

Investigation of the evolution and influence of hardening phases on the corrosive behavior of AA2198

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The Al-Li alloys are 2XXX series aluminum alloys and has been gaining space in the aeronautical applications. Adding 1% by weight of Li to aluminum, reducing by 3% at the final density and increasing by an average of 6% in the modulus of elasticity of the material. The characteristics and advantages presented by the Al-Li alloys, together with the growing interest of the aeronautical industry, have resulted in the interest in studying the relationship between the microstructure and its corrosion behavior. Alloy 2198 is a third generation of Al-Li alloys. Alloy elements such as Cu, Li and Mg promote the increase of the mechanical strength of the alloy by solid solution and the precipitation of phases T1 (Al₂CuLi), Θ (Al₂Cu) or S (Al₂LiMg). Phase T1 is the main hardening phase of the material and because it is more electrochemically active, it decreases the corrosion resistance. In this work, the AA2198 as received was solubilized at 500 °C to clear the thermal history of the material. A homogenization treatment was carried out for 1 h and 4 h with mechanical vacuum and an oven with argon controlled atmosphere. Differential Scanning Calorimetry (DSC) and Dynamic Mechanical Analysis (DMA) tests were performed to verify the kinetics and influence of phase precipitations on the mechanical response of the material. The resistance to corrosion of the different homogenization conditions was investigated with electrochemical tests, such as Open Circuit Potential (OCP) and Polarization.