*Supporting Information for*

# Multiphoton-Gated Cycloreversion Reactions of Photochromic Diarylethene Derivatives with Low Reaction Yields upon One-photon Visible Excitation.

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## 1. Excitation intensity dependence of time profiles under the femtosecond laser excitation

In order to clarify non-linear absorption process under femtosecond laser excitation, we measured the excitation intensity dependence of time profiles of the bleaching signal.

Figure S1 shows the time profiles of the bleaching signals in three diarylethene derivatives (upper panel; PT1(c), middle; PT2(c), bottom; PT3(c)) Excitation intensities were 0.5, 1.0, 1.5 and 2.0 μJ/pulse, respectively, and all signals were normalized at time 0. As clearly shown in Fig. S1, no remarkable change of dynamic behavior (time constants, preexponential factors, and negative constant values) was observed with increasing in excitation intensity, although the S/N ratio decreased with an decrease in the excitation intensity. From these results, it was concluded that non-linear absorption process could not occur under our femtosecond laser excitation conditions.

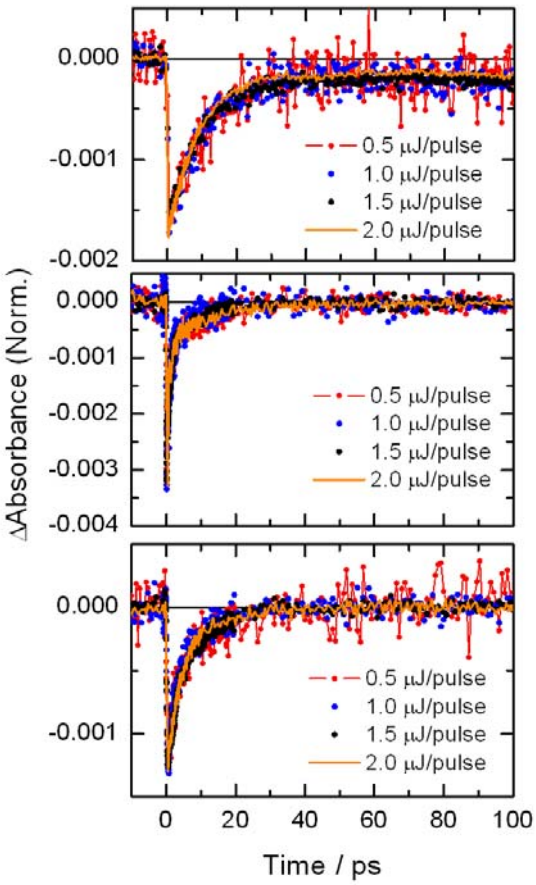


Figure S1. The time profiles of the bleaching signals in three diarylethene derivatives (upper; **PT1(c)**, middle; **PT2(c)**, bottom; **PT3(c)**) in n-hexane solution. Each excitation/monitoring wavelengths is 565/540 nm for **PT1(c)**, 590/605 nm for **PT2(c),** and 590/600 nm **PT3(c**). Excitation intensities are 0.5, 1.0, 1.5, and 2.0 μJ/pulse