Light's Influence on Optical Constants of Polystyrene Doped with Valiot Crystal

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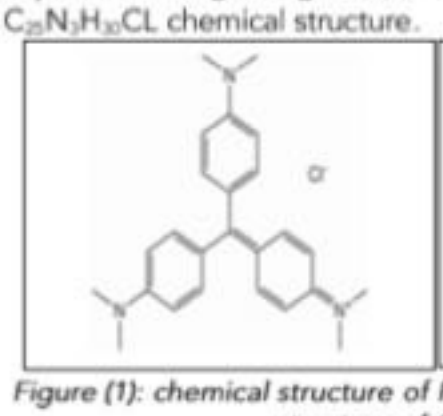
Abstract
Polystyrene (PS) doped with Crystal Valiot dye(CV) at a doping ratio of 1:1 was discovered to have optical properties, absorption, transmittance, reflectivity, and refractive index. Using the traditional casting method, the solutions were deposited on a glass base. These properties were measured with a UV-Visible dual spectrometer over a 300-900 nanometer range. The outcome of the light effect was obvious. If it causes a decrease in absorbance and an increase in transmittance when the membranes are exposed to light.
Keyword: Light effect, Polystyrene, Crystal Valiot, Reflectivity, Reflectivity.

1. Introduction

Dye are organic compounds that absorb light in a specific range of wavelengths that fall in the visible region and do not prevent the molecule from being absorbed, d the absorption of light within this UV dye is light in the ultraviolet region. Regions are accompanied by electron transitions between molecular orbitals that are supported by the dye molecule's structure [1]. The first organic dye that was prepared was dye (W.H.Perking), as it was attended in the year (1865) by the English chemist According to all sources, this is the start of the organic chemical industries, Crystal violet, one of the most important and useful laser dyes in recent years, has received a lot of attention in physical chemistry from both fundamental and applied research [2]. Crystal violet is also an atriphenyltmethane dye. It has antimicrobial properties, is mutagenic, and is used to prevent fungal growth in poultry feed .It is used as a bacteriostatic agent in medical solutions [4,5], so this property helps to treat staphylococcus aurous skin infection [6,7]. Crystal violet is one of the dyes that changes in many studies about molecular structures [8] and electronic states, so it has many applications in sensors and light emitting diodes [9,10]. In our experiment, polystyrene was mixed with the dye Crystal Valiot and then exposed to light figure(1,2) PS (C8H8). and CV $C_{25}N_3H_{30}CL$ chemical structure.



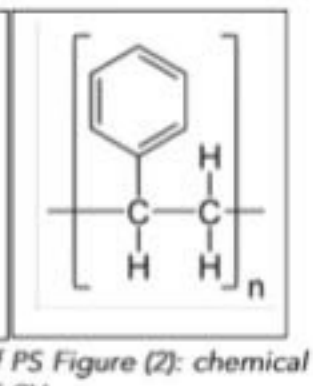


Figure (1): chemical structure of PS Figure (2): chemical structure of CV

Section of the Laboratory

PS doped CV thin films, dissolve 0.015 g of CV in 10 mL of tetrahydrofuran (THF) and stir for 30 minutes to obtain a homogeneous solution, then dissolve 2 g of PS in 30 mL THF with vigorous stirring for 2 hours to obtain a polymer solution. A 2 ml CV solution is mixed with a 5 ml PS solution and poured onto a glass substrate at room temperature to form PS-CV thin films ,as well as, Thin films of CV-stained PS were exposed for 60 minutes in an aluminum box to a TUV 30 W low-pressure mercury lamp (G30T8 Philips) at room temperature. The lamp was 10 cm away from the samples, and it emitted radiation with a wavelength of 253.7 nm and a power density of 21 mW/cm^2. A spectrophotometer was used to measure the change in the absorption spectrum of the samples at room temperature ,and Sigma-Aldrich provided all of the materials used.

2. Results and Discussion

Several factors influence the optical absorbance spectrum, including chemical composition, absorbed photon energy, thin-film thickness, and topography. Several UV-visible spectroscopies were performed in our study using a double beam UV visible laser.
At room temperature, use a spectrophotometer (CE-7200). Thickness (D) of thin films:
The Swanepoal equation was used to calculate the thickness of the thin films (D) prepared within the scope of the study(11) .

$$d = \frac{1}{2} * \left(\frac{\lambda_1 * \lambda_2}{\lambda_1 * n_2 - \lambda_2 * n_1} \right) \dots\dots\dots *$$

Where is the wavelength, and Lowering and raising of the sample.

Absorption

It occurs when the frequency of light scattered

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