences of the oligonucleotides used in the assay

Name	Oligonucleotides sequence (5'-3')
N-DNA	CCCTTAATCCCCTATAATAAATTTTAAATATTATTTATTAATAAAAAA
G-DNA	ATTAATAAATAATATTTAAAATTTATTATAGGGTGGGGTGGGGTGGGG
T-DNA	CCCCACCCCACCCCACCCTATAATAAATTTTAAATATTATTTATTAATA AAAAA
One-base mismatched target DNA (T1)	CCCCACCCCACCCCACCCTATAATAAAATTTAAATATTATTTATTAATA AAAAA
Three-base mismatched target DNA (T3)	CCCCACCCCACCCCACCCTATAATAATAGTTAAATATTATTTATTAATA AAAAA
Random target DNA (RA)	GATGAATACCTAGGACACTTACTATTAAACTGGTTTGGGAAAACCAAA TATATT

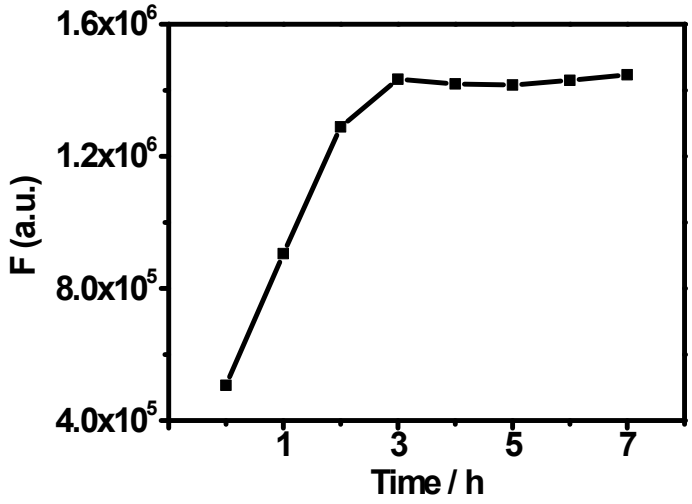

Fig. S1 Effect of reduction time on the assay.

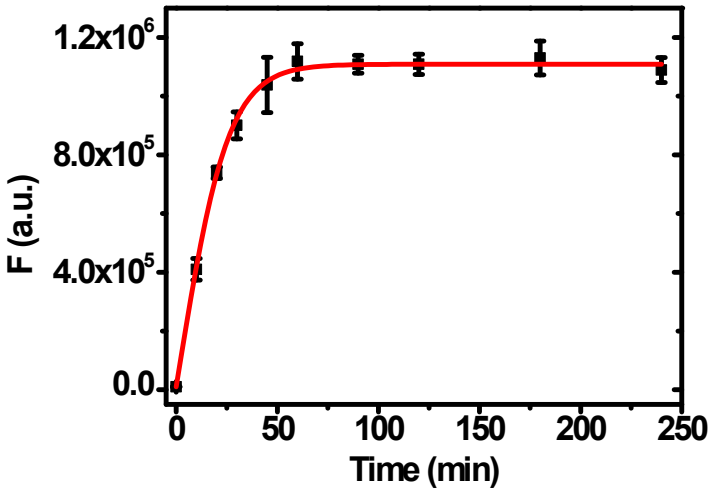

Fig. S2 Effect of incubation time of N-DNA-Ag NCs enhanced by G-DNA. Error bars are calculated based on three replicates.

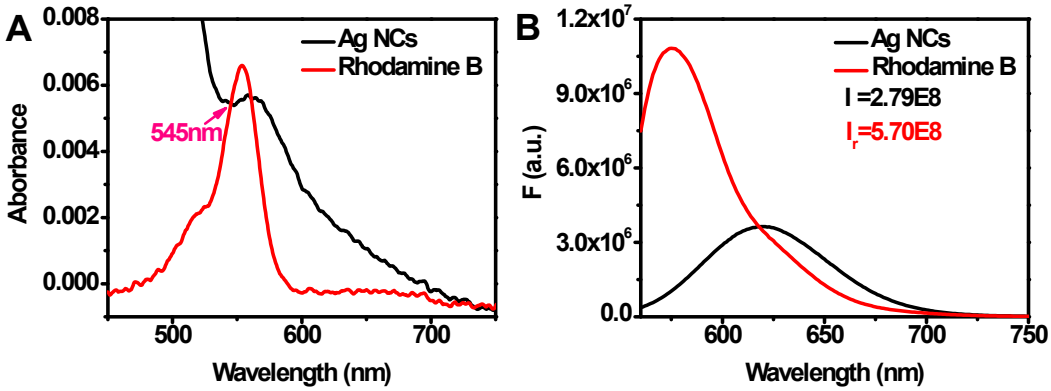

Fig. S3 (A) UV-vis absorption spectra and (B) fluorescence emission spectra of (black) N/G-DNA-Ag NCs and (red) the standard Rhodamine B with excitation at 545nm, where the absorbance values are equal.

