On the mechanism of the thermal *cis-trans* isomerisation of azoderivatives in nematic mesophases

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Liquid Crystals are materials that combine the molecular order characteristic of the crystalline state and the molecular mobility typical of the liquid phase. The potential application of the liquid-crystalline systems arises from the possibility to change the mesogens alignment as response to diverse external stimuli such as light, heat, mechanic or electromagnetic fields, among others. Light is probably the best way to control and modify the properties of liquid-crystalline systems instead of electricity or heat because it is a clean and cheap energy source and it can be controlled quickly and remotely. Nowadays, there is a growing interest in the properties of photoactive dye-doped liquid-crystalline systems due to their emerging applications as information processing materials.

Since the first notice of the azobenzene isomerisation from Hartley in 1937,[1] many efforts have been done in the investigation of its *cis-trans* isomerisation mechanism in isotropic solvents. For this process, two different mechanisms have been proposed. One involves a rotation around the N-N bond and the other involves an inversion through a linear state. To our knowledge, few studies about the mechanism that works in liquid-crystalline solvents have been realized and this field is still quite unexplored[2-5].

Due to the great interest of researchers in azobenzene-doped liquid crystals a thorough study about the mechanism that acts in the azobenzene thermal relaxation process in a mesomorphic environment is needed. In this contribution a kinetical study of the thermal *cis-trans* isomerisation process in isotropic and in mesogenic solutions is presented. In this way, the corresponding energetic activation parameters, $\Delta H^{\neq}$ and $\Delta S^{\neq}$, as well as the volumes of activation, $\Delta V^{\neq}$, have been determined. The photochemical *trans-cis* isomerisation process was also studied.

References:

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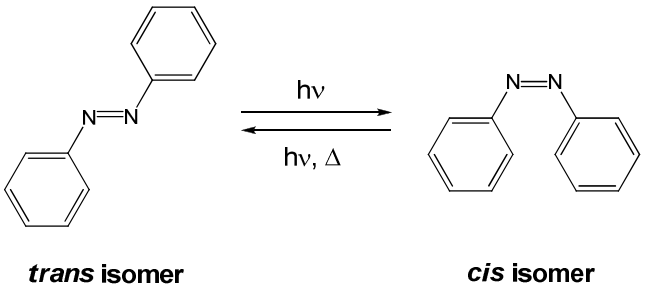

***trans* isomer** ***cis* isomer**

Photo and thermal isomerisation processes for the azobenzene.

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