Absorption spectra and photoisomerization quantum yields of azobenzene redetermined

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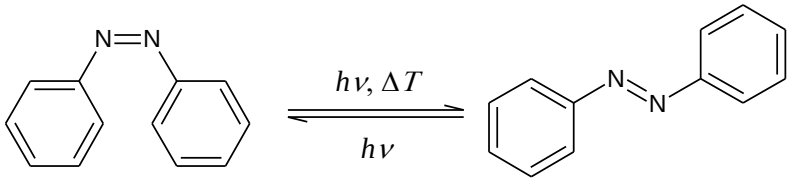
Azobenzene is a photochromic molecule existing in two isomeric forms the *cis*- and *trans*-isomers.



cis-azobenzene *trans*-azobenzene

Azobenzene is widely used in various applications for photoswitching e.g., in biochemical and material science, and as a chemical actinometer. For its best performance, the knowledge of the correct molar absorption coefficients and its isomerization quantum yields is essential. Our attempt to apply the azobenzene isomerization for chemical actinometry reviled inconsistencies in the published values and therefore we redetermined them [1,2].

Pure *trans*-azobenzene was prepared by warming the solution in darkness and used for determination of *trans*-azobenzene molar absorption coefficients at various temperatures (5–45 °C). The molar absorption coefficients of *cis*-azobenzene were obtained using three independent techniques. For these purposes the *cis*-isomer was prepared by irradiation to the photostationary state (λ_{irr} = 348 nm) to obtain ~97 % *cis*-isomer and later the kinetic experiments were utilized to reach the molar absorption coefficients calculations.

Quantum yields of *trans–cis* and *cis–trans* photoisomerization in methanol were then redetermined for the monochromatic irradiation at range of wavelenghts 280–434 nm. The concentrations were obtained from the analysis of UV-vis spectra performed in Matlab program. The photon flux was determined by ferrioxalate actinometer. The presentation compares the obtained results to the previously published data and detail the newly developed methods for QY determination.

[1] Ľ. Vetráková, V. Ladányi, J. Al Anshori, P. Dvořák, J. Wirz, D. Heger, *Photochem. Photobiol. Sci.*, **2017**, *16*, 1749-1756.

[2] V. Ladányi, P. Dvořák, J. Al Anshori, Ľ. Vetráková, J. Wirz, D. Heger, *Photochem. Photobiol. Sci.*, **2017**, *16*, 1757-1761.