Supporting Information

Reversible Stability Switching of a Hairpin DNA via a Molecularly Designed Photo-Responsive Linker Unit

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1. UV spectral change of t-DNA2 with irradiating UV light

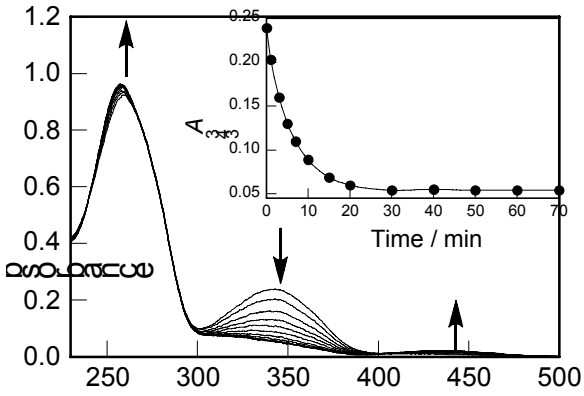
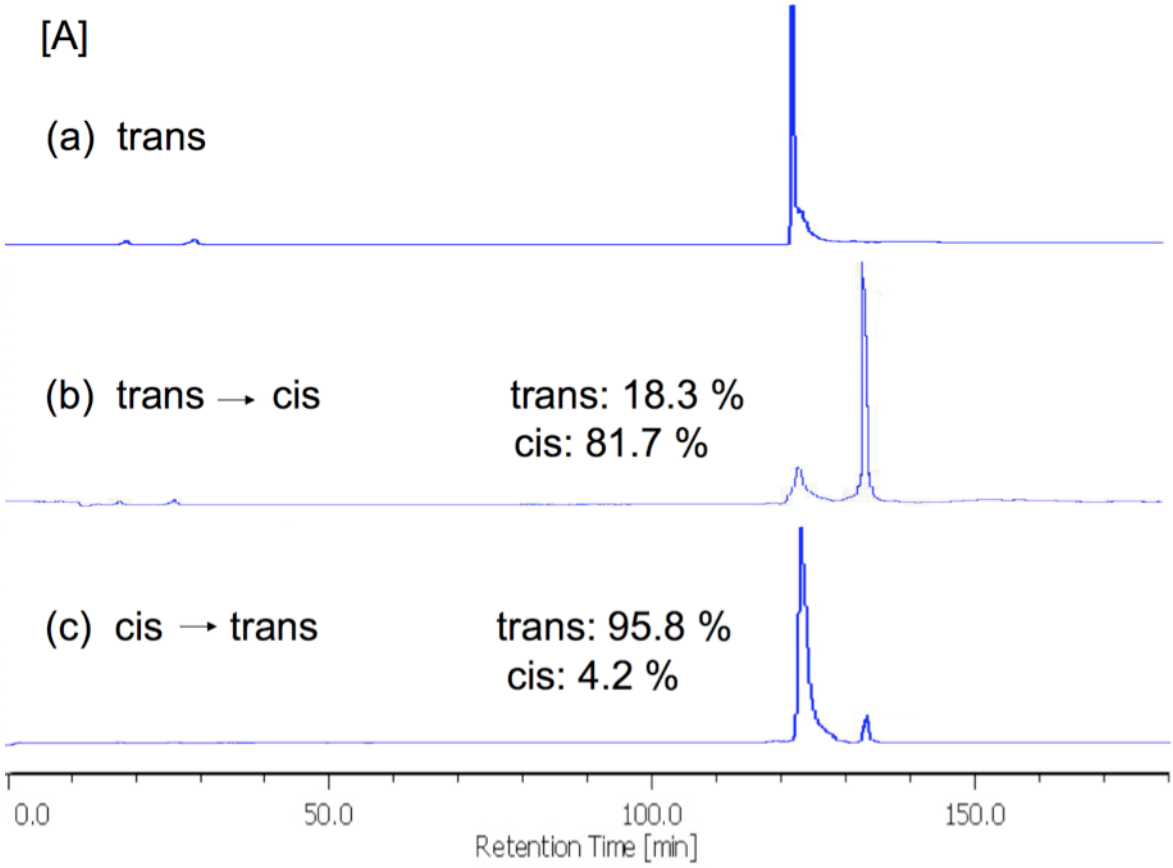


Fig. S1 UV spectral changes of t-**DNA2** with irradiating UV light [Funakoshi 4 W handy UV lamp, AGC Techno Glass V-Y43 filter (λ > 400 nm)]. Inset: plots of absorbance at 343 nm (A_{343}) as a function of irradiation time. Experiment was performed in a 10 mM phosphate buffer (pH 7.0) containing 100 mM NaCl and 0.1 mM EDTA. DNA concentrations were adjusted to 12 μM.

