Supplementary Material

1 Supplementary Data

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2 Supplementary Figures and Tables

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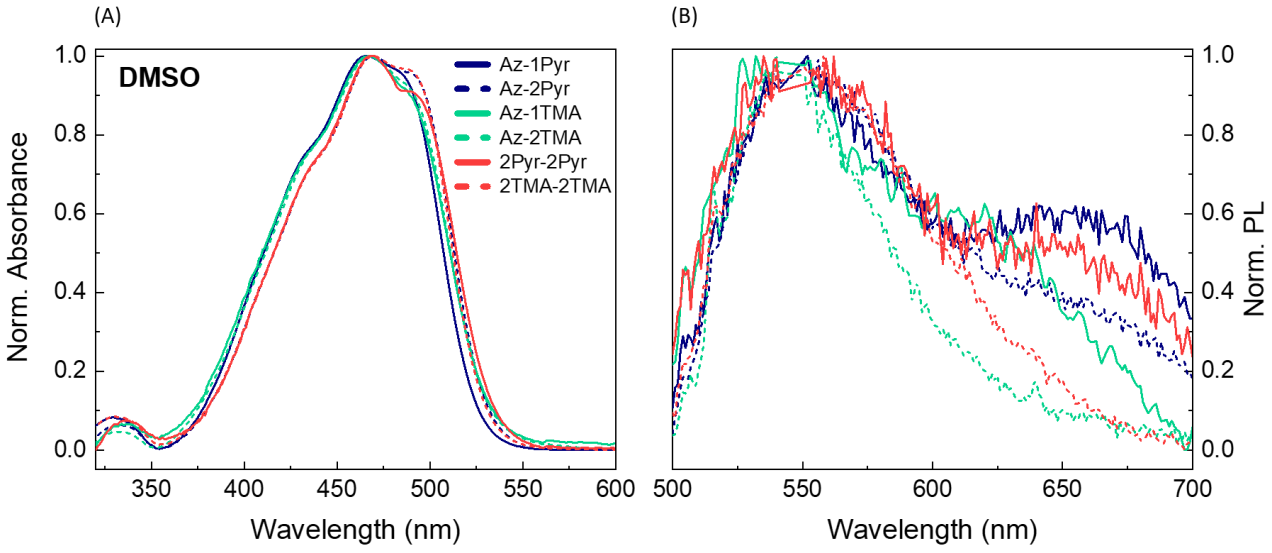
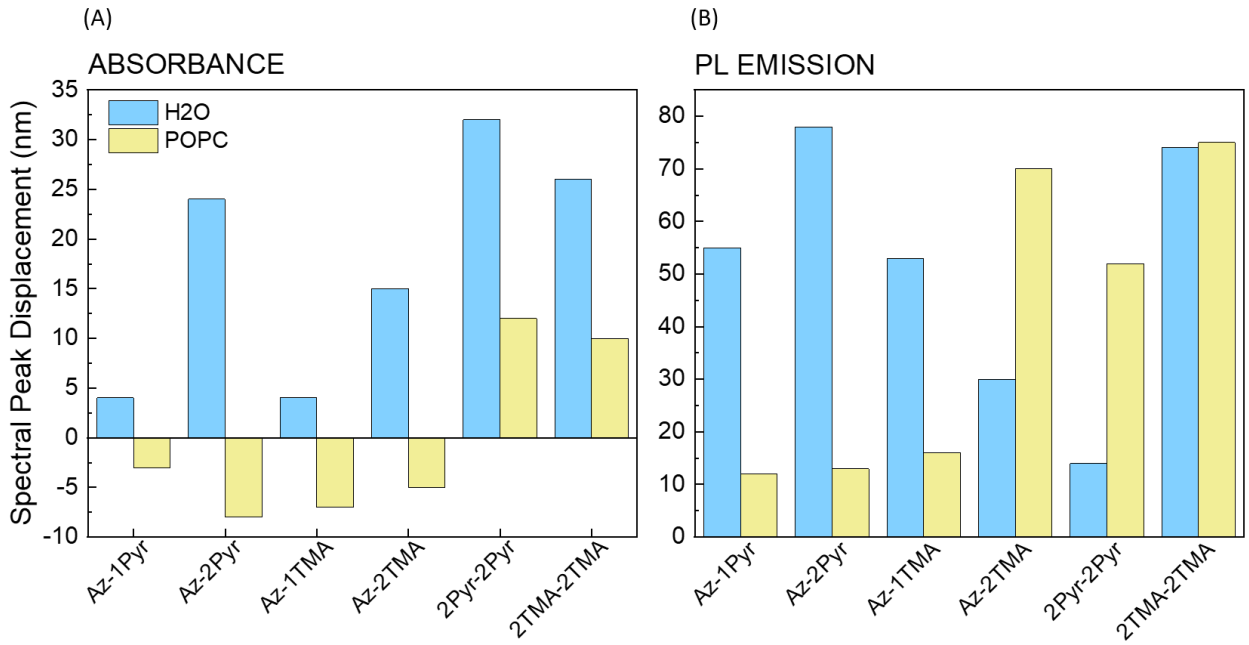
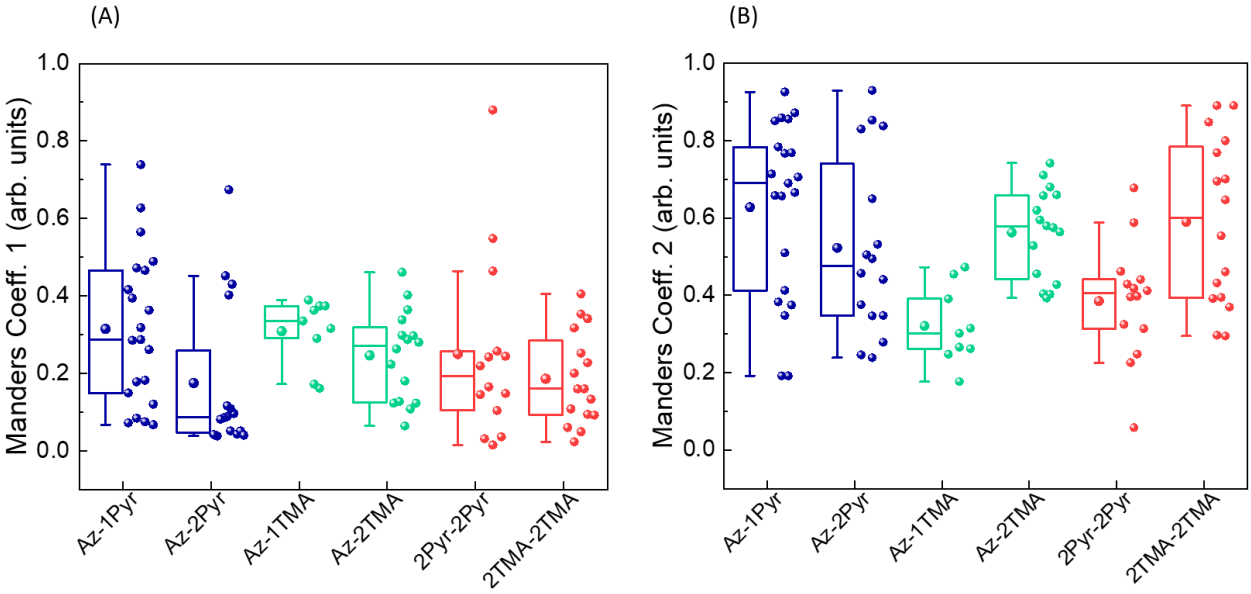
2.1 Supplementary Figures



