

Effet de la cinétique de précipitation sur la résistance à la corrosion de l'acier inoxydable duplex 2205 et de l'alliage d'aluminium 2000

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Soutenue en: 2018

Abstract: This thesis is subdivided into two main parts. First, the influence of the microstructure of the AA2214-T6 aluminum alloy on the morphologies and electrochemical properties of anodic alumina oxide films was investigated. (AAO) formed, and then to see if the heat treatment T4 brought to the AA2214 alloy brought improvements in term of the morphologies of (AAO) and in term of resistance to the corrosion of the anodic alumina oxide films .Secondly, we orientate this work to correlate the pitting potential (E_{pit}) evolution with the kinetics of σ phase precipitation in the 2205 duplex stainless steel aged at 850°C after solution treatment at 1150°C. The potentiodynamic polarization curves indicate a reduction of the pitting corrosion resistance with the aging time, which is revealed by a decrease in the E_{pit} values from 0.65 to 0.40 VSCE. Thus, E_{pit} values are used to determine the kinetics parameters of the σ phase precipitation. The experimental transformed fraction agrees well with the one calculated by using the modified Kolmogorov–Johnson–Mehl–Avrami equation with an impingement parameter $c = 0.6$.

Keywords : Kinetics, KJMA, Pitting corrosion, Potentiodynamic polarization, sigma phase precipitation, Aluminum alloy, (AAO) anodic alumina oxide, porous structure, T4, EIS