

Microstructural analysis and Mechanical properties of Al-Cu functionally graded materials fabricated by using Powder Metallurgy Method

Kotikala Rajasekhar,

National Institute of Technology, Warangal, India

rajakotikala@gmail.com

V. Suresh Babu, M.J. Davidson

National Institute of Technology, Warangal, India

ABSTRACT

In the present study, four dissimilar-layered volume fraction of Al-Cu functionally graded materials (FGMs) were fabricated by using powder metallurgy. The volume fraction of Cu (0, 5, 10 and 15% wt.) powder mixture was hot pressed with a pressure of 400MPa and sintered at 550⁰C for 3h as layer by layer. The mechanical and microstructural investigation shown the material composition distribution of two-layered FGMs varied gradually. The properties of FGMs such as density and hardness was carried out in order to compare with homogeneous mixture of Non-FGM samples. A complete characterization of the microstructural graphs of FGMs achieved using Optical Microscope, Back scattered electron, scanning electron microscopy and XRD analysis. The results shown that the improved micro-mechanical properties of the Al-Cu FGMs based on material selection and sintering temperature as well as dwell time.

Keywords: Functionally Graded Materials, Powder Metallurgy, Copper, Microstructural analysis, Mechanical properties.