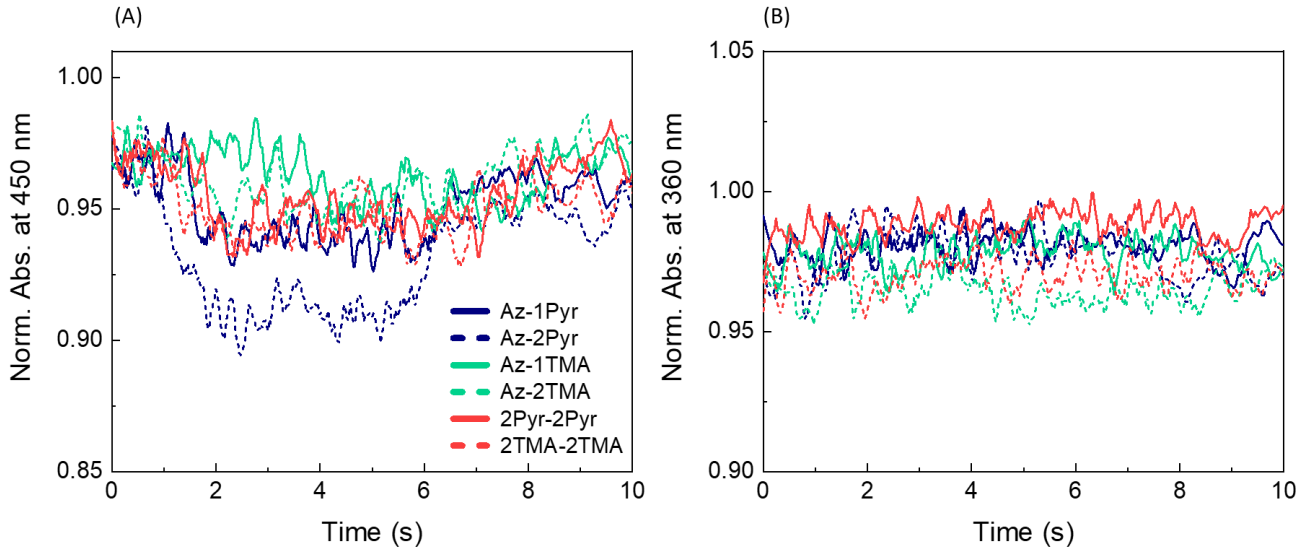
Supplementary Figure 1: (**A**) UV-vis and (**B**) PL spectra of the six molecules in DMSO. PL spectra have been acquired with fixed excitation at 470 nm and were normalized to both lamp intensity and ground state absorption.



