

AUTOMATIC MEASUREMENT OF IONIC CONDUCTIVITY OF SOLID STATE MATERIAL

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“your attention and co-operation are highly appreciated....”

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ABSTRACT

This thesis describes the automatic measurement of ionic conductivity of solid state material using the PCL-1800 data acquisition system (DAS) card. The PCL-1800 is a very high-speed, high-performance multifunction plug-in DAS card for the IBM personal computer (PC) and compatible computers.

The measurement of ionic conductivity is performed by executing the control software. The ionic conductivity circuitry is connected to the PC using parallel interfacing card. The control software to automate the measurement is written in QBASIC but the display is running on window environment using Visual Basic.

1. INTRODUCTION

With the spread use of computers in all works of life, the system operation introduces the computer to act as a controller. Using the appropriate software, the computer can control the whole system operation automatically and display the result on the screen. The computer can be used to measure voltage, current and ionic conductivity of solid state material. At present, the ionic conductivity is measured manually by taking the output voltage reading from the oscilloscope and uses the voltage to calculate the ionic conductivity. This technique gives some disadvantages such as; cannot get the accurate result and the time response is too fast.

Observing the need for faster result and high efficiency with less error, the project titled “Automatic Measurement of Ionic Conductivity of Solid State Material” was conducted. A microcomputer is used in this project in order to get accurate result and faster operation. This automatic technique offers some advantages such as; high efficiency, less error, can get faster result and time taken for experimenting become shorter.

This report describes the automatic measurement of ionic conductivity of solid state material using the PCL-1800 data acquisition system (DAS) card. Chapter 2.0 of the report describes the theory of ionic conductivity and its measurement. Chapter 3.0 and 4.0 describe the hardware and software