

## Supporting Information

### **A novel, label-free fluorescence detection method for the formation of the G-quadruplex DNAs based on the DNA-templated silver nanoclusters**

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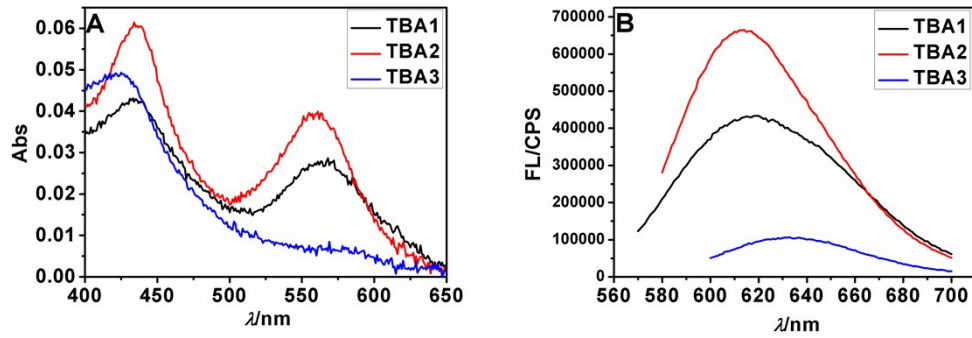
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**Table S1.** Names and sequences of the oligonucleotides.

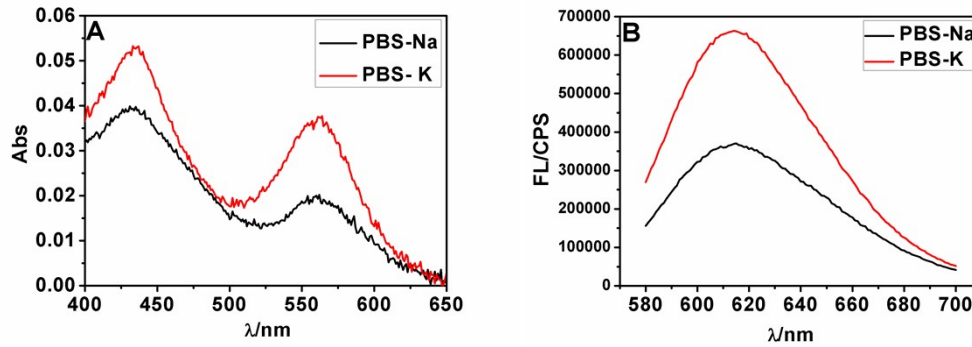
Oligonucleotides	Sequences (5' - 3')
TBA1	CCCTTAATCCCCTTTGGTTGGTGTGGTTGGAAACCCTAACTCCCC
TBA2	CCCTTAATCCCCTTTGGTTGGTGTGGTTGGAAACCCTTAATCCCC
TBA3	CCCTTAATCCCCTTTGGTTGGTGTGGTTGGAAAGGGTGGGGTGGGG TGGGG
C-TBA2	TTTCCAACCACACCAACCAAA
TBA	GGTTGGTGTGGTTGG
M-TBA2	CCCTTAATCCCCTTTGGTTGATGTGATTGGAAACCCTTAATCCCC
AGRO100	CCCTTAATCCCCGGTGGTGGTGGTTGTGGTGGTGGTGGCCCTTAAT CCCC
C-AGTO100	CCACCACCACCACAACCACCACCACC
O-AGRO100	GGTGGTGGTGGTTGTGGTGGTGGTGG
T30695	CCCTTAATCCCCTTTGGGTGGGTGGGTGGGTAAACCCTTAATCCCC
C-T30695	TTT ACCCACCACCCACCC AAA
O-T30695	GGGTGGGTGGGTGGGT
kit	CCCTTAATCCCCTTTTCGGGCGGGCGCGAGGGAGGGGAAACCCTTA ATCCCC
C-kit	TTT CCCCTCCCTCGCGCCCGCCCG AAA
O-kit	CGGGCGGGCGCGAGGGAGGGG
bcl-2	CCCTTAATCCCCTTTGGGCGCGGGAGGAAGGGGGCGGGAAACCCT TAATCCCC
C-bcl-2	TTT CCCGCCCCCTTCCTCCCGCGCCC AAA
O-bcl-2	GGGCGCGGGAGGAAGGGGGCGGG
HTG	CCCTTAATCCCCTTTGGGTAGGGTTAGGGTTAGGGAAACCCTTAA TCCCC
C-HTG	TTT CCCTAACCTAACCTAACCC AAA
O-HTG	GGGTAGGGTTAGGGTTAGGG