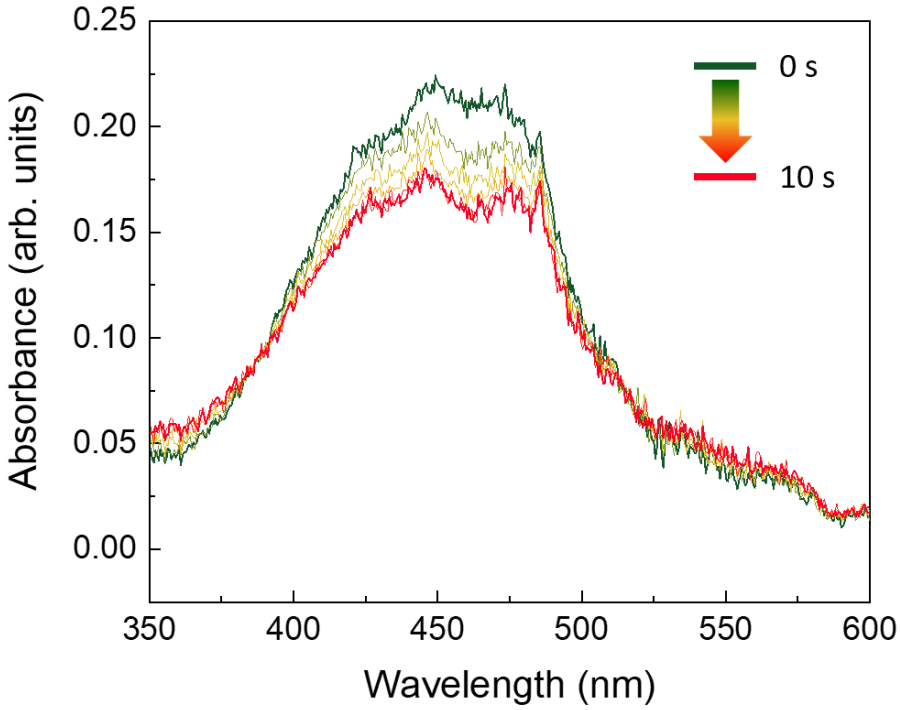
Supplementary Figure 2: (**A**) UV-vis and (**B**) PL spectral shifts displacements. Reference spectra of the six molecules are the ones in DMSO (Figure S1).



