

**CONTRIBUTION TO THE STUDY OF PRECIPITATION KINETICS IN THE Al-Zn-Mg-(Cu)
SYSTEM ALLOYS BY DIFFERENTIAL SCANNING CALORIMETRIC (DSC) AND
MICROHARDNESS MEASUREMENTS**

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Abstract

The Al-Mg 5xxx series aluminum alloy are widely used in industry especially for marine applications since they possess an excellent balance among material such as general corrosion resistance, strength, weldability, weight compared to other Al alloys and formability. These properties are related to the magnesium content and to the applied heat treatments. They undergo the transition phases by precipitation which improves their mechanical properties. These improvements can be obtained by solution heat treatments and suitable ageing ones. Although they are already well studied, the questions concerning the stability of the microstructure and the effect of the various heat treatments are always asked. In this work, we present a study on the evolution of the precipitation reactions after quenching, exactly the evolution of the equilibrium phase (formation, coalescence, and dissolution), Al-12 wt. % Mg alloy aged at 250°C during different ageing times. The use of various experimental techniques as differential dilatometry, differential scanning calorimetry, scanning and transmission electron microscopy, X-ray diffraction and microhardness measurements, shows their importance and their complementarity in the study of ageing process in this alloy. The obtained results clarified the parameters that govern the stage of β particles appearance and the mechanical responses to the applied heat treatments.

Keywords: Al-Zn-Mg-(Cu) alloys, differential scanning calorimetric; microhardness measurements

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