The influence of the deformation in cold rolling formatting on the characteristics of the oxide layer obtained by anodization on the ALUMINIUM alloy of TYPE 2024.

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Abstract.

The objectives of this work is to study the influence of the rolling treatment on the corrosion behavior of 2024 aluminum-alloy specimens anodized in sulfuric bath. The elaborated specimens without and with rolling treatment have been deeply characterized using optic microscopy (OM), scanning electronic microscopy (SEM), X-ray diffraction (XRD) and differential scanning calorimetry (DSC). The corrosion behavior was studied in NaCl solution 3% by performing the polarization plots and by electrochemical impedance spectroscopy.

Keywords: Aluminum alloy, Corrosion, anodizing, SIE, Bode diagram, Nyquist diagram, equivalent electrical Circuit: R (CR/QR), Rolling.

1. Introduction

Many researchers have focused on the development of aluminum and its alloys, as they have a high technological value and are widely used in industrial applications, thanks to their attractive combination of high specific strength, high thermal electrical conductivity, good malleability, excellent usability, availability in many forms (e.g. rolling, extrusions, embossing, forging doors, casting and composite materials, Al-MMC) and relatively low costs for manufacturing components and suitable for a variety of connectivity techniques, surface treatment and recyclability [1-6]. Furthermore, aluminum alloys offers one of the best metal options for the structural components of aircraft due to their well-known performance characteristics, manufacturing costs, execution methods and manufacturing facilities, and allowing their use in large quantities in the future [7]. Among these alloys, the quaternary Al–Cu–Mg–Mn 2024 alloy is one of the most used [8]. However, the low hardness and corrosion resistance of these alloys are limiting factors for many applications [9]. Therefore, it is necessary to improve the corrosion resistance and surface properties of this alloy by appropriate surface modification methods. In this regard, small-thickness aluminum alloys are