Supplementary Information

A New Approach to Light up DNA/Ag Nanocluster-based Beacons for Bioanalysis

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Supplementary Table and Figures

Table S1. Names and sequences of the oligonucleotides.

Oligonucleotide	Sequence
Ag-DNA	5′-CCCTTAATCCCCAGCACATCTGATAGTTCTATGCT-3′
En-DNA	5′-GAACTATCAGATGTGCTGGGTGGGGTGGGGTGGGG-3′
B-DNA	5′-TATATCAGCATAGAACTATCAGATGTGCT-3′
T1: T-DNA	5′-AGCACATCTGATAGTTCTATGCTGATATA-3′
T2	5′-AGCACATCTGATAGTTCTATGCTTATATA-3′
T3	5′-AGCACATCTGATTGTTCTATGCTTATATA-3′
T4	5′-AGCATATCTGTTAGTTATATGCTTATATA-3′
B-DNA (Amplification)	5′-TATATCAGCATAGAACTATCAGATGTGCTATGA-3′
T-DNA (Amplification)	5′-TCATAGCACATCTGATAGTTCTATGCTGATATAGTGA-3′
A-Ag-DNA	5′-CCCTTAATCCCCAGCACATCTGATAACCACACCAA-3′
A-En-DNA	5′-GTGGTTATCAGATGTGCTGGGTGGGGTGGGGTGGGG-3′
A-B-DNA	5′- ATCAGATGTGCT-3′
Aptamer	5′- GGTTGGTGTGGTTGG-3′

Table S2. The lifetimes of dark DNA/Ag NCs and bright DNA/Ag NCs.

sample	τ_1 (ns)	A_1 (%)	τ_2(ns)	A_2 (%)	τ_{ave} [a] (ns)	x^2
Bright Ag NCs	3.72	97.66	9.20	2.34	3.85	1.100
Dark Ag NCs	3.14	93.65	9.44	6.35	3.54	1.024

[a] The average lifetime was calculated according to $\tau_{ave} = \Sigma A_i \tau_i$.

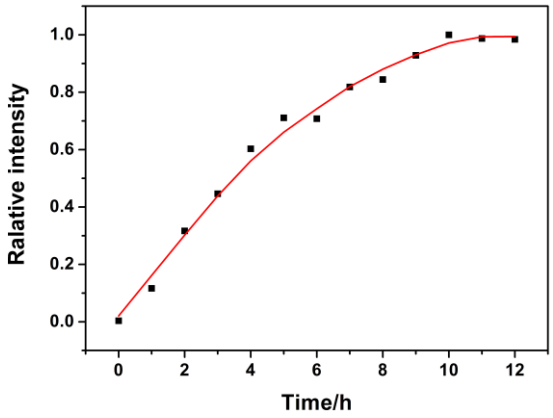

Figure S1 The fluorescence intensity of bright DNA/Ag NCs enhanced as a function of incubation time.

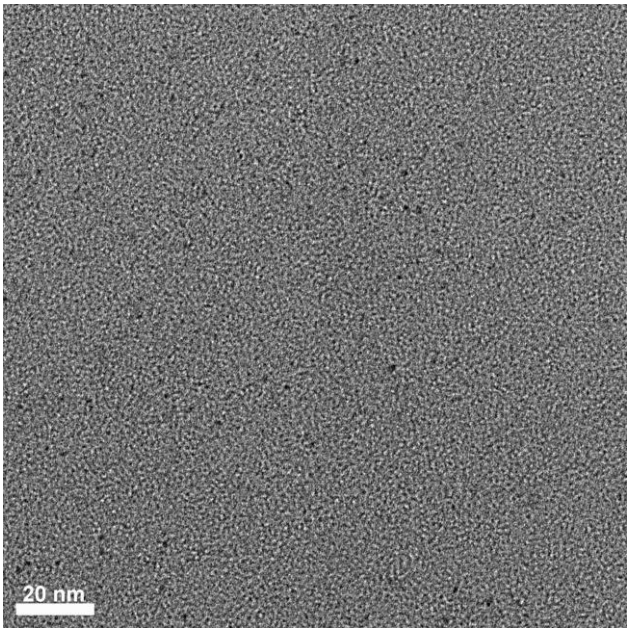

Figure S2TEM image of DNA/Ag NCs.

