

Abstract

A potentiostat is the electronic hardware required to control a three electrode cell, the system functions by maintaining the potential of the working electrode at a constant level with respect to the reference electrode by adjusting the current at a counter electrode. The result from the measurement from the potentiostat can be used as reference to calculate such as the liquid concentration, acidity, corrosion rate and electron transfer rate from capacitor. For the use of capacitance measurement on capacitor, the data will be displayed as I-V curve by using Cyclic Voltammetry method. In the operation of potentiostat will be using three different electrode sensor which is working electrode, reference electrode, counter electrode. The system from the potentiostat consists analog circuit and microcontroller circuit. Analog circuit using an Op-amp TLC274 as the core of its system, the op-amps in the analog circuit work as three different methods which consist buffer circuit, differential circuit and I to V converter circuit. The DAC MCP4725 are used to control the voltage in the differential op-amp. Microcontroller are used to change the voltage value of DAC and data acquisition to acquire data from the analog circuit. And we can display the acquired data to the computer. The prototype of the potentiostat are able to control the voltage between $-1V - 1V$, and have three different scan rate values $10mV/s$, $50mV/s$, $100mV/s$, and the range measurement of current is $10\mu A$ to $300\mu A$.

Keyword: Potentiostat, electrode, I-V curve.