Title :

Experimental study on Mechanical Properties of AA7075/B4C Nano Composites Fabricated by Powder Metallurgy Techniques

Abstract:

This work is focused on the fabrication of the AA7075/B4C Nano composite by ball milling of Boron carbide powder of initial size of 50 microns to particle size in Nano range by selecting parameters from previous studies. After confirming the particle by SEM images mixing with AA7075 alloy was done in ball milling machine with different compositions (2, 4 and 6 percentage), followed by cold compaction at 900Mpa under manual hydraulic pellet press and then sintering at 620oC for 30 minutes. Microstructural investigation and energy dispersive spectroscopy analysis were done under SEM. Mechanical properties were tested to find the effect of reinforcement in the matrix material. Results show that there is enhancement in the mechanical properties as compared with the base alloy. Furthermore, as the percentage of reinforcement increases density of the composite decreases and porosity increases. Interestingly here hardness value increased after two percent of composition tremendously after sintering. It is due to the formation of intermetallic compounds in the composite material.

Keywords: Powder Metallurgy, Ball milling, Cold compaction, Sintering, hardness, porosity .