

Supplementary Material (ESI) for Chemical Communications
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Electronic Supplementary Information for:

Directing energy transfer in discrete one-dimensional DNA-templated assemblies

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General methods

CD, UV-vis and PL were recorded on a JASCO 815 equipped with a Peltier temperature controller, PFD-425S. A 1 x 1 mm quartz cuvette was used for all the measurements. In case of the time integrated PL measurements, the donor molecules were excited at 400 nm where the optical density is below 0.2. This is necessary to avoid indirect excitation of the acceptor and to see whether transition in acceptor emission is caused by energy transfer and not because of reabsorption. The TCSPC measurements were carried out using a Becker & Hickl SPC-130 TCSPC electronics, using a temperature-controlled stage that allowed temperature adjustments between 15 °C and 90 °C with an accuracy of 1 °C. The samples were excited at 375 nm with an excitation power of 30 micro W using the frequency-doubled pulsed output from a Ti:Sapphire Tsunami laser with 82 MHz repetition rate. The photoluminescence (PL) emerging from the sample was collected by two off-axis parabolic mirrors along a trajectory orthogonal to the excitation. The PL was then dispersed in a monochromator, and directed onto a Peltier cooled photomultiplier tube yielding an overall time resolution of 180 ps.

Materials

The ssDNA was supplied HPLC purified and freeze-dried by MWG Biotech Ag and kept in the dark at low temperature. **D** was synthesized as previously described.¹

Sample preparation

All **D**-containing samples were prepared by adding **Tn** or **Tn-Cy3.5** in MilliQ water to solid **D** and heating to 70 °C for at least 5 minutes.

Spectra

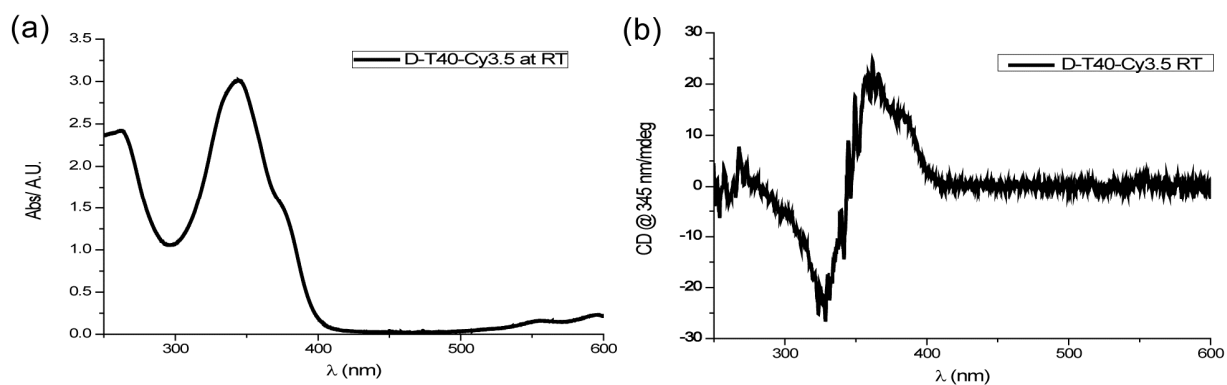


Fig. S1 a) Absorption and b) Circular dichroism spectrum of **D-Tn-Cy3.5** at RT in water ($[D] = 4[T40-Cy3.5] = 1.6$ mM).

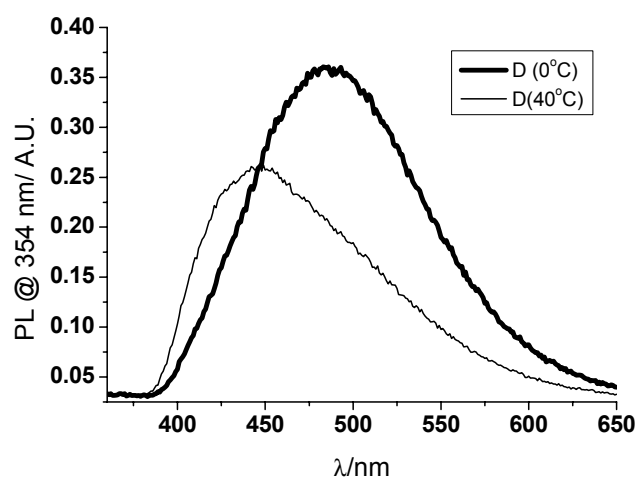


Fig. S2 Fluorescence spectra of **D** in water at 40 °C and 0 °C ($[D] = 1.6$ mM).

