IONIC CONDUCTION IN COMPOSITE MG30 POLYMER ELECTROLYTES

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MAY 2010

ACKNOWLEDGEMENTS

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ABSTRACT

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Polymer is an important constituent of composite polymer electrolytes(CPE).The potential of 30% poly(methyl methacrylate) grafted natural rubber (MG30) as a polymer host, zinc chloride ($ZnCl_2$) as a salt, propylene carbonate (PC) as a plasticizer and titanium dioxide (TiO_2) as a inorganic filler. Impedance spectroscopy technique was carried out in order to to determine electrical conductivity value.The highest conductivity value of solid polymer electrolytes which is MG30 added with salt is 2.389×10^{-5} S/cm with 60 wt.% of $ZnCl_2$ at room temperature.CPE was prepared by adding the highest conductivity of SPE with the plasticizer and filler. The ionic conductivity was investigated by using impedance spectroscopy. The highest conductivity of 2.38×10^{-4} S/cm was obtained from 30 wt.% of TiO_2 nanofiller at room temperature.

CHAPTER 1

INTRODUCTION

1.1   Background

A polymer can be defined as a large molecule (macromolecule) composed of repeating structural units typically connected by covalent .In 1811, Henri Braconnot did pioneering work in derivative cellulose compounds, perhaps the earliest important work in polymer science. The development of vulcanization later in the nineteenth century improved the durability of the natural polymer rubber, signifying the first popularized semi-synthetic polymer. In 1907, Leo Baekeland created the first completely synthetic polymer, Bakelite, by reacting phenol and formaldehyde at precisely controlled temperature and pressure. Bakelite was then publicly introduced in 1909.

Despite significant advances in synthesis and characterization of polymers, a correct understanding of polymer molecular structure did not emerge until the 1920s. Before then, scientists believed that polymers were clusters of small