Anisotropy in the Photodimerization of 9-Acetylanthracene in Inclusion Compound

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Besides their intrinsic and basic scientific significance, organic solid-state photoreactions are attractive for a variety of reasons. They are useful as a means for synthesizing novel products that may be very difficult, if not impossible, to prepare by other means. The advantage of these reactions is that they are friendly to the environment.

Solid-state photochemical reactions are highly dependent on the geometry of the reacting compound and its product. An important advantage in the understanding of the reaction mechanism, the course of the reaction, and the reaction control factors lies in the ability to follow the geometrical changes during the reaction.

In inclusion compounds, the guest molecules occupy space formed by the host molecules. If the host molecules provide topochemical conditions required for bimolecular reactions and the guest molecules are photochemically active, regio- and stereo-selective reactions are anticipated.

Photochemical [4 + 4] dimerization reaction of 9-acetylanthracene inclusion compound was studied using the chromophore absorption spectra tail irradiation method[1]. X-ray diffraction data was collected after irradiation for different periods of time.The interesting finding is that only one of the two crystallographic independent pairs of 9-acetylanthracene undergo solid state photodimerization to ca. 40% conversion to the head-to-tail dimer without destruction of the single crystallinity nature.

[1] Enkelman V., Wegner G., *J. Am. Chem. Soc.*, 1993, **115**, 10390.

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