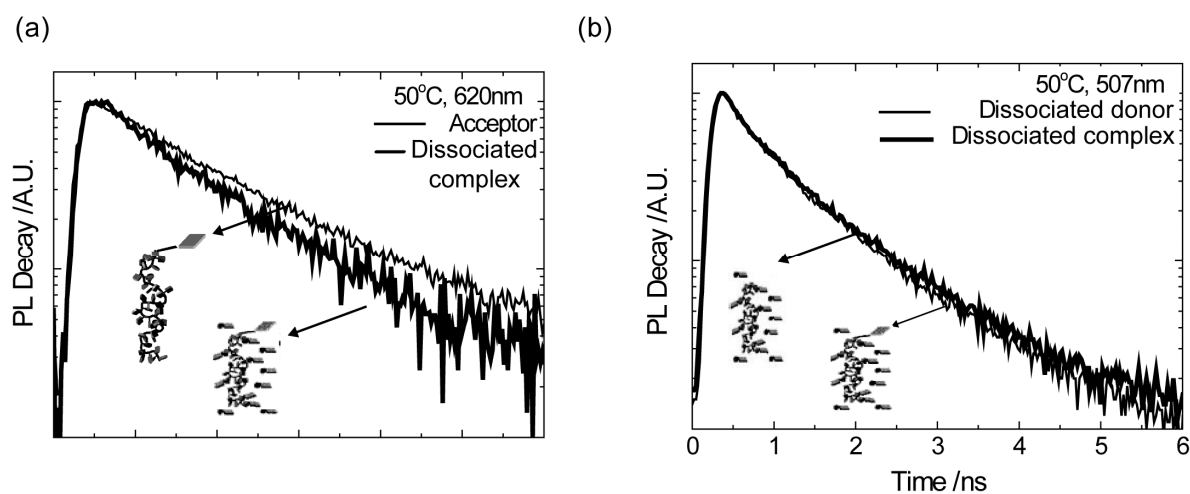


Fig. S3 a) Photoluminescence decay of the acceptor template **T40-Cy3.5** ($[\text{T40-Cy3.5}] = 0.4 \text{ mM}$) and the complex **D-T40-Cy3.5** ($[\text{D}] = 4[\text{T40-Cy3.5}] = 1.6 \text{ mM}$) monitored at the acceptor emission wavelength (620 nm) at 50°C and b) photoluminescence decay of **D** in the complexes with and without acceptor dye attached monitored at the donor emission wavelength (507 nm) at 50°C ($[\text{D}] = 4[\text{T40}] = 1.6 \text{ mM}$, $[\text{D}] = 4[\text{T40-Cy3.5}] = 1.6 \text{ mM}$).

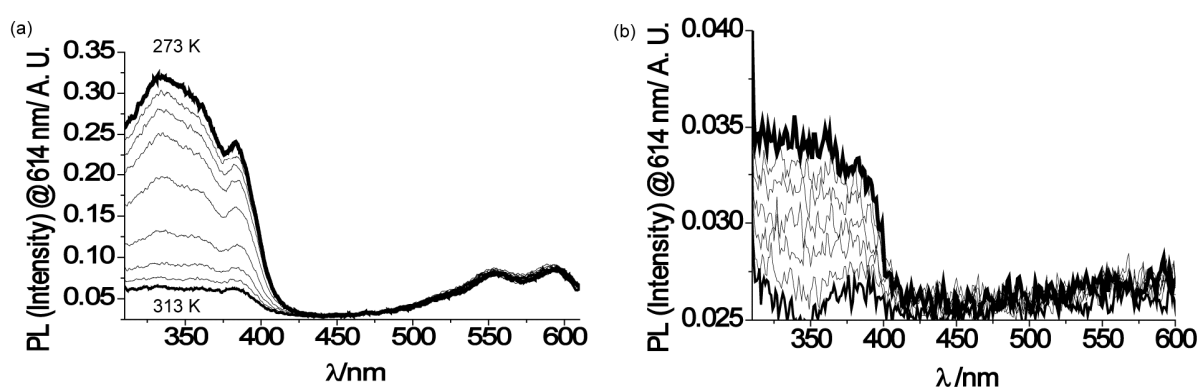


Fig. S4 a) Excitation spectra of the **D-T40-Cy3.5** templated assembly probed at $\lambda_{\text{em}} = 614 \text{ nm}$ at different temperatures. b) Excitation spectra of the **D-T40** templated assembly without acceptor dye probed at $\lambda_{\text{em}} = 614 \text{ nm}$ at different temperatures. ($[\text{D}] = 4[\text{T40}] = 4[\text{T40-Cy3.5}] = 1.6 \text{ mM}$).

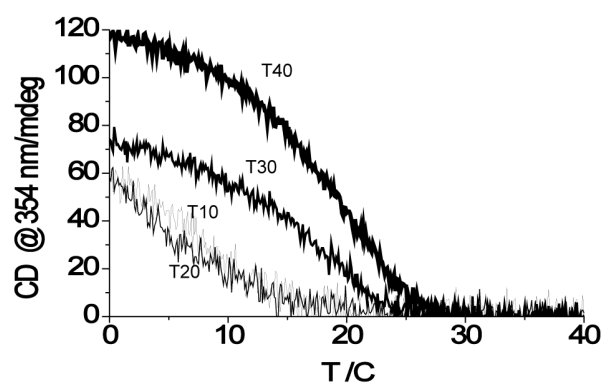


Fig. S5 CD cooling curves of the **D-Tn-Cy3.5** templated assemblies monitored at $\lambda = 354$ nm ($[\mathbf{D}] = 4[\mathbf{Tn-Cy3.5}] = 1.6$ mM).

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- (1) P. G. A. Janssen, A. Ruiz-Carretero, D. González-Rodríguez, E. W. Meijer and A. P. H. J. Schenning. *Angew. Chem. Int. Ed.* 2009, **48**, 8103.