

Accumulation of the photonic energy of the deep-red part of the terrestrial sun irradiation by rare-earth metal-free E-Z photoisomerization

Supporting Information

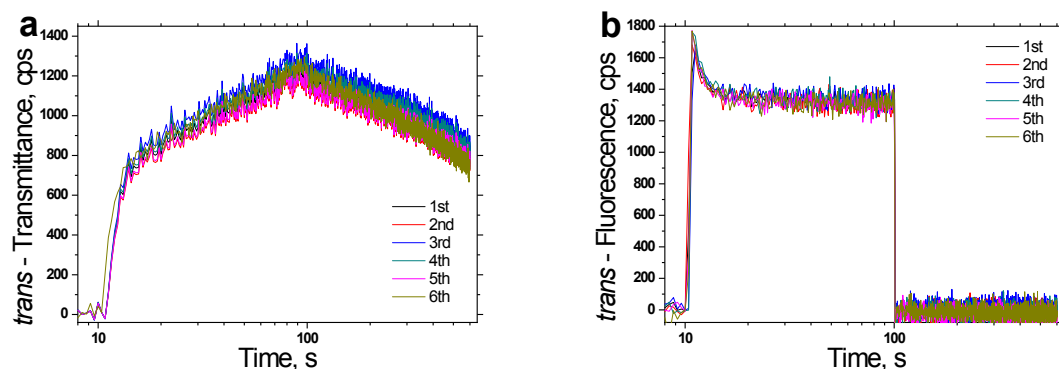


Figure S1: (a) - Temporal evolution of the *trans*-Transmittance and (b) - Temporal evolution of the *trans* - Absorption, for 6 successive scans. **Conditions:** Compound **4b**; Constant sample temperature, $T=15^{\circ}\text{C}$; Intensity of the probe beam is constant, $1\ \mu\text{W}\times\text{cm}^{-2}$; Excitation duration $\Delta t = 90\text{s}$; **dye** ($1\times 10^{-4}\text{M}$) / at concentration of Ba^{2+} ions $2\times 10^{-1}\text{M}$; Pump beam intensity $I_{\text{pump}} = 4\ \text{mW}\times\text{cm}^{-2}$.

Setup for studying the dynamical parameters of the TTA-UC in engineered atmosphere

The laser beam (single mode diode laser) pass through a spatial filter in order to reach nearly TEM_{00} transversal intensity distribution. A series of reflective neutral density (ND) filter (Thorlabs Inc.) placed on revolving optical holder (in order to keep the optical axes of the experiment unchanged) were used to attenuate smoothly the beam power. Afterward, the beam passed through the system of ultra-broadband mirrors (MaxMirror, Semrock Inc.) and finally focused by achromatic lens ($\text{NA}=0.24$) onto the sample. A defocusing achromatic lens placed on an electronically controlled μ -positioning stage (DL125 Delay Line Stage, Newport Corp.) controls the excitation spot diameter. The resulting excitation spot diameter is permanently controlled by a beam profiler (BP104-VIS, Thorlabs Inc.). The optical density of the all samples at the excitation wavelength is nearly 0.1; therefore the attenuation of the pump light can be neglected for the given thickness of the optical samples ($1000\ \mu\text{m}$ or $400\ \mu\text{m}$). The luminescence emission generated by the sample was collected with the same apochromatic lens, thus the excitation- and observation- spots are completely spatially overlapped. The emission of the excitation laser was rejected by the appropriate notch filter: for instance by application of a notch filter designed for $\lambda=633\ \text{nm}$ ($\text{FWHM} \sim 29\text{nm}$, NF 03- 633E-25, Semrock Inc.); rejection better than 10^6 times can be achieved.