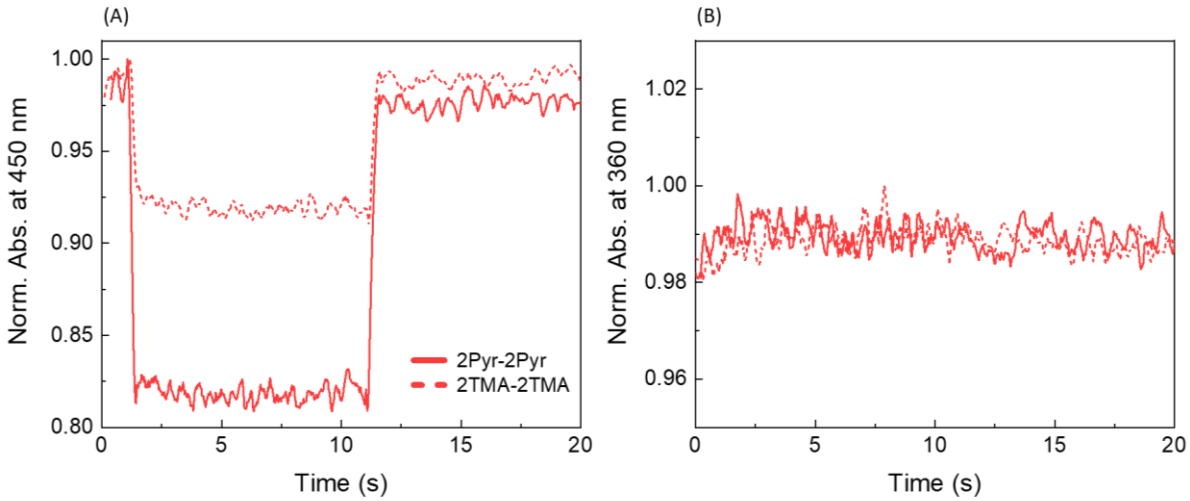
Supplementary Figure 3: Manders Coefficients, M1 and M2.