**Table S2** The lifetimes of different DNA-Ag NCs

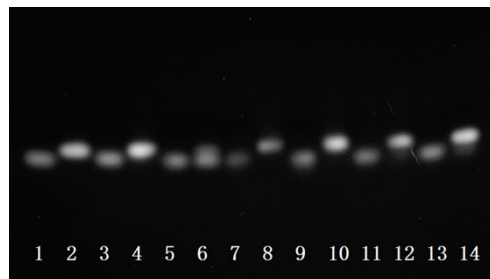
Samples	$\tau_1$ (ns)	$\alpha_1$ (%)	$\tau_2$ (ns)	$\alpha_2$ (%)	$\tau_3$ (ns)	$\alpha_3$ (%)	$\langle \tau_a \rangle$	$\chi^2$
TBA2	0.84	26.99	2.53	67.72	6.42	5.29	2.28	1.000
TBA2/C-TBA2	0.73	26.93	2.47	67.87	6.63	5.19	2.22	1.000
M-TBA2	0.82	28.84	2.44	64.24	5.40	6.91	2.18	1.000



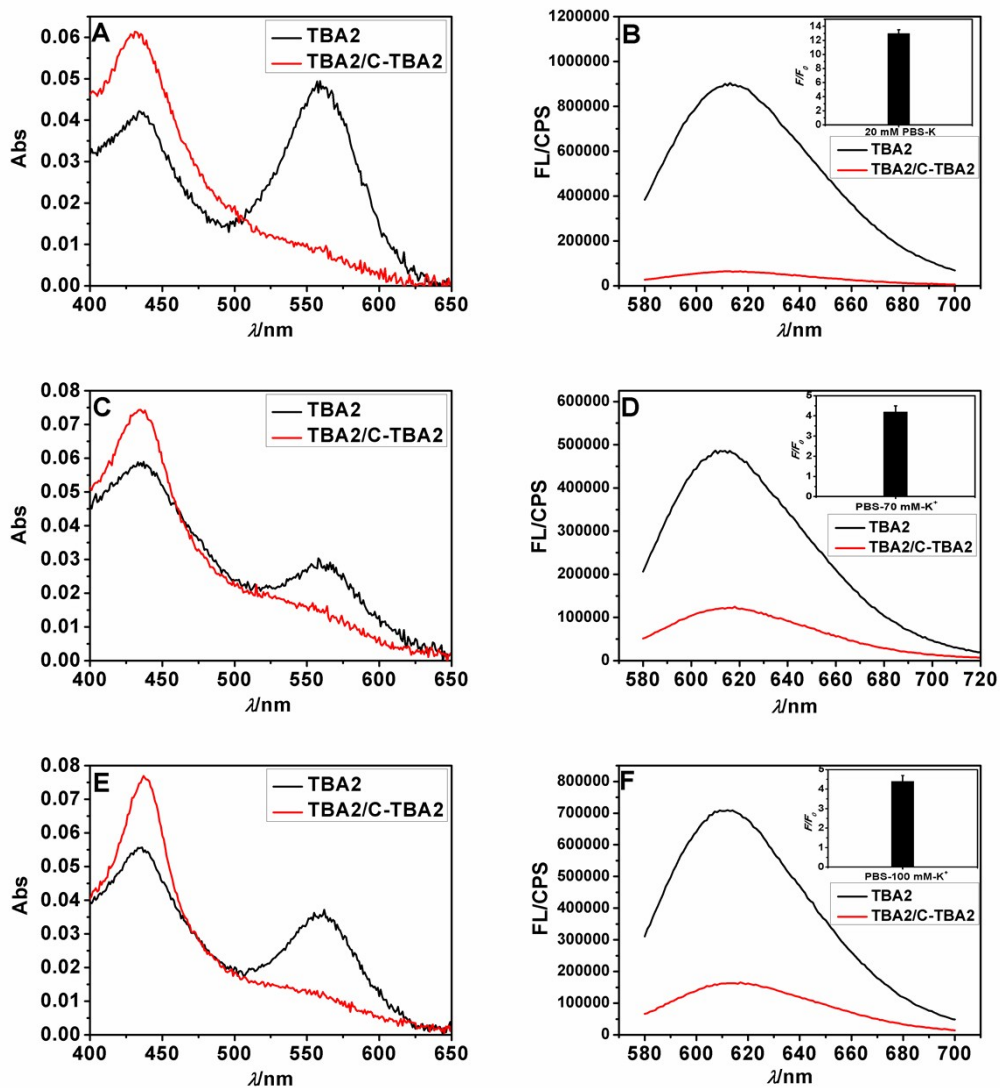
**Fig.S1** The Ag NCs synthesized with the sequences of TBA1, TBA2, and TBA3 as the templates in 20 mM PBS-K buffer. (A) UV-vis absorption spectra and (B) Fluorescence emission spectra of DNA-Ag NCs.



