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CHEMICAL RESISTANCE & ELECTRICAL PROPERTIES OF POLYACRYLATE ESTER OF 2,2[BIS(3,5-DIMETHYLOL4-4HYDROXYPHENYL)] PROPANE CONTAINING IONIC TRACES

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ABSTRACT

The chemical resistance of polyacrylate ester of 2,2 [bis (3 , 5 - dimethylol-4-hydroxyphenyl)] propane to a series of standard reagents namely 20% (HCl, HNO3, H2SO4, MeCOOH, NaOH) was studied according to standard provedures. Time of saturation and % uptake were estimated from plots of changes in weight versus the square root of immersion time. The films showed remarkable stability in all reagents except NaOH. Electrical characteristics namely electrical resistance was investigated from V/I plots at constant temperatures (20-80 °C). The electrical conductivity variation with temperature was studied, the activation energy value was estimated from plot of $\ln\sigma$ against (1/T) and was found to be 0.71 eV; however films behaved as perfect insulators.

INTRODUCTION

Electrical application of polymers has attracted increasing attention in recent years, several systematic studies have being carried out in terms of conductivity and stability[1]. It is well known that polymers are materials having very high electrical resistivity. However; conjugation is necessary for modest conductivity in doped hydrocarbon polymers[2,3], and it has shown that electrical conductivity can be varied by suitable dopants over orders of magnitude. Several dopants have been employed and studied e.g. SO3, ASF5, I2, LiAlH4[4,5]. These are generally incorporated via vapour phase or solution doping technigue. A new electrically conductive polymers have been synthesized and studied by chemical or electrochemical methods[6]. Promising characteristics were found which encourage their applications in micro-electronic devices such as photoelectrochemical displays, electrodes and electrolytes for solid state batteries, optical information storage devices and sensors[7].

On the other hand, the chemical and environmental resistant of polymers are one of required characteristics for various applications of polymers mainly polymer coating, buried electrical power cables, storage vessels and long term marine application[8].

We have recently synthesized an acrylate polyester resin which showed promising thermal and mechanical properties[9]. Accordingly it was intended in the present work to study chemical resistance and electrcal properties of this polyester.