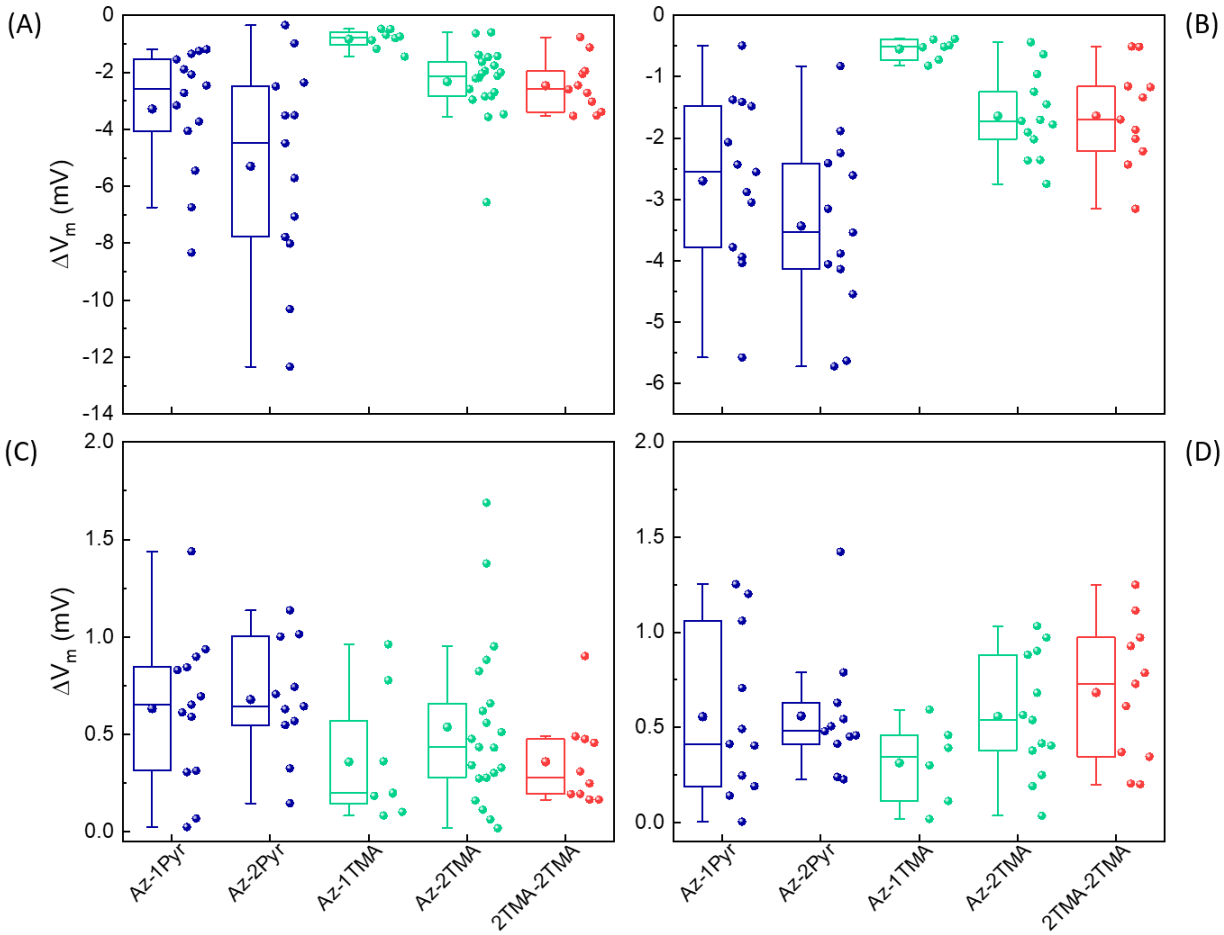
Supplementary Figure 4: Isomerization kinetics of the azobenzene series in water taken at 450 nm (**A**) and 360 nm (**B**) as a function of illumination time. Data were taken through steady-state absorption measurements of the molecules in solution under illumination with a blue LED (470 nm).



