Electronic Supporting Information:

**Charge Transfer in DNA Assembly: Effects of Sticky End**

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Figure S1. Characterization of the DNA assemblies. 15% Nondenaturing PAGE analysis. (a) Lane 1: 20-bp DNA ladder; lane 2: **ST10**; lane 3: **ST8**; lane 4: **ST6**; lane 5: **ST4**; lane 6: **ST2**. (b) Lane 1: 20-bp DNA ladder; lane 2: **N1 + P1 (ST10)**; lane 3: **N2 + P2**; lane 4: **N1+P2**; lane 5: **N2+P1**; lane 6: **N1+ C +P2**.
Figure S2. (a) Schematic illustration of DNA assembly for the examination of the effects of sticky end length: ST10, ST8, ST6, ST4 and ST2. (b) Time profiles of the transient absorption of PTZ$^{\cdot+}$ monitored at 520 nm during the 355 nm laser flash photolysis of ST10 (black), ST8 (blue), ST6 (cyan), ST4 (gray) and ST2 (gray), respectively. The represented profiles were obtained from the accumulation of 32 laser shots.
Experimental

DNA Synthesis.

All reagents for DNA synthesis were purchased from Glen Research. Cyanoethyl phosphoramidites of \( N \)-(3-hydroxy-propyl)-1,8-naphthalimide and 10-(2-Hydroxyethyl)phenothiazine were synthesized as previously reported\(^1,2\) DNA used in this study was synthesized on an Applied Biosystems DNA synthesizer with standard solid-phase techniques and purified on a JASCO HPLC with a reverse-phase C-18 column with an acetonitrile/50 mM ammonium formate gradient. Duplex solutions were prepared by mixing equimolar amounts of the desired DNA complements and gradually annealing with cooling from 80 °C to room temperature. Cooling was performed over 16 h. DNAs conjugated with NI and PTZ at the 5' end were synthesized according to a previous procedure. 5’ end phosphorylated oligonucleotides were synthesized by Chemical Phosphorylation Reagents II (Glen Research). DNA ligation reaction was carried out as previously described.\(^3\) In briefly, a sample solution (25 μL) containing 2 μM NI- and PTZ-modified DNAs, 2μM phosphorylated DNA strands (sample, P), 66 mM Tris-HCl buffer (pH 7.6), 6.6 mM MgCl\(_2\), 0.1 M NaCl, 10 mM DTT, and 1 mM ATP was heated at 80 °C for 10 min, then gradually cooled down to 16 °C (1.0 °C/min) by a thermal cycler (BIORAD). T4 DNA ligase (20 unit, TOYOBO)
was added to the mixtures, and the reaction was carried out at 16 °C for 16 h. After the reaction, the mixture was heated at 85 °C and desalted with Micro Bio-Spin Chromatography Column (BIORAD) before sample preparation for laser flash photolysis.

**Laser Flash Photolysis Experiments.**

Nanosecond transient absorption measurements were performed as previously described.\(^4\text{-}^7\) The third-harmonic oscillation (355 nm, fwhm of 4 ns, 20 mJ/pulse) from a Q-switched Nd:YAG laser (Continuum, Surelight) was used for the excitation light. A xenon flash lamp (Osram, XBO-450) was focused into the sample solution as the probe light for the transient absorption measurement. Time profiles of the transient absorption in the UV-visible region were measured with a monochromator (Nikon, G250) equipped with a photomultiplier (Hamamatsu Photonics, R928) and digital oscilloscope (Tektronics, TDS-580D).
Gel shift assay.

50 μM each of DNA strands were annealed in 100 mM NaCl, 20 mM Na phosphate buffer (pH 7.0) from 95 °C to room temperature. After incubation, an amount of glycerol (50%) equal to 10% of the reaction volume was added and resulting sample was loaded onto 15% nondenatureing polyacrylamide gel at 200 V for 2 hr. The gel was stained by Stains-All (Sigma).8,9

References.