EFFECT OF ADDITION OF Al_2O_3 NANOFILLER ON CONDUCTIVITY OF PVC-PEMA-$LiCF_3SO_3$ POLYMER ELECTROLYTES

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ABSTRACT

In this study, thin film of poly (vinyl chloride) (PVC) – poly (ethyl methacrylate) (PEMA) is used as polymer host with lithium triflate ($LiCF_3SO_3$) as the doping salt and aluminium oxide (Al_2O_3) as the inorganic filler in the preparation of PVC-PEMA based composite polymer electrolytes. This study focus on the investigation of the electrical characteristics of PVC-PEMA based blend in particular the determination of the ionic conductivity of the polymer electrolyte. The conductivity is measured using impedance spectroscopy.

CHAPTER 1

INTRODUCTION

1.0 Introduction

Polyvinyl chloride (PVC) was first commercialized in 1993 in Germany and the United State. Its global consumption is more than 30% of the plastics used in the world. PVC has been also used as a host for preparation of polymer electrolyte. PVC based polymer electrolyte system plasticized with ethylene carbonate (EC) and propylene carbonate (PC) have been reported to be applicable to lithium and lithium-ion secondary batteries (Alamgir *et al.*, 1993). As a result, intense research has been carried out on polymer electrolytes.

Applications of lithium batteries in automotive industries, portable devices and aerospace applications is presently the subject of interest, both to the battery developer and the manufacturer (Battery Council International Meeting *et al.*, 1996). Depending on the type of the cathode, anode and the electrolyte used in the battery one can expect a range of energy densities. In addition, with the use