

Affecting of Corrosion Potential and Current Density on Variation Polarization Curves with Polyvinylchloride

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In this study, we was carried out that experiments for measuring the variations of corrosion potential and current density for polarization curves with polyvinylchloride. The results were examined to find out especially the influence affecting the corrosion potential and vary condition (temperature, date, pH, bacteria, and added salt). The second anodic current density peak and the minimum passive current density are designated I_p/I_0 , respectively. The value of I_p/I_0 is used as a measurement for the extent of degradation of the polyvinylchloride. The potentiodynamics parameters of the corrosion were obtained using Tafel's equation

1. Introduction

The development of polymer chemistry began in the 1920s. Chemists were making great progress in clarifying the chemical structure of various substances, but they were generally puzzled by the behaviour of certain materials, including wood, gelatin, cotton, and rubber. These observations strongly suggested the presence of very high molar mass solutes, but chemists were not ready at that time to accept the idea that such giant molecules could exist. Instead, they postulated that materials such as rubber consist of aggregates of small molecular units, held together by inter-molecules force. Once the structures of these macro-molecules were understood, the way was often for manufacturing polymers, which now pervade almost very aspect of our daily lives. About 90 percent of today's

chemists including biochemists, work with polymers. Polymers are very large molecules containing hundreds or thousands of atoms, people have been using polymers since prehistoric time, and chemists have been synthesizing them for the past century. Natural polymers are the basis of all life processes, and our technological society is largely dependent on synthesis polymers^{1,2}. The 1960s is known to some as the space decade. Undoubtedly the 1970s will similarly be known as the environmental, ecological, or pollution decade, for it is in this decade that environmental pollution has become a popular cause for concern. Much of the material spoken and written about environmental pollution has been presented with great emotion from a position firmly on one side or the other of the issues³. In this article we attempt to provide an overview of the ways in which corrosion polarization techniques can be used to enhance our knowledge of the chemical behaviour of polymer systems. In particular, we should like to discuss the applications of electrochemical methods to the study of nonaqueous solutions and corrosion of polymeric systems.

2. Experimental

Polyvinylchloride was obtained from MD(Mu-Dung)corporation in Kwang Ju. The working electrode was cast in solution to expose a all side shaped face of 1cm² are on way end with platinum line. The reference electrode was calomel electrode(silver/silver chloride), and counter electrode was graphite carbon rod. When the corrosion polarization measurements was behaviour under a nitrogen atmosphere(on the sample solution).

All experiments were performed at a scan rate of 50 mv/sec with EMS 100(Garry Instruments, Inc) interfaced with a PC.

Table plots were obtained from ± 200 mv region from the steady state potential. While vinylchloride content was maintained at 10^{-3} mol, and the pH of the solution were added to control with sodium hydroxide and sulfuric acid. In order to observe the effects of salt with dissolved oxygen content vinylchloride was added magnesium chloride. The experiment of oxygen content in solution was cast to expose in a nature. The experiments of temperature were obtained from 20 °C to 45 °C region and the effect of enzyme was tested with bacteria(fungi).

3. Colclusions

The corrosion polarization curves of polyvinylchloride exhibits a total of three redox waves. The cathodic peak potential was $E_{pc1} = -0.50V$ and anodic peak potentials were $E_{pa1}=+0.08V$ and $E_{pa2}=+0.58V$ observed, respectively. The second anodic current peak increases with service time (I_p/I_0).

We were found that the corrosion potentials could be evaluated positive potentials. because this is caused by the increase of oxidation reaction. We was known that the best potential of corrosion rate was observed to be $+0.08V$ on ranges between from $30^{\circ}C$ to $40^{\circ}C$. The pH on the pitting corrosion were found to be region between from $pH=2.6$ till $pH=4.6$. The corrosion rate exhibited good when it is not added $MgCl_2$.

The effect of mass transfer was obtained more than $\alpha=0.5$. Accordingly, this approach has been the advantage of being applicable to electrode reactions that are totally reversible.