Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry

Electronic Supplementary Information

pH-Responsive Self-Duplex of ^{Py}A-Substituted Oligodeoxyadenylate in Graphene Oxide Solution as a Molecular Switch

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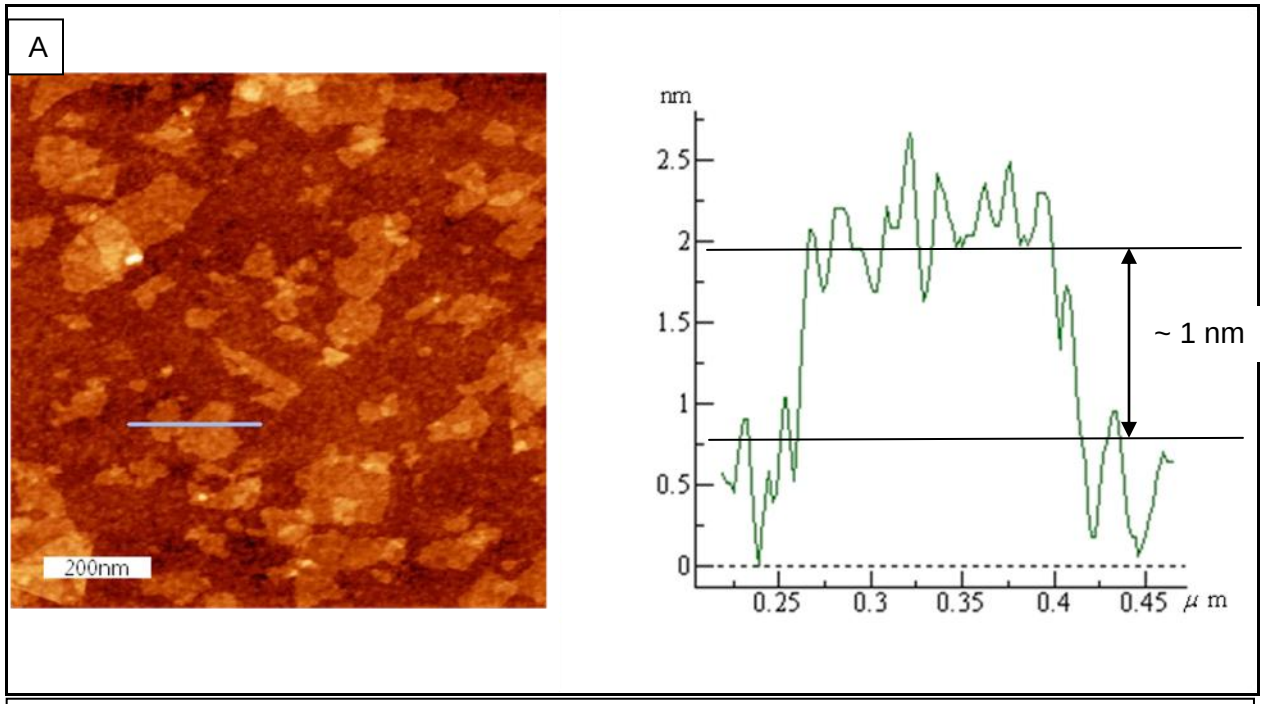
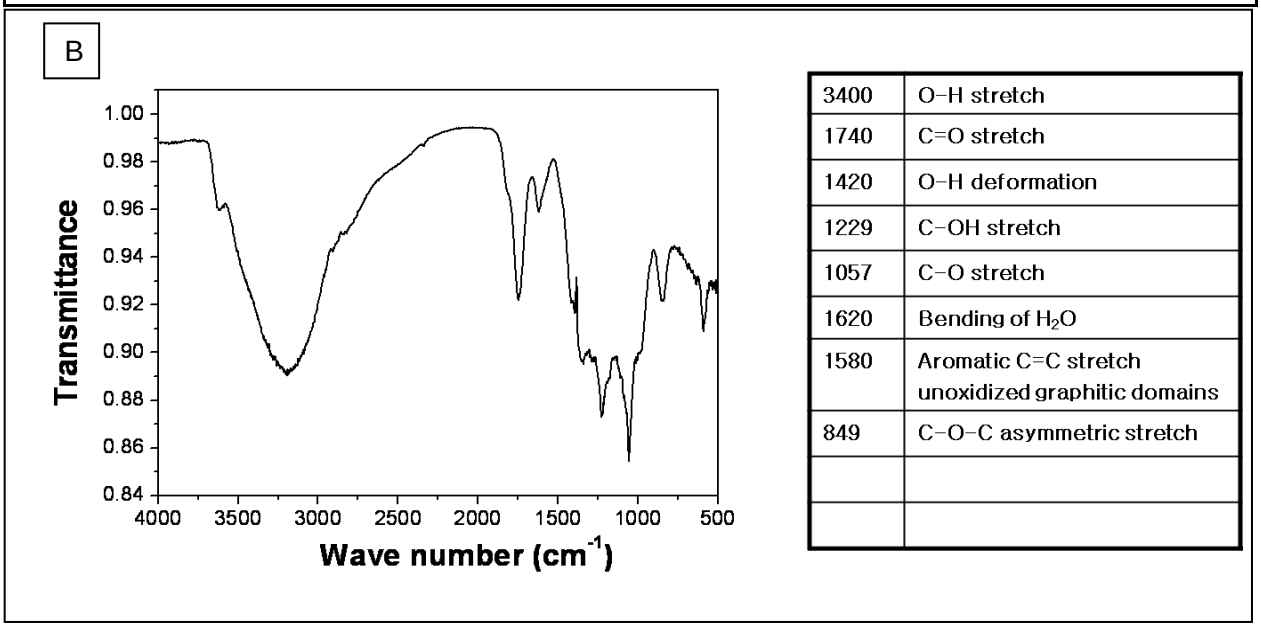
Table S1. MALDI-TOF mass spectral data ([M+]) for the ODNs

