

Temperature gating of the ring-opening process in diarylethene molecular switches

Diana Dulić

Laboratoire d'Électronique Moléculaire
SPEC, CEA Saclay, France

Department of Applied Physics, Material Science Center (MSC+), University of Groningen, Nijenborgh 4, 9747 AG Groningen, The Netherlands

Abstract. We performed UV/Vis kinetics experiments over the temperature range between 115 and 290 K for hexafluoro and hexahydro dithienylcyclopentene based photochromic switches. The results reveal a key parameter associated with reversibility of these molecular systems. For the first time, we show that whereas the ring closing process shows little temperature dependence, photochemical ring opening is strongly temperature dependent and below ca 130 K, the photochemistry is effectively suppressed. Strong temperature dependence of the ring opening implies that variation of temperature might be used for gating of photochromic behavior of diarylethenes^[1].

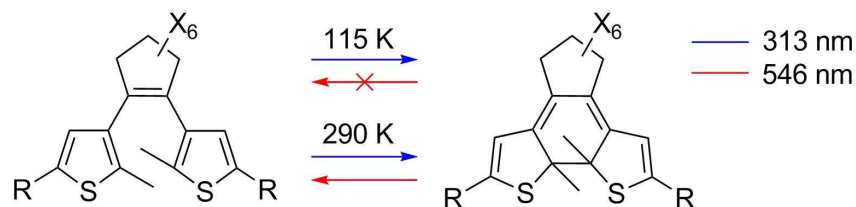


FIGURE 1. Suppression of the ring opening process with decreasing temperature has been reported, leading to the complete absence of the photoreaction below a cutoff temperature. By contrast, it has been demonstrated that the reverse ring closure process shows no significant temperature dependence above 115 K. Reversibility of the photoprocesses can be thus controlled by temperature.

REFERENCES

1. Dulić, D., Kudernac, T., Pugžlys, A., Feringa, B. L., Van Wees, B. J., *to be published in Advanced Materials*, WILEY- VCH, Weinheim, Germany