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Preparation and mechanical properties of carbon nanotube reinforced aluminum matrix composites**H Erdem Çamurlu, Aynur Kazaz, M Ayşe Dere and Harun Evlek**
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Carbon nanotube (CNT) reinforced aluminum (unalloyed) matrix composites were produced by hot pressing powder metallurgical technique. Composites containing 0.25 – 3 wt. % CNT were obtained. Mixing was performed both by conventional ball milling (CBM) and high energy ball milling (HEBM). In CBM, which was performed solely for mixing purposes, zirconia balls having 2 mm diameter were used and milling was conducted for 15 minutes. In HEBM, a Retsch PM100 unit with tungsten carbide balls of 5 mm diameter was utilized, where mixing and grinding was conducted for 90 minutes at 150 rpm under argon atmosphere. Hot pressing of the composites was performed at 600°C for 30 minutes. Densities of the obtained composites were over 97% of theoretical. In the microstructure of the composites obtained by CBM, carbon nanotubes were in the form of agglomerates and clusters. Thus, it was seen that conventional mixing was not sufficient for a good dispersion of CNT in Al. Hardness values were about 32.5 HB10 and did not change with the addition of CNT. 3 point bending strength of unreinforced sample was 295 MPa. There was a slight decrease in the strength and strain with increasing CNT content. In the composites obtained by HEBM, CNTs were seen to be well dispersed in the microstructure of the composites. Hardness was seen to be higher, as a result of the application of HEBM instead of CBM. Hardness of unreinforced Al increased to 42.5 HB10. Hardness of the composite containing 3 wt. % CNT reached a hardness value of 81.5 HB10. 3 point bending strength values were about 320 MPa and were not affected by the addition of CNT. Strain values of the composites were lower, as compared to unreinforced sample..

Biography

H Erdem Çamurlu has completed his PhD in 2006 from Middle East Technical University, Ankara, Turkey. Currently, he is an Associate Professor in the Mechanical Engineering Department of Akdeniz University, Antalya, Turkey. He has published more than 35 papers in reputed journals.

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