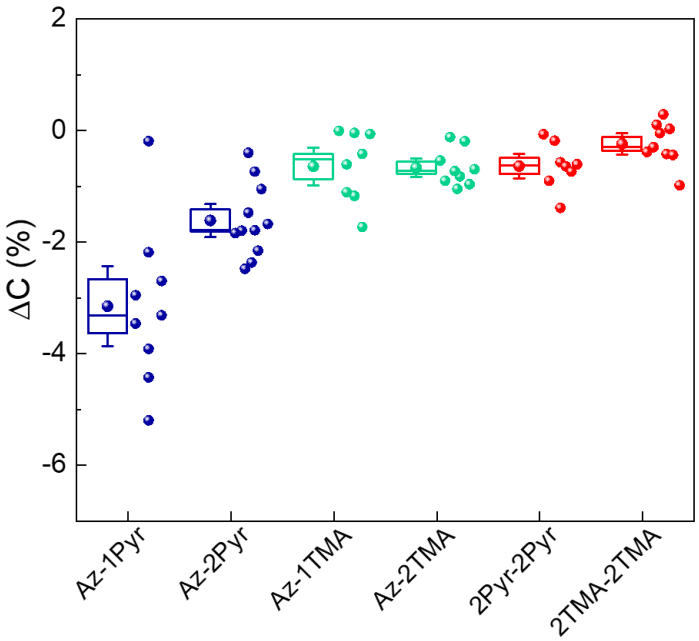
Supplementary Figure 5: UV-vis absorption spectra of **Az-2Pyr** in POPC liposomes, taken under illumination with a blue LED (470 nm).



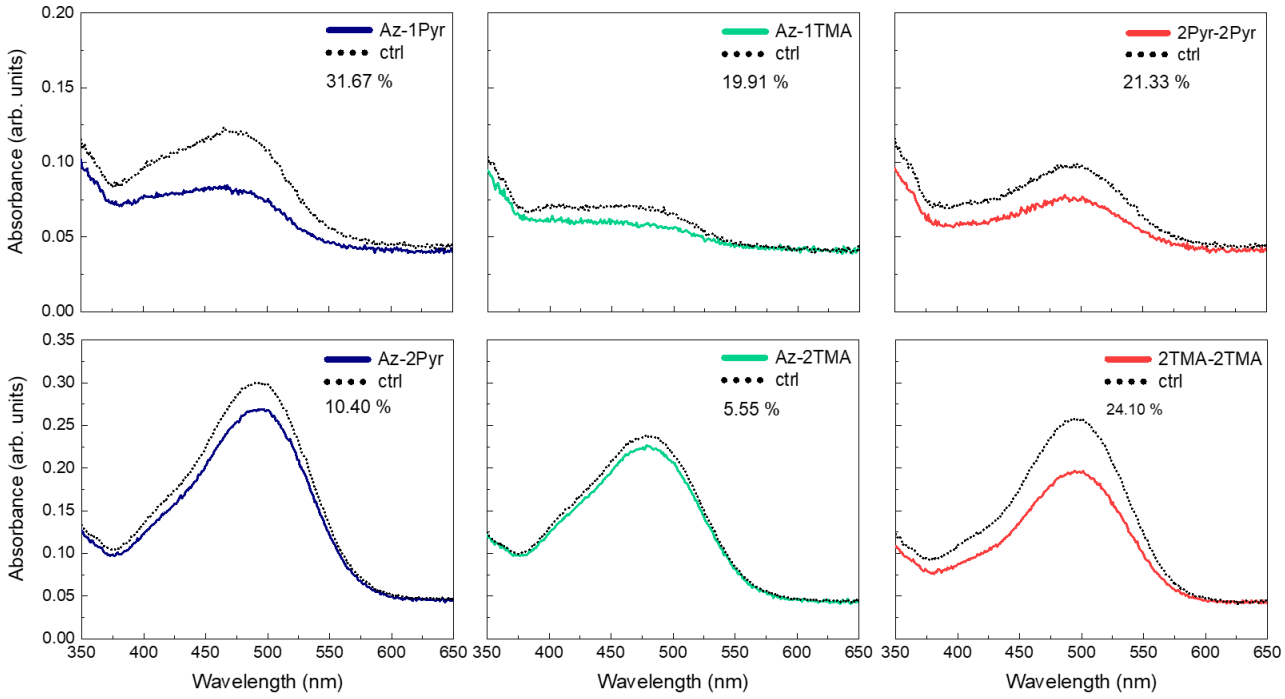
Supplementary Figure 6: Isomerization kinetics of 2Pyr-2Pyr and 2TMA-2TMA, in POPC at 450 nm (A) and 360 nm (B) as a function of illumination time. Data were taken through steady-state absorption measurements of the molecules in solution under illumination with a LED (470 nm).