Rhodamine B in water (QY=0.31) is chosen as a standard.[1,2] The quantum yield of N/G-DNA-Ag NCs in water is calculated according to:

$$\Phi = \Phi_r \times \frac{I}{I_r} \times \frac{A_r}{A} \times \frac{n^2}{n_r^2}$$

Where the subscript "r" denotes the reference fluorophore of Rhodamine B, Φ is the quantum yield and Φ_r is 31%, I is the integrated emission peak areas, A and A_r are equal in this case, n and n_r are the refractive indices of the solvents (1.33 for water).

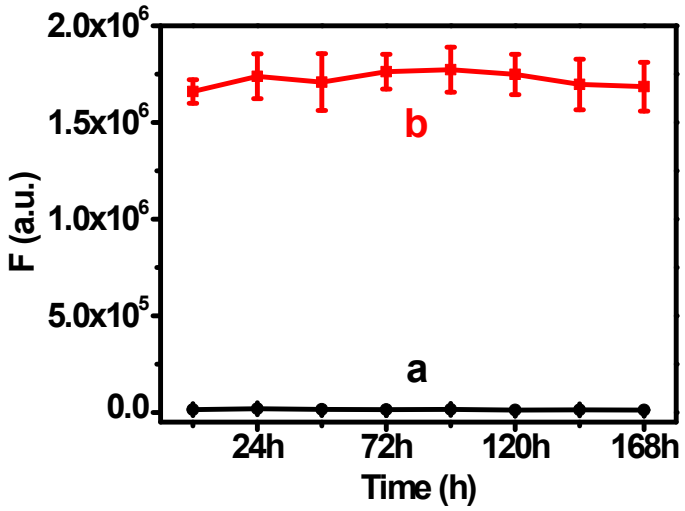

Fig. S4 Fluorescence changes of (a) N-DNA-Ag NCs and (b) N/G-DNA-Ag NCs within 1 week. Error bars are calculated based on three replicates.

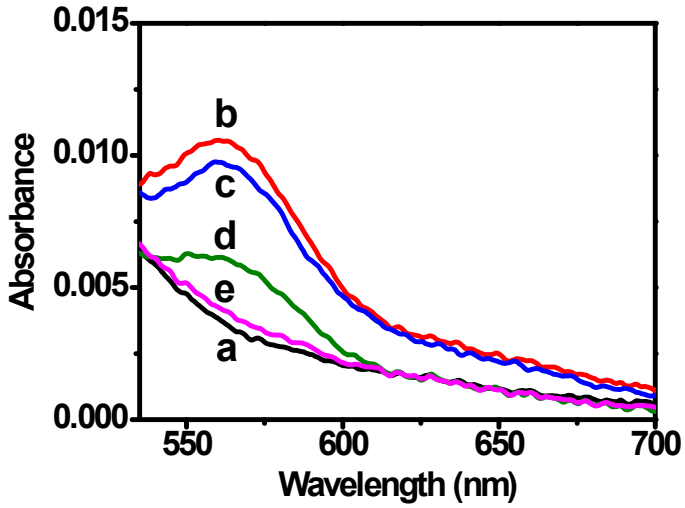

Fig. S5 UV-vis absorption spectra of solutions (a) N-DNA-Ag NCs, (b) N/G-DNA-Ag NCs, (c) N/G-DNA-Ag NCs in the presence of Exo III. (d) N/G-DNA-Ag NCs in the presence of T-DNA (e) N/G-DNA-Ag NCs in the presence of T-DNA and Exo III. [N-DNA] = 10 μM, [G-DNA] = 10 μM, [T-DNA] = 1 μM, [Exo III] = 300 U.

The successful Exo III amplification was supported by the corresponding UV-vis absorption spectra (Fig. S5). The UV-vis absorption spectra for N-DNA-Ag NCs (curve a), N/G-DNA-Ag NCs (curve b), N/G-DNA-Ag NCs in the presence of Exo III (curve c), N/G-DNA-Ag NCs in the presence of T-DNA (curve d) and N/G-DNA-Ag

NCs in the presence of T-DNA and Exo III (curve e) were fully in accordance with their fluorescence spectra.

References

1 D. Magde, G. E. Rojas and P. G. Seybold, Photochemistry and Photobiology, 1999, **70**, 737-744.

2 J. H. Shen, Y. H. Zhu, C. Chen, X. L. Yang and C. Z. Li, Chem. Commun., 2011, **47**, 2580-2582.