2. Comparison of HPLC charts of (A) DNA1 and (B) DNA2 before and after light irradiation



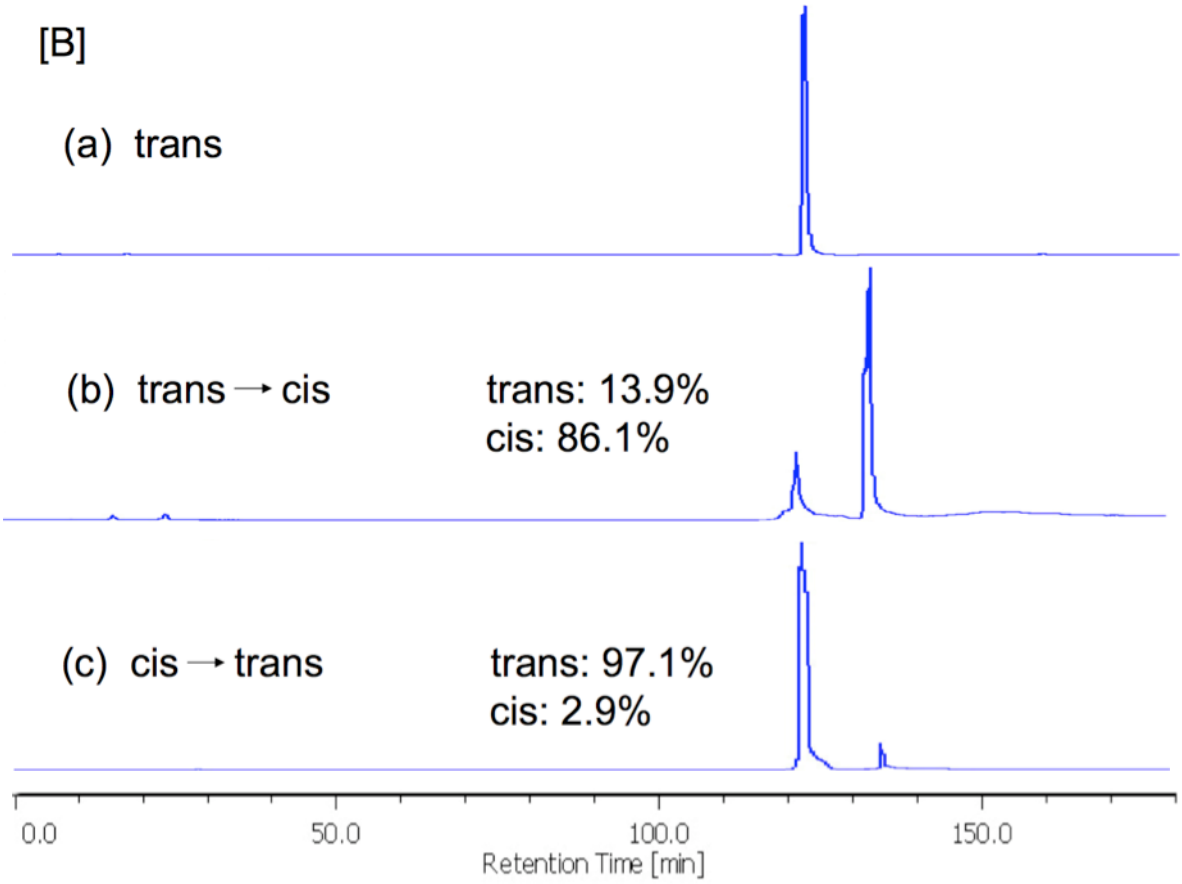


Fig. S2 Comparison of HPLC charts of **DNA1** [A] and **DNA2** [B]; (a) before UV light irradiation, (b) after UV light irradiation, and (c) after Visible light irradiation. Experiments were performed in a 10 mM phosphate buffer (pH 7.0) containing 100 mM NaCl and 0.1 mM EDTA. DNA concentrations were adjusted to 100 μM. The HPLC charts were obtained using a HPLC (JASCO LC-2000 Plus) at 25 °C: TSKgel ODS-80Ts (TOSOH, Japan) column were connected, water (0.01 M TEAA, pH7.0) and 50% MeOH (0.01 M TEAA, pH7.0) mixture as an elute solvent.