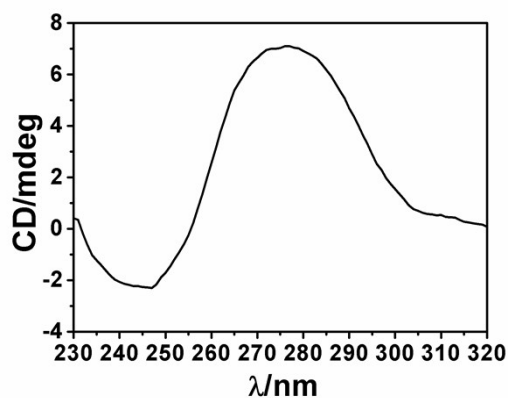
**Fig.S2** The TBA2-Ag NCs synthesized in 20 mM PBS-Na or PBS-K buffer. (A) UV-vis absorption spectra and (B) Fluorescence emission spectra of DNA-Ag NCs.



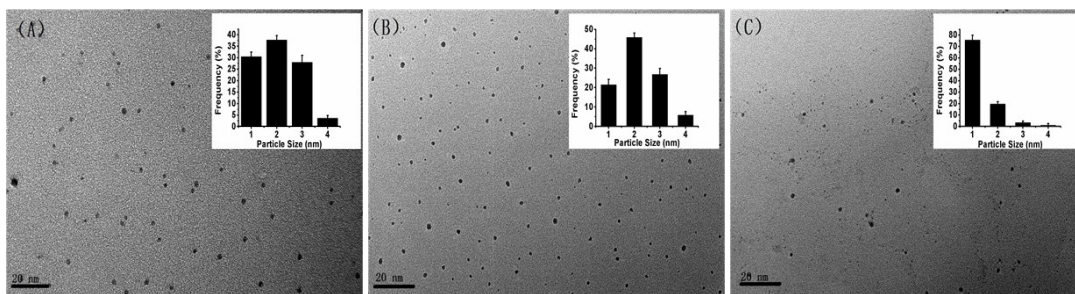
**Fig.S3** Agarose gel electrophoresis (AGE) analysis. Different DNAs were added into lanes 1-14. Lane 1: TBA2; lane 2: TBA2/C-TBA2; lane 3: AGRO100; lane 4: AGRO100/C-AGRO100; lane 5: T30695; lane 6: T30695/C-T30695; lane 7: kit; lane 8: kit/C-kit; lane 9: bcl-2; lane 10: bal-2/C-bcl-2; lanes 11 and 13: HTG; lanes 12 and 14: HTG/C-HTG. They were in PBS buffer contains 40 mM K<sup>+</sup> (lanes 1-12) or Na<sup>+</sup> (only for lanes 13 and 14). Concentrations for each DNA in AGE are all 3.0 μM.



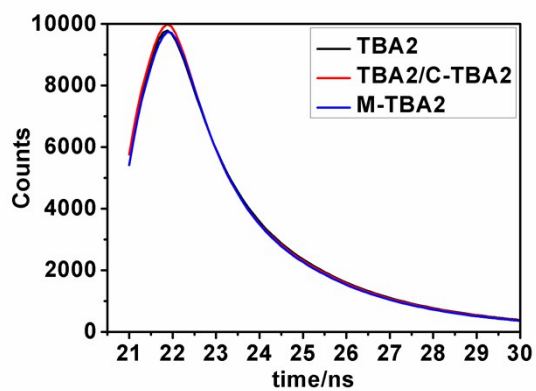
**Fig.S4** The Ag NCs synthesized with the sequences TBA2 and TBA2/C-TBA2 in Table S1 as the templates. The UV-vis absorption spectra (A, C and E) and the fluorescence emission spectra (B, D and F) of Ag NCs in the presence of different concentrations of  $K^+$ . The inset showed the  $F/F_0$ . A and B: 20 mM PBS-K buffer; C and D: PBS buffer containing 70 mM  $K^+$ ; E and F: PBS buffer containing 100 mM  $K^+$ .



