

DOI: <http://dx.doi.org/10.21123/bsj.2016.13.1.0174>

Investigation of the dielectric Properties of (PPAB) terminated by phenylenediamine doped by $\text{Na}_2[\text{Fe}(\text{CN})_5\cdot\text{NO}]\cdot 2\text{H}_2\text{O}$ using Lumped equivalent circuit

HassanK. Ibrahim

Kkalid I.Ajeel

Department of Physics, College of Education, University of Basrah, Basrah /Iraq.

E-mail : Hakaib_2014@yahoo.com

Received 2, January, 2008

Accepted 26 May 2009



This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Abstract

The aim of this paper is to demonstrate the effect of $\text{Na}_2[\text{Fe}(\text{CN})_5\cdot\text{NO}]\cdot 2\text{H}_2\text{O}$ impurity (0.1 M) concentration on the dielectrical properties of poly (P-Aminobenzaldehyde) terminated by phenylenediamine in the frequency and temperature ranges (1-100)KHz and (283-348) 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 adding $\text{Na}_2[\text{Fe}(\text{CN})_5\cdot\text{NO}]\cdot 2\text{H}_2\text{O}$ as additive to the polymer lead to increase of the dielectric constant with increasing temperature and it is decreasing with increasing the frequency .The dissipation factor is increasing with as the frequency increased.

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

Introduction:

Organic molecular systems have been rapidly developed due to the newly developed technologies of synthesizing a new molecular materials with compatible desirable properties. [1] Studying the dielectric properties of polymers are 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 that poly alpha naphthyle acrylate. [3].

Insulators with low dielectric constant are preferred to be use 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 wide range of frequencies and temperatures. Although the dielectric properties of a number of polymers have been