ELECTRICAL CHARACTERISTIC OF PVC-LiTFSI-Al_2O_3 (MICRO SIZE)POLYMER ELECTROLYES

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ABSTACT

In this study of composite polymer electrolyte, poly (vinyl Chloride), (PVC) was used as the host polymer and lithium (bis) trifluoromethanesulfonimide, (LiTFSI) as the doping salt with Alumina, Al_2O_3 as the filler. PVC and salt in different wt% concentrations were dissolved in Tetrahydtofuran (THF). The influence of different concentrations of salt on PVC gave rise to different values of ionic conductivity. The best ionic conductivity was choosen for further experiment. The best ionic conductivity of PVC-LiTFSI was mixed with micro size of filler to form PVC-LiTFSI- Al_2O_3 composite polymer electrolyte. The ionic conductivity of the samples was determined by impedance spectroscopy. Temperature dependence of conductivity behavior of the best conducting PVC-LiTFSI and PVC-LiTFSI- Al_2O_3 samples were also investigated to obtain the values of activation energy (E_a) of conduction.

CHAPTER 1

INTRODUCTION

1.1 Introduction

A large group of organic materials in industrial applications is in the form of natural and synthetic organic polymers. Increasing understanding in the relationships between the molecular structures of polymers and their chemical and physical properties, make it possible to design and to produce various polymer materials of desired characteristics for specific applications such as in electrochemical cells.

Polymer or plastic have unique properties which is attributed to their long chain structure. Polymer is a class of material that is made up of a large number of molecules, which is formed from the repetition of small and simple chemical units called monomer linked together by covalent bond.

According to P.V Wright et al [1973], polymer becomes ionically conducting when inorganic salts are dissolved in them. The polymer acts as a host, while the inorganic salt dissociate in them to provide the ions necessary for conduction. The