Poster

AGE-HARDENING EFFECT ON THE PROPERTIES AND NANOSTRUCTURE OF FUNCTIONALLY GRADED AL ALLOY – SICP COMPOSITES

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Abstract

Functionally graded Al/SiC_p composites (FGMMC´S) have shown a great potential for industrial applications in the aerospace and automotive industries [1-3]. The combination of a high wear resistance up to relatively high temperatures and good bulk toughness, provided by the incorporation of the ceramic particles on the superficial region of the component, are the main advantage of these materials. These composite materials are produced by conventional liquid metallurgy processes (stir and centrifugal casting), the properties of the produced components being those resulting from this processing route. It becomes possible to perform post-processing age-hardening heat treatments and combine this capability with adequate castability, by adjusting the chemical composition of the Al-alloy matrix[4]. Age-hardening originates nano-scaled precipitates which can improve the hardness and toughness of the material [5]. An unknown issue is the influence of the presence of the SiC particles, and particularly of the SiC/Al-alloy interface on the precipitation sequence in these materials.

The main aim of this work is to investigate the effect of age-hardening on the properties and nanostructure of functionally graded Al/SiC_p composites. The structures of the materials were studied at the micro and nano-scale by complementary characterization techniques (TEM, AFM and nano-identation).

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