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Dielectric Properties of poly vinyl alcohol (PVA) doped with Alizarin Orange Dye thin films prepared by cast method using Lumped equivalent circuit

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Abstract

In this study the dielectric properties of poly vinyl alcohol (PVA) doped with Alizarin Orange Dye thin films prepared by cast method were deposited on aluminum substrate at room temperature by using cast method technique by using Lumped equivalent circuit. The dielectric properties were studied in the frequency and temperature ranges (1-100)KHz and (303-343) K respectively.

These properties include dissipation factor, series and parallel resistance, series and parallel capacitance, real and imaginary part of the dielectric constant, a.c conductivity and impedance (real and imaginary) part, that have been deduced from equivalent circuit.

The investigation shows that the dielectric constant of polymer under study increases with increasing temperature while it is decreasing with increasing the frequency .The dissipation factor is increasing as the frequency increased.

Keywords: resistance, capacitance, dielectric properties, a.c conductivity, dissipation factor .

1.Introduction

Organic molecular systems have been rapidly developed due to the newly developed technologies of synthesing a new molecular materials with compatible desirable properties. [1]

Studying the dielectric properties of polymers is of increasing importance because it provided an understanding to the molecular chains which reflect the wide polymer applications and usage in engineering [2].
Most of polymer materials are used as insulators in wires, cables, printed circuit boards and in many other electronic devices such as poly alpha naphthyle acrylate. [3] .

Insulators with low dielectric constant are preferred to be used in the industry of communication coaxial cables to minimize as much as possible the electron density on the conductor surface, whereas the high dielectric constant materials are preferred to be used in the industry of capacitors[4].

The evaluation of dielectric properties of the insulator film is carried out by measuring simultaneously the capacitance and the dielectric losses of the film over a