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Characterization study of functionally graded metal ceramic composites fabricated by layer processing technique

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Abstract

Functionally graded materials are a ceramic metal composite which transitions from metal on one face to ceramic on the opposite face. In a Functionally Graded Material both the composition and the structure gradually change over the volume, resulting in corresponding changes in the properties of the materials. When two dissimilar materials (e.g. metal and ceramic) with large difference in material properties are bonded, large leap in the in plane normal stresses and high-transverse shear stresses occur at the interface during fabrication and operation. This leads to decohesion at the metal–ceramic interface and low load-bearing performance. Functionally graded materials provide a solution to this problem. In this content Multilayered functionally graded materials (FGMs) systems are designed, synthesized and characterized considering 10, 20, 30 and 40 vol. % ceramic concentrations. Multi Layered FGMs are fabricated into flat beam samples by Layer Processing technique. Porosity content, Micro structural studies, and micro hardness are determined. Thermal properties (thermal fatigue behavior and thermal shock resistance) are also evaluated for functionally graded Materials. Material Used for this research is Al/SiC and Ni/Al_2O_3.

Biography

Kumar R, 34 years old has completed his M.E (Master of Engineering) from Anna University and Engineering from University of Madras, He is working as an Assistant Professor in the department of Mechanical Engineering, M S Ramaiah Institute of Technology Bangalore, India. He is doing his research in the field of FGM (Functionally Graded Materials) and registered for PhD in engineering at VTU (Visvesvaraya Technological University)