Sequence	Calc. *m/z*	Found *m/z*
ODN A	5800.1	5799.6
ODN B	5931.9	5931.1
ODN C	6921.4	6920.7
ODN D	6853.2	6852.8





3400	O–H stretch
1740	C=O stretch
1420	O–H deformation
1229	C–OH stretch
1057	C–O stretch
1620	Bending of H_2O
1580	Aromatic C=C stretch unoxidized graphitic domains
849	C–O–C asymmetric stretch

Fig. S1 A) The AFM image of used graphene oxide on SiO_2 and thickness profile of graphene oxide. B) IR spectrum of used graphene oxide.

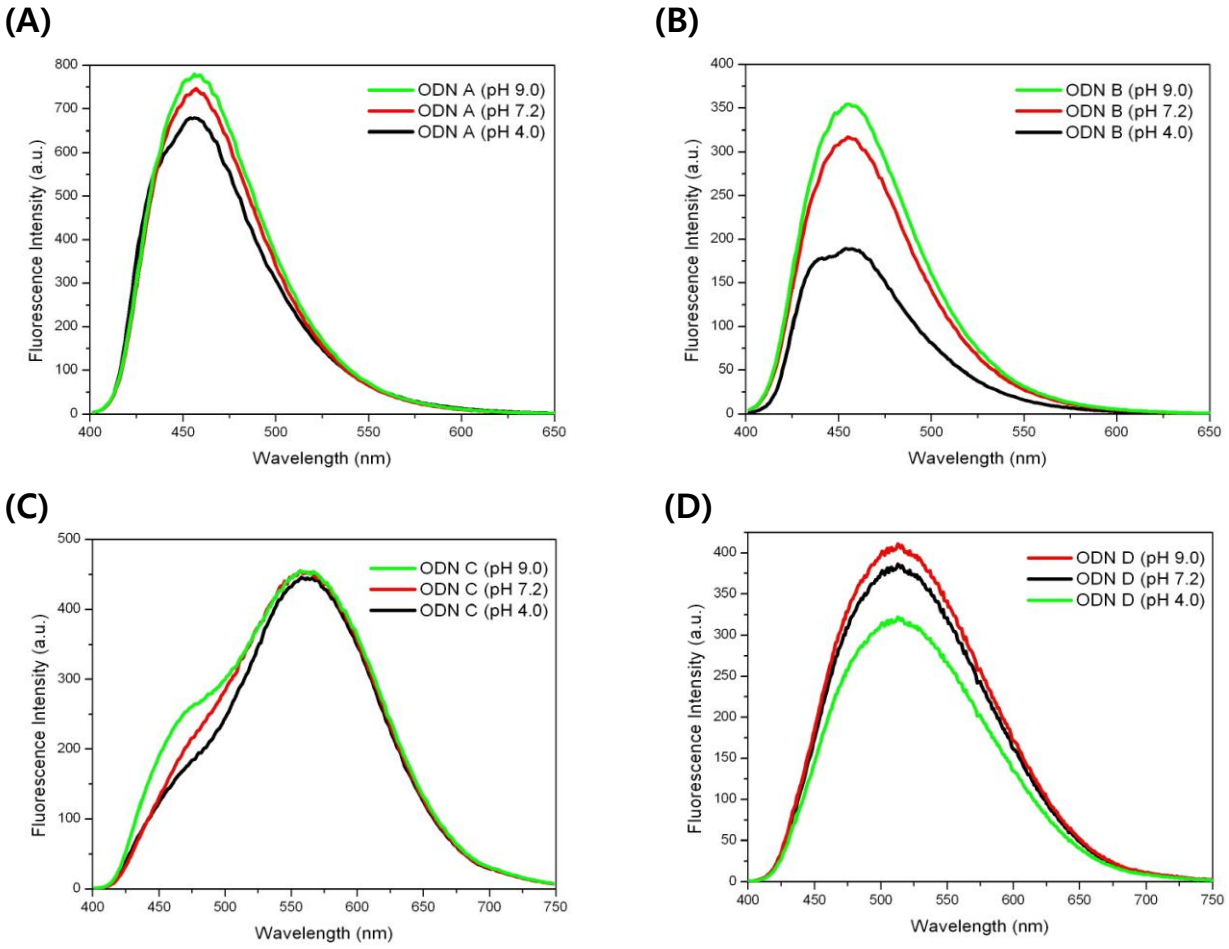


Fig. S2 Fluorescence emission spectra of ^{Py}A-substituted oligonucleotides at the different pH conditions. Spectra were recorded at 20 ℃ in 10 mM Tris–HCl (pH 7.0), 10 mM $MgCl_2$, 100 mM NaCl. Each concentration of ODN was 3.0 μM. (A) ODN A, (B) ODN B, (C) ODN C and (D) ODN D fluorescence emission spectrum