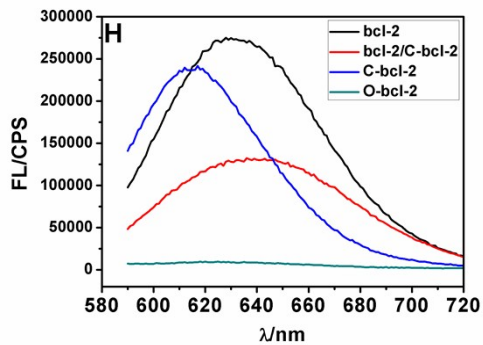
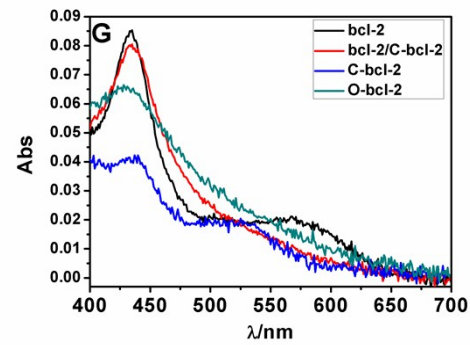
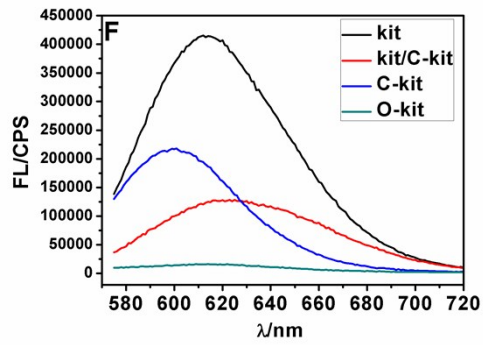
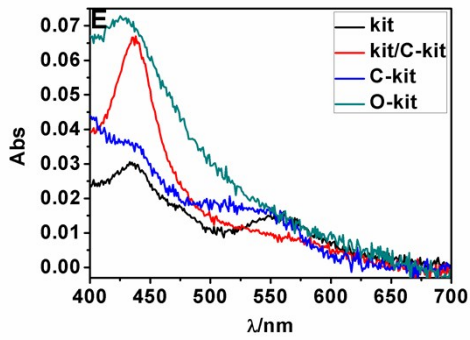
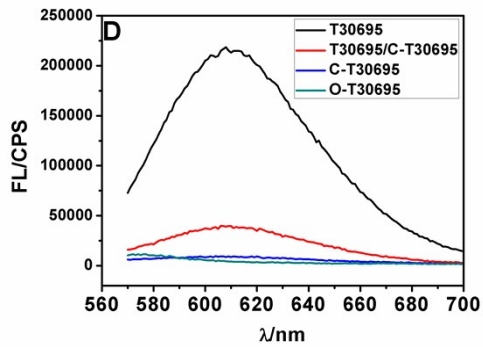
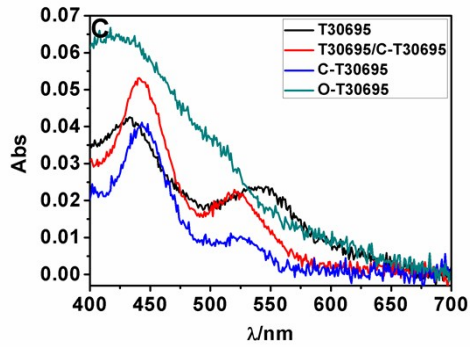
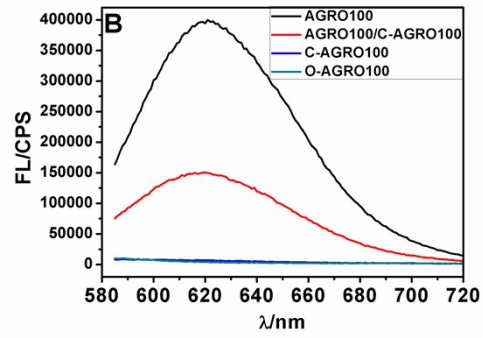
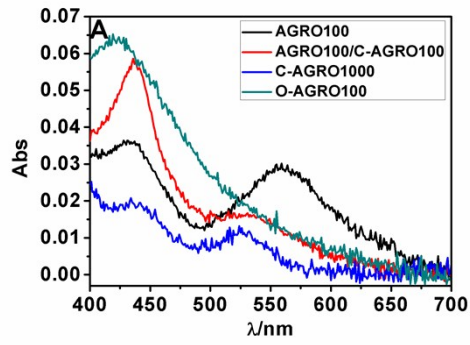
**Fig.S5** CD spectra of TBA2-Ag NCs obtained with 5  $\mu$ M DNA in PBS buffer containing 40 mM  $K^+$ .

