Introduction

- Fulgides and their derivatives are thermally irreversible photochromic switches with high application potential, e.g., for optical memory devices or optical switches [1].
- The open isomers 1Z and 1E Stationary UV/VIS Absorption Spectra
- Fulgides and their derivates are thermally irreversible
- The closed isomer
- Our results are of relevance for understanding competition
- Time-resolved studies so far have not taken the
- Dimethyl-3-furyl-ethylidene]-2-(isopropylidene)-succinic anhydride (3)
- Related fulgimides [3] and the
- Branching ratio is 2:1 (in agreement with [2]).

Stationary UV/VIS Absorption Spectra

- The open isomers 1Z and 1E only absorb in the UV, with maxima of their first bands at λ_{max} = 335 and 350 nm.
- The closed isomer 1C absorbs strongly in the visible with a maximum at λ_{max} = 470 nm.

Fs-Tansient Absorption Spectroscopy

- Parameters from global fit with sequential kinetic scheme.
- τ_{EE} is related to the initial dynamics out of the Franck-Condon region, τ_{EC} is the slowest isomerization time scale
- The oscillations are interpreted as vibrational coherences.

Conclusions

- The ultrafast decay of the ESA indicates that the photoisomerizations occur within only 0.1 – 0.25 ps.
- The ultrafast simultaneous appearance of the HPA shows that the E-C / E-Z branching happens on the excited state surface within this time.
- Possible interpretations of the ESA time constants are:
  1. Late branching: population of a dark intermediate state within 0.1 ps, subsequent isomerization and deactivation to the electronic ground states from there.
  2. Early branching in the Franck-Condon region: two separate excited-state pathways with different sub-ps time constants.
- Quantum yields are rationalized by observed dynamics.
- The results were supported by the TDDFT calculations
  1. Indications for easily accessible CI E
  2. Quantum yields are rationalized by observed dynamics.
  3. Possible interpretations of the ESA time constants are:
  4. The oscillations are interpreted as vibrational coherences.

References