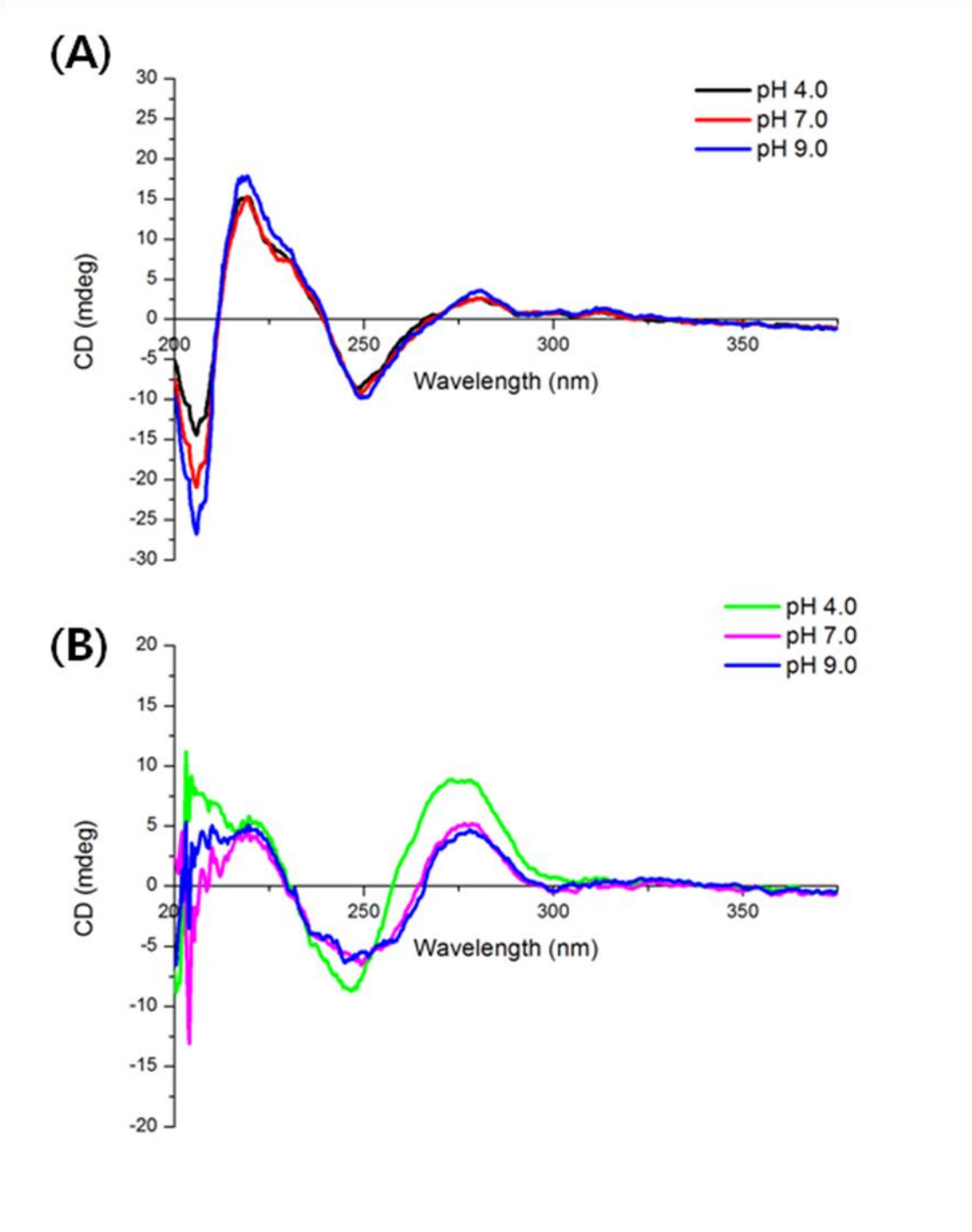


Fig. S3 CD spectra of ^{Py}A-substituted oligonucleotides (ODN A and B) at the different pH conditions. Spectra were recorded in 10 mM Tris–HCl (pH 7.0), 10 mM $MgCl_2$, 100 mM NaCl at 20 ℃. Each concentration of ODN was 3.0 μM. (A) ODN A and (B) ODN B CD spectra.