3. UV spectral change of c-DNA1 and c-DNA2 with irradiating Visible-light

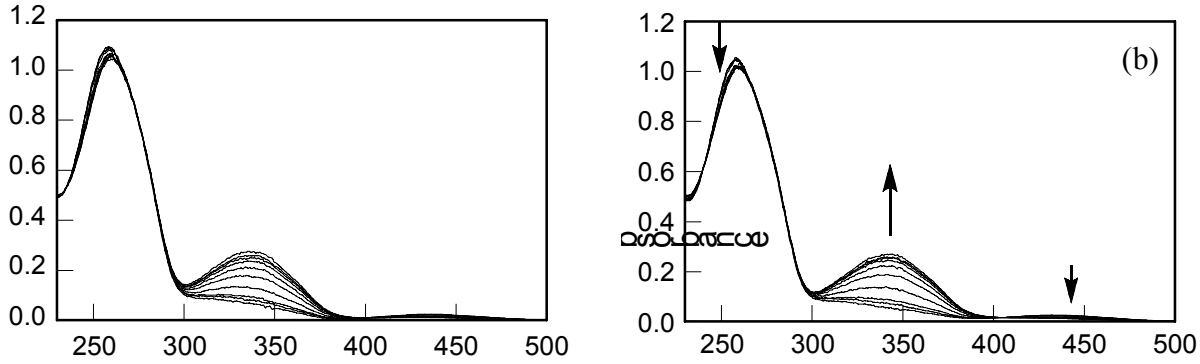


Fig. S3 UV spectral changes of **(a)** c-**DNA1** and (b) c-**DNA2** with irradiating visible light [Funakoshi 4 W handy UV lamp, AGC Techno Glass V-Y43 filter (λ > 400 nm)]. Experiment was performed in a 10 mM phosphate buffer (pH 7.0) containing 100 mM NaCl and 0.1 mM EDTA. DNA concentrations were adjusted to 12 μM.

4. Isomerization behaviors of c-Az1 and c-Az2 upon heating

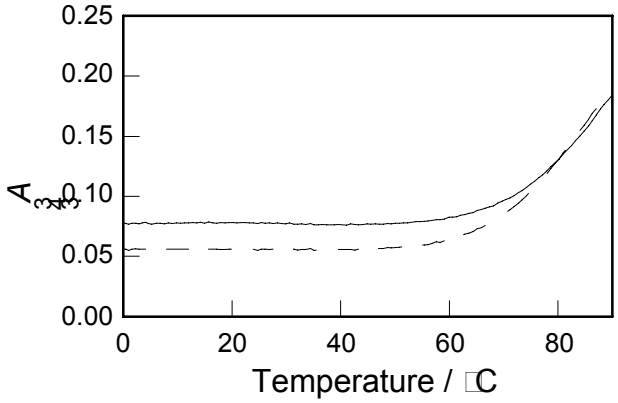


Fig. S4 Plots of absorbance at 343 nm (A_{343}) for c-**DNA1** (solid line) and c-**DNA2** (broken line) as a function of temperature (heating rate: 0.5 °C mim^{-1}). Experiment was performed using a UV-1700 spectrometer (Shimadzu) in a 10 mM phosphate buffer (pH 7.0) containing 100 mM NaCl and 0.1 mM EDTA. DNA concentrations were adjusted to 12 μM.

5. Typical UV melting curves and the dA/dT plots

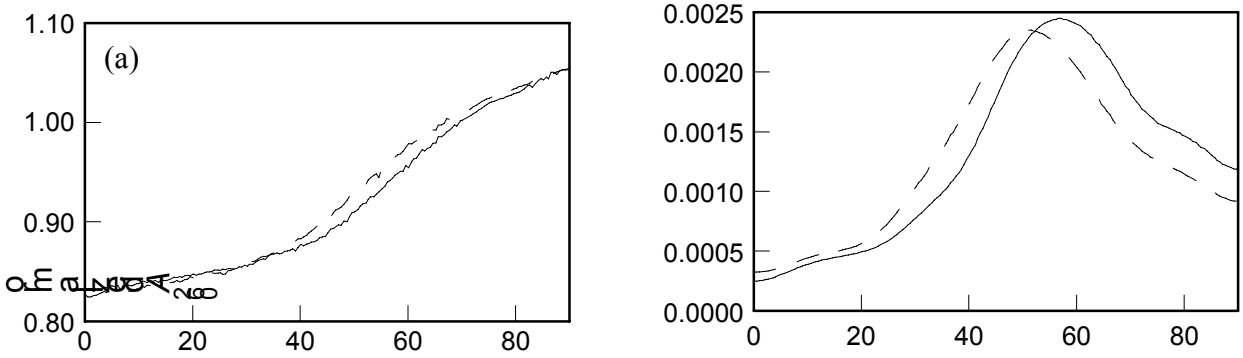


Fig. S5 (a) Typical UV melting curves and (b) their dA/dT plots. t-**DNA1**(broken line) and t-**DNA2** (solid line). Experiments were performed in a 10 mM phosphate buffer (pH 7.0) containing 100 mM NaCl and 0.1 mM EDTA. DNA concentrations were adjusted to 10 μM.