CHAPTER - 1

INTRODUCTION

This century has witnessed the real revolution in the industry, due to various inventions One of them is the use of polymers (plastics). The property, such as the strength and elasticity, on one hand and the resistance on the other, make them comparable and sometimes much better than the metals. The applications of them have grossly taken over the needs in human life.

The depletion of the conventional energy sources viz. petroleum and coal have started the bells of caution ringing. By the end of this century we will be in live situation. Scientists have always been looking for the new and / or alternative sources of energy. With the view, the attention turns to the sun, the biggest source of energy in the form of light and heat. The conversion of light energy into electrical energy has been of interest to everyone, all the time.

The advent of solar cells and the continuous improvement in the yield, has always interested the research minds. With the view to replace the semiconductors by the polymers, which are higher in weight, free from corrosion and lower in cost.

It is believed that luminescence of ploymers, will play an important role in their selection for application in the PESC cells (Photoelectrochemical solar cells). The conversion efficiency or yield of PESC cells is less since most of the solar energy falling on the cell is not utilized for conversion into electrical energy. The efficiency of solar cell is affected, when luminescent polymers are used as concentrator. Some work [1-4] has been carried out to increase the efficiency of PESC cells by using polymer films. Thus, polymers are needed in the form of films With this view some polyesters of coumarin have been synthesized in the laboratory.

In addition to the above, the application of luminescence spectroscopy to polymers have been the subject of severals reviews and books [5-11] . It is known that luminescence is sensitive to chemical structure and geometry of molecule and also surrounding environment. In surrounding environment solvents affect the luminescence.

To study the effect of solvents on luminescence of polymers, the solvents Dioxin, Tetrahydrofuran,Dimethylformamide, Acetonitrile , Dimethylsulphoxide have been chosen. All the results have been shown in graphs. Fluorescence efficiency of coumarin changes due to change in the surrounding media [12] . In recent past, various photophysical aspects viz., pH effect, solvent and substituent effect, hydrogen bonding, polarization etc. were studied for coumarins [13-17].

In the present study, polyesters of coumarins with different dibasic acids have been chosen. An attempt is made to study the effect of solvent on luminescence of these polymers.

It is observed from the present investigations that monomer, 5, 7- OH - 4 - Me coumarin show the peak at 430 nm while its polymer shows the peak at 410 nm with a hump around 520 nm. For the study of effect of solvent on fluorescence,all the specimens were dissolved in the different solvents like Dioxane, Tetrahydrofuran, Dimethylformamide, Acetonitrile, Dimethylsulphoxide at two different concentrations. It has been observed that intensity for almost all the specimens is lower in high concentration solutions than in low concentration solutions. Significant shift has not been observed in the position of the peak.

In addition to above, the fluorescence peak shifts towards longer wavelength as polarity increases and the intensity decreases. Above observed results are explained by considering the solvent - solute interaction; which can be a polarity induced interaction, resulting in the perturbation of position of energy levels; however, the concentration doesnot perturb the position of an energy level.

Hence, no change is observed in the position of the peak for higher or lower concentrations.

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