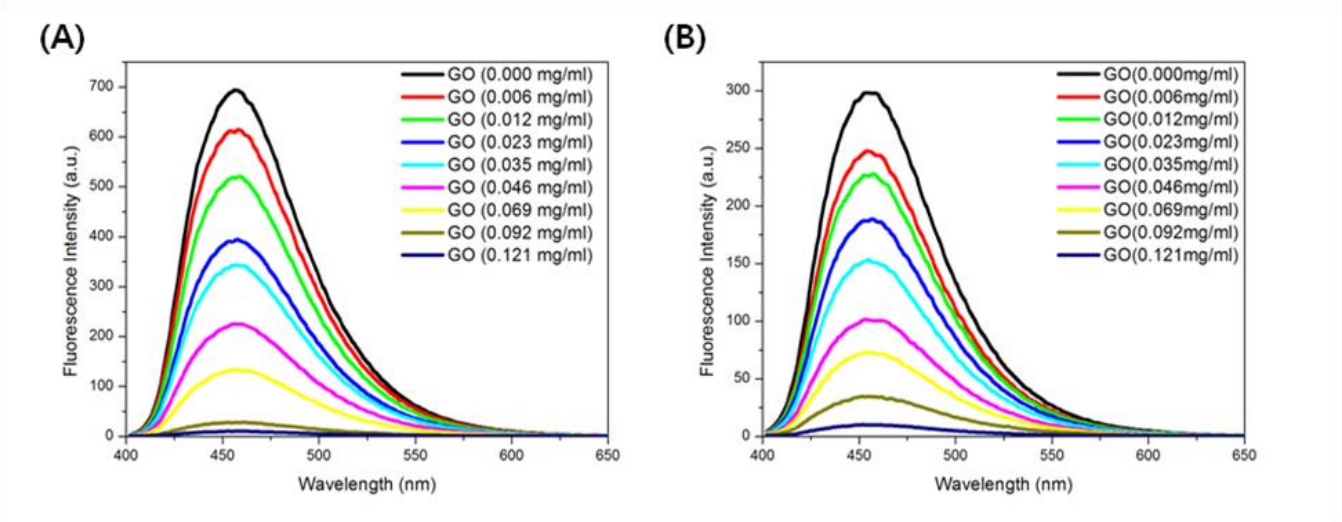


Fig. S4 Fluorescence emission spectra of ^{Py}A-substituted oligonucleotides (ODN A and B) in the presence of GO at different concentrations in 10 mM Tris-HCl buffer (pH 7.0) containing 100 mM NaCl and 10 mM $MgCl_2$ at 20°C. (A) ODN A and (B) ODN B fluorescence emission spectra in the different concentration of GO solution.

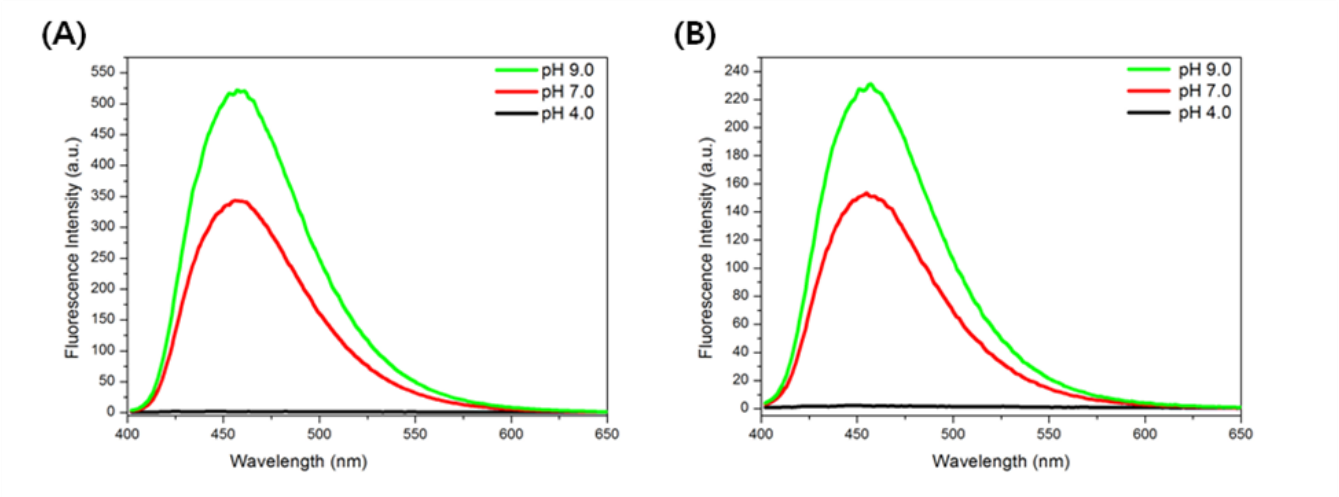


Fig. S5 Fluorescence emission spectra of ^{Py}A-substituted oligonucleotides (ODN A and B) at a fixed concentration of GO related to pH shifts. Spectra were recorded by continuously changed pH, from pH 7.0, 4.0 to 9.0 at 20 ℃ in 10 mM Tris–HCl (pH 7.0), 10 mM $MgCl_2$, 100 mM NaCl. Each concentration of ODN was 3.0 μM. (A) ODN A and (B) ODN B fluorescence emission spectra in GO solution.