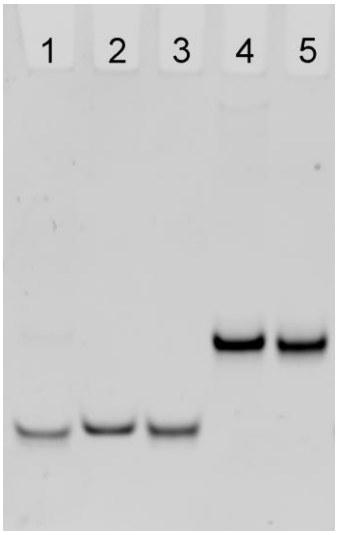

Figure S3 Native polyacrylamide gel electrophoresis analysis of the behavior of DNA strands with and without clusters. Lane **1**: En-DNA; lane **2**: Ag-DNA; lane **3**: Ag-DNA with clusters; lane **4**: En-DNA+Ag-DNA; lane **5**: En-DNA+Ag-DNA with clusters.

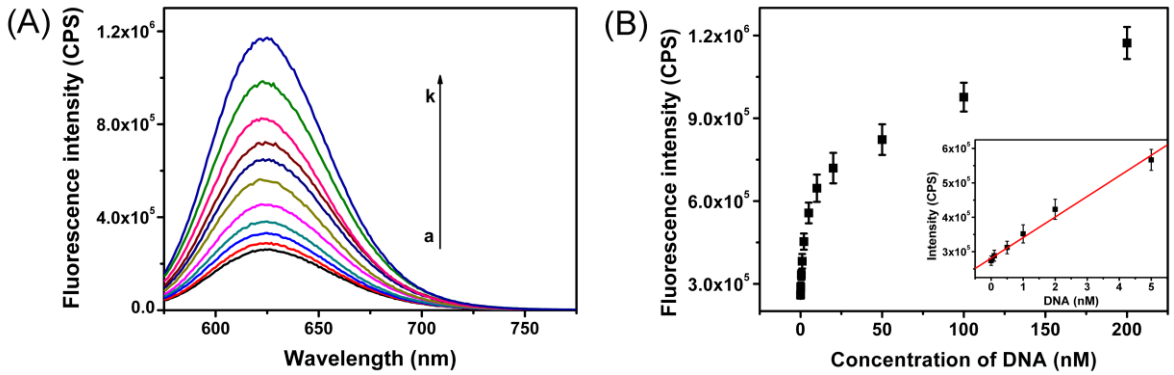

Figure S4 (A) Fluorescence emission spectra of analyzing different concentrations of T-DNA using the ExoIII-based amplification method (from **a** to **k**): 0, 0.1, 0.5, 1, 2, 5, 10, 20, 50, 100, 200 nM. The concentration of other DNA used is all 1.0 μM. **(B)** The relationship between the fluorescence intensity and the concentration of T-DNA. The inset shows a linear relationship (R = 0.993) over the concentration of T-DNA from 0.1 to 5.0 nM.

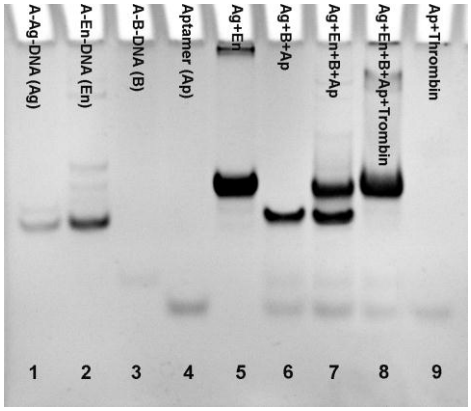

Figure S5 Native 15% polyacrylamide gel analysis of strand displacement mechanism. Different DNA were added into lanes 1-9. Lane 1: A-Ag-DNA; lane 2: A-En-DNA; lane 3: A-B-DNA; lane 4: Aptamer; lane 5: A-Ag-DNA+A-En-DNA; lane 6: A-Ag-DNA+A-B-DNA+Aptamer; lane 7: A-Ag-DNA+A-En-DNA+A-B-DNA+Aptamer; lane 8: A-Ag-DNA+A-En -DNA+A-B-DNA +Aptamer+thrombin ; lane 9: Aptamer+thrombin. Concentrations for each DNA in PAGE are all 1.0 μM.

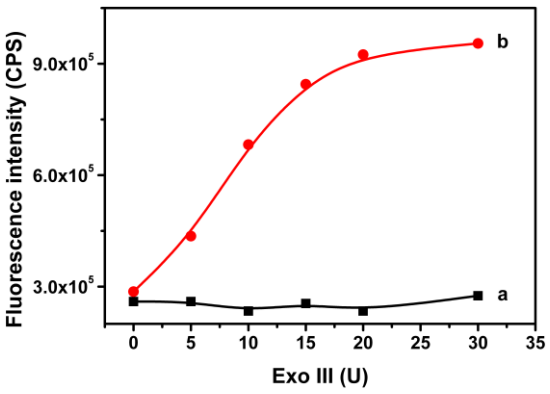

Figure S6 Fluorescent intensity at 620 nm with different amounts of Exo III; curve a : 0 nM target DNA present, curve b : 100 nM target DNA present.