

Synthesis of Poly-Methyl Methacrylate-Zinc Composites and Study Electrical Properties

Bahaa H. Rabee

Babylon University, College of Education, Department of physics, Iraq

Majeed Ali Habeeb

Babylon University, College of Education, Department of physics, Iraq

E-mail: majeed_ali74@yahoo.com

Ahmed Hashim

Babylon University, College of Science, Department of physics, Iraq

E-mail: ahmed_taay@yahoo.com

Abstract

In this paper, samples of (PMMA-Zn) composites were prepared using Hot Press method. The effect of Zinc content and temperature on the D.C electrical conductivity have been investigated. Results show that the D.C conductivity of such composites increases suddenly by several order of magnitude at a critical weight concentration.

The D.C electrical conductivity changed with increasing of temperature. Also the activation energy change with increasing filler concentration.

Keywords: Composites, electrical conductivity, poly-methyl methacrylate.

Introduction

Polymer Matrix Composite is material consisting of polymer matrix combined with a fibrous reinforcing agent. Polymer matrix composites are very popular due to their low cost, high strength to weight ratio, non-corrosive and simple fabrication methods. Polymer matrix composites reinforcement by strong fibrous network is characterized by the high tensile strength, high stiffness, high fracture toughness, good abrasion resistance, good puncture resistance, good corrosion resistance and low cost [1]. Electrical properties of polymers are the responses when an electric field applied and the subject of electrical properties of polymers covers a diverse range of molecular phenomena. In contrast to metals, when the electrical response is one of electronic conduction polymers display a much less striking response. These absences of any over riding conduction dose allow, however, a whole set of more suitable electrical effects to be observed more easily, for example, polarization phenomena resulting from distortion and alignment of molecules under the influence of the applied field becomes apparent. Examination of such polarization not any gives valuable insight into the nature of the electrical response itself, but it also provides an effective way to probe molecular dynamics. For this, reassigned electrical studies form a desirable supplement to studies of purely mechanical properties aimed at reaching an understanding of the behavior of polymers on a molecular level. The study of electrical properties will also facilitate the fundamental understanding of the thermal and optical properties of polymer[2]