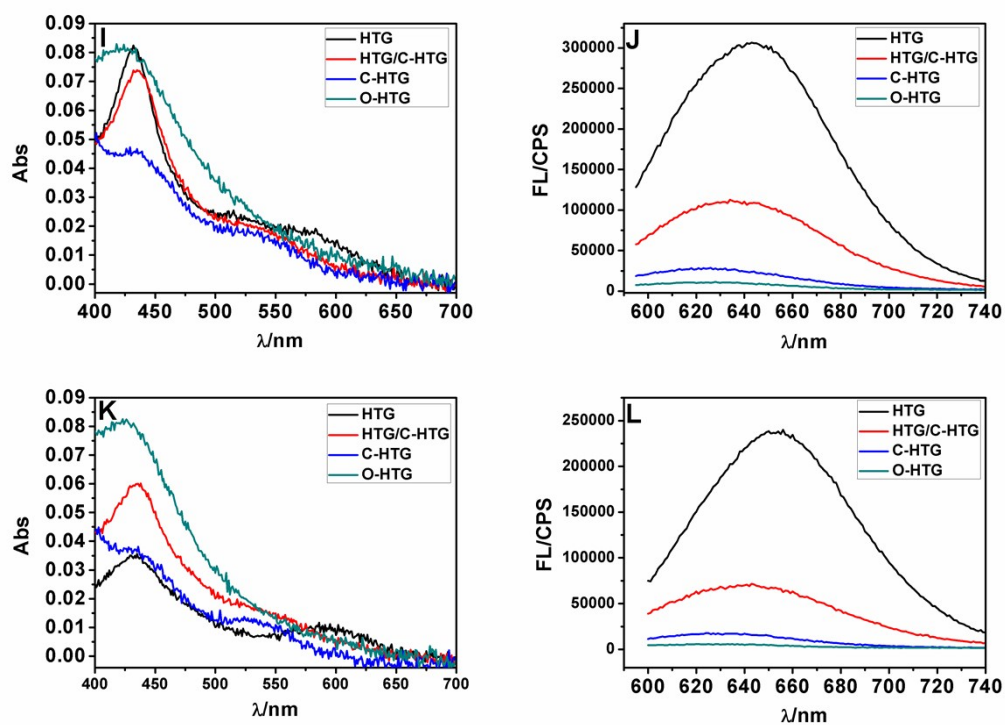


**Fig.S6** TEM images of TBA2-Ag NCs (A), TBA2/C-TBA2-Ag NCs (B) and M-TBA2-Ag NCs (C). The inset showed the size distribution histogram.



**Fig.S7** The TCSPC data for TBA2-Ag NCs, TBA2/C-TBA2-Ag NCs and M-TBA2 Ag NCs (excitation at 405 nm and emission at 620 nm).





**Fig.S8** The UV-vis absorption spectra (A, C, E, G, I and K) and fluorescence emission spectra (B, D, F, H, J and L) of different G-rich DNA sequences templated Ag NCs. A and B: AGRO100-, C-AGRO100-, O-AGRO100 and AGRO100/C-AGRO100-templated Ag NCs; C and D: T30695-, C-T30695-, O-T30695- and T30695/C-T30695-templated Ag NCs; E and F: kit-, C-kit-, O-kit- and kit/C-kit-templated Ag NCs; G and H: bcl-2-, C-bal-2-, O-bcl-2- and bcl-2/C-bcl-2-templated Ag NCs; I, J, K and L: HTG-, C-HTG-, O-HTG- and HTG/C-HTG-templated Ag NCs. They were synthesized in PBS buffer contains 40 mM K<sup>+</sup> (A~J) or Na<sup>+</sup> (only for K and L).