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Spacer effect caused by azobenzene system in E/Z isomerization: An application for optical storage device

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A b s t r a c t

The spacer effect caused by the system of molecules during the process of E/Z isomerization is reported. The phenomenon was predicted by absorption measurements with UV light of 365nm wavelength was illuminated to the solution of azobenzene dimers with aliphatic and aromatic spacers were incorporated. The photosaturation was observed within 18 seconds for both compounds. But, the dramatic variation in thermal back relaxation is the significant interest in this study. That is Z-E isomerization or thermal back relaxation was occurred around 7-13hours. Here the variation in back relaxation is directly related to the nature of spaced associated with the molecular structure. In particular, the spacer effect is very much important in synthesizing the materials for the optical storage device fabrication.

Keywords:

Azobenzene
E/Z isomerization
Optical storage device
Aliphatic/Aromatic spacers.

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1. Introduction

The information can be saved in the optical storage device by illuminating UV light on it. There are many organic light sensitive compounds have been used in the optical storage device concept. The principle involved in this optical storage device is photoisomerization. i.e., the stable E-isomeric form converts into Z-isomeric form, when UV light of 365nm irradiated on the system of azobenzene molecules. The reverse process happens in two ways; such as (i) By illuminating white light of wavelength 450nm, (ii) By keeping the system in dark place called "Thermal back relaxation" [1]. The thermal back relaxation is an interesting property in photoisomerization. There are two major factors for the consideration in the photophysical or photoisomerization phenomenon. Namely, (i) Nature of the chemical species and (ii) Characteristics of UV light [2, 3]. Tacitly, E/Z isomerization of azodyes change with chemical structure, various functional groups and nature of spacers associated with it. It is clear that the different spacer in materials must give different photophysical properties [4]. Hence, aliphatic and aromatic spacers are quite interesting when thermal back relaxation is concerned in the photoisomerization.