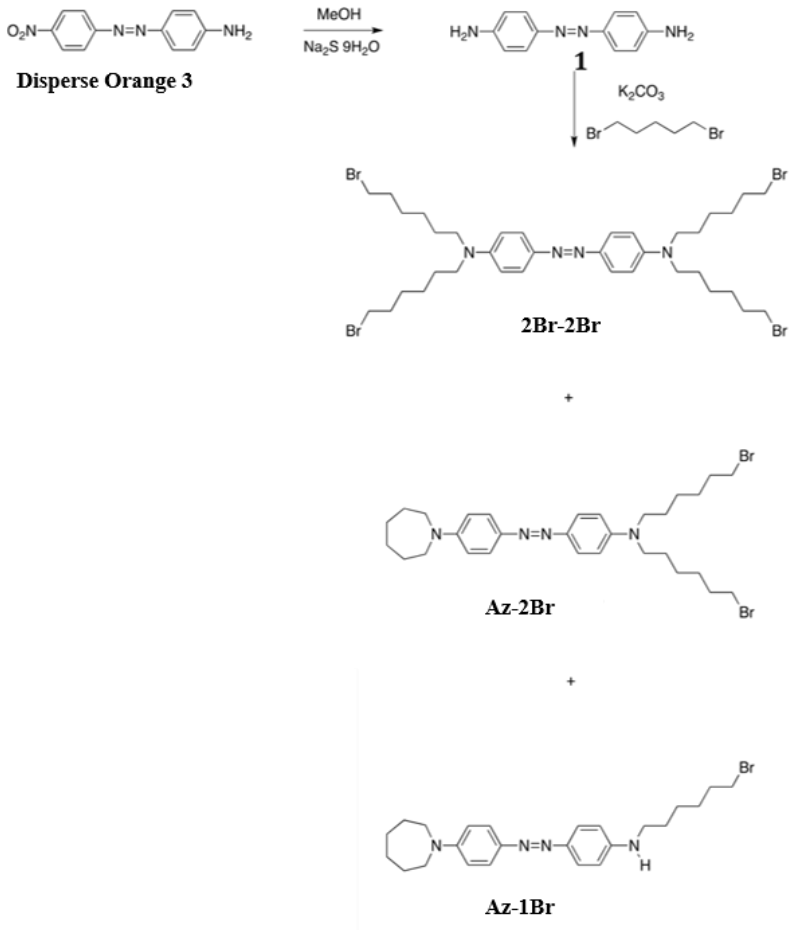
Supplementary Figure 7: Electrophysiology measurements, patch-clamp technique in whole-cell configuration. Hyperpolarization with 20 ms (A) and 200 ms (B) light pulses. Depolarization with 20 ms (C) and 200 ms (D) light pulses.



Supplementary Figure 8: Measured light-induced capacitance changes in HEK-293 cells.



Supplementary Figure 9: Cell Association (uptake) of the six compounds with HEK-293 cells. Samples were stained with each azobenzene molecules [25 µM] and maintained at 37 °C for 60 minutes in dark. Absorbance of the supernatant was measured at 470 nm for all the molecules. Control samples with no cells were treated the same and their absorbance values represented the total azo-molecules from which the supernatant values were subtracted to give the amount associated with cells. All conditions and controls were measured in triplicate.



Supplementary Figure 10: Synthetic route for the ω-bromo terminated precursors of Az-1Br, Az-2Br and 2Br-2Br.

Table S1: Time constants values. Collective isomerization dynamics of the molecules were best fitted with a single exponential function.

Sample	τ (360 nm)	τ (450 nm)
Az-1Pyr	1.05 s	1.12 s
Az-2Pyr	1.62 s	1.48 s
Az-1TMA	0.74 s	0.82 s
Az-2TMA	0.87 s	0.97 s