TRB1759 - THE INFLUENCE OF PARTICLES DISTRIBUTION ON THERMAL STRESSES IN METAL MATRIX COMPOSITES

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Abstract: This work reviews some experimental results that have been published about aluminum matrix reinforced with SiC distribution and their influence in composite material resistance. It is too difficult to obtain a mathematical model relating the composite material and SiC distribution, but qualitative analyses indicate that micro structural characteristics were very influenced by SiC particulate distribution. For example, in the matrix adjacent to the ceramic reinforcement there are an enhanced nucleation and growth of the precipitates, specially Mg2Si. Recent studies recognized that deviations from the periodicity of reinforcement distribution can markedly influence the plastic deformation characteristics even when they have a neglected effect on the elastic properties. For over all constructive response of the composite is influenced by the physical and geometrical properties of the reinforcing phases. The finite element method, the Eshelby method and dislocation mechanisms are usually employed in formulation of the constitutive response. The aim of this work is to show the stress distribution around the particles and inside the clusters. The finite element code used for the present study was Ansys 5.5, it was primarily only considered thermal stress distribution around particles equally distributed and evolution of the elastic stresses. Afterwards, this study has analysed the non uniform distribution of particles and the evolution of the elastic-plastic stresses.

Keywords: distribution off sic in metal matrix.

TRB1881 - FRICTION DISTRIBUTION COEFFICENT STUDIES USING ATOMIC FORCE MEASUREMENTS ON DIAMOND-LIKE AND MOLYBDENUM DISULFIDE

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Abstract: In this work molybdenum disulfide (MoS2) and DLC friction distribution have been studied by LFM (Lateral Force Microscopy) technique for friction measurements. Using RF magnetron sputtering has performed the deposition of MoS2 and DLC. The tribological properties of sputtered MoS2 and DLC films at nanometer scale have been obtained in AFM (Atomic Force Microscopy) with the tip in contact with the surface, working in the lateral force mode. The lateral force acts on the pyramidal tip attached to the end of the cantilever due to friction or viscous forces, resulting in the cantilever torsion and deflection related to friction magnitude. The relationship among data from friction coefficient, surface composition and crystal structure is presented. Auxiliary characterization techniques as Raman scattering spectroscopy, conventional AFM and X-ray photoelectron spectroscopy (XPS) for both, MoS2 and DLC films, are also presented. This new technique provides new information about the contribution of crystal structure to friction coefficient. Specially, concerning the DLC films it was possible to get an evaluation about the contribution of the hydrogen content as a function of the friction coefficient analyzing on very small area only in a few samples. So that, this new material characterization option related to tribology area deserves special attention.

Keywords: atomic scale, diamond like-carbon.