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## ELECTROCHEMICAL MEASUREMENTS OF ANODIZING STAINLESS STEEL TYPE AISI 304

Dr. Sami A. Ajeel<sup>\*1</sup>, Basheer A. Abdul-Hussein<sup>\*2</sup>, Yaqoob M. Baker <sup>\*1</sup>

<sup>\*1</sup>: Department of Production and Metallurgy Engineering of the University of Technology/ Iraq

<sup>\*2</sup>: Department of Chemical Engineering of the University Technology/ Iraq

### ABSTRACT

Corrosion is the destructive attack of a metal by chemical or electrochemical reaction with its environment. Stainless steels have surface passive layer which exhibits a truly remarkable property: when damaged (e.g. abraded), it self-repairs as chromium in the steel reacts rapidly with oxygen and moisture in the environment to reform the oxide layer. If the oxide forms a continuous layer on the surface it will stop or slow down the oxidation process and protect the metal from further corrosion. The oxide layer is enhanced with further thickening by anodizing process. This work deals with comparative study of corrosion behavior of mechanical polishing, electropolishing and anodizing 304 stainless steel specimens. Electrochemical measurements are applied using open circuit, polarization and cyclic polarization at room temperature in sea water (3.5% NaCl, pH 6.7). Improvement in corrosion resistance is clearly observed for specimens after anodizing process that shown,  $E_{corr} = -359.6$  mV and  $i_{corr} = 3.83 \mu A/cm^2$ , while the specimen after electropolishing,  $E_{corr} = -398.8$  mV and  $i_{corr} = 4.69 \mu A/cm^2$ , and specimen before treated,  $E_{corr} = -419.9$  mV and  $i_{corr} = 5.56 \mu A/cm^2$ , and pitting potential increases in positive direction.

**Keywords:** Corrosion, Anodizing, Stainless steel 304, Electrochemical measurements

### 1. INTRODUCTION

Stainless steel 304 is the standard "18/8" stainless; it is the most versatile and most widely used, available in a wider range of products, forms and finishes than any other [1]. The corrosion resistance of austenitic stainless steels is primarily attributed to the passive oxide film formed on its surface that, exposed to an aqueous solution, is a mixture of iron and