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Durometer Test and Impedance Measurement of Metal Precursor Reinforced Polymer Composites

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Abstract

Polymer composites were preferred for the domestic and industrial applications due to unique high performance properties. In the present work we demonstrated the preparation of polyvinyl alcohol (PVA)/Copper bismuth sulphide (CuBi_2S_3) metal precursor composites by solution blending. The decreased softness by 45% was confirmed as a function of metal precursor loading tested by shore - A durometer. It may be due to the presence of metal precursor in polymer system distinguished by Scanning Electron Microscope (SEM) techniques. We observed the influence of metal precursor on bulk resistance and impedance as function of temperature across the broadband frequency and wide temperature range. The dc conductivity obeys the Arrhenius relationship and confirmed the decrease in activation energy. This investigation may be feasible for the electrical and electronic domains.

Keywords: Impedance; Durometer test; Metal precursor; Composites.

1. Introduction

The electrical properties of polymers were highly crucial for various applications which includes low loss cables [1], battery electrodes [2], electromagnetic shielding [3], electronic components as capacitors and thermistor, modern civil and military devices [4-5]. The polymer conductivity and dielectric properties were essential properties for the engineering applications and implementation. In the present study polyvinyl alcohol (PVA) was selected due to easy casting, film forming and glossy in nature. Several reports with PVA demonstrated improved electrical performance of PVA system as function of fillers [6-9]. The role of metal precursor was highly important to modify the PVA systems enable to understand the structure, morphology co-related

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