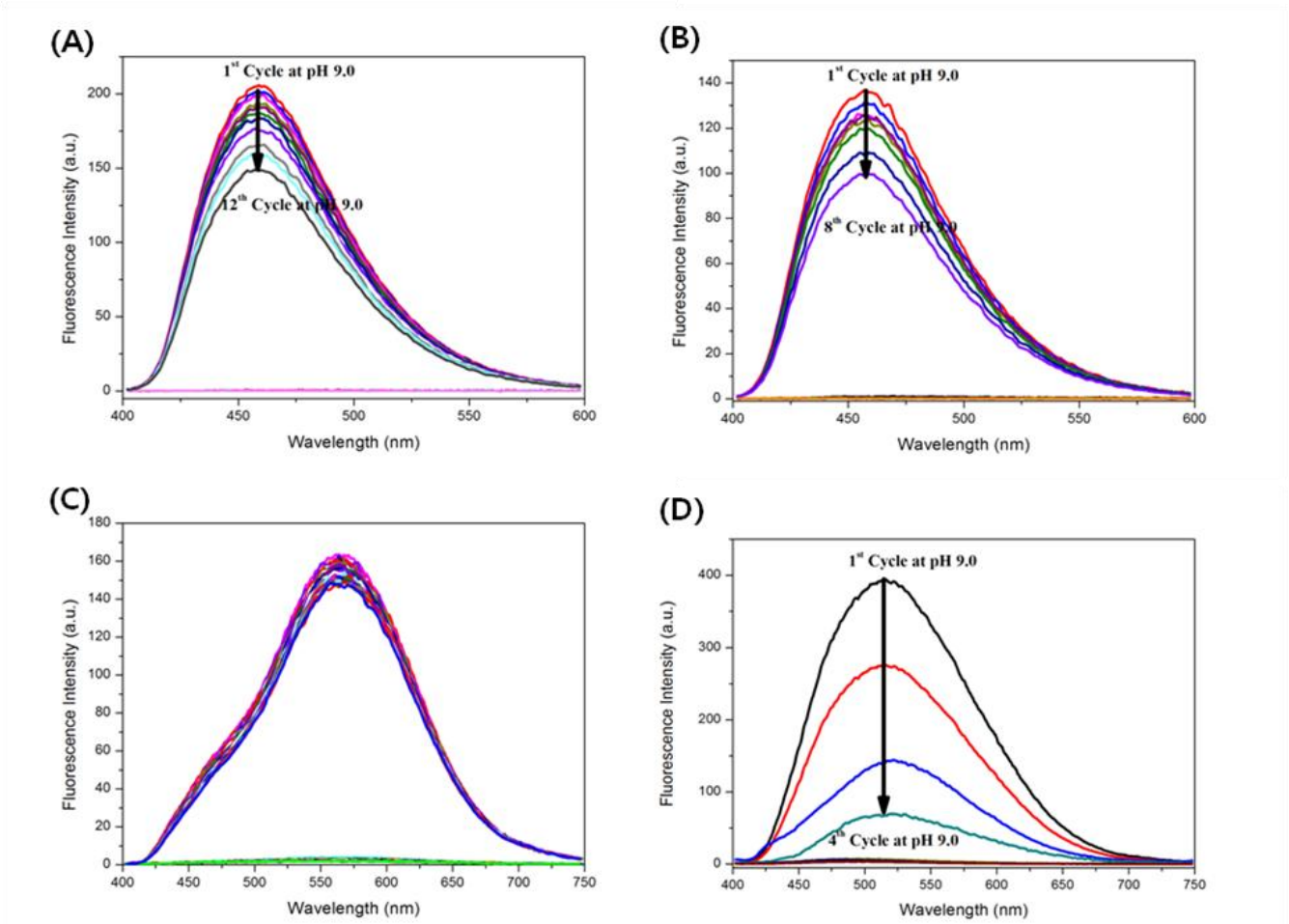


Fig. S6 Cycling of the molecular switch as observed by fluorescence spectroscopy. Spectra were recorded by continuously changed pH, from pH 4.0 to 9.0 at 20 ℃ in 10 mM Tris–HCl (pH 7.0), 10 mM $MgCl_2$ and 100 mM NaCl. Each concentration of ODN was 1.5 μM. (A) ODN A, (B) ODN B, (C) ODN C, and ODN D, respectively.