



AA5083 Aluminium Alloys Reinforced with Multi-walled Carbon Nanotubes: Microstructure and Mechanical Properties

By Julien Stein

Shaker Verlag Sep 2012, 2012. Buch. Condition: Neu. Neuware - The overall goal of this study is to process new metal matrix composites reinforced by carbon nanotubes (CNT) with enhanced mechanical properties. The main part of this work was achieved using chemical vapour deposition-grown multi-walled CNT as reinforcement and a high-performance light aluminium alloy, AA5083, as the matrix. Dense and homogeneous CNT/AA5083 composites were processed by the powder metallurgy route, followed by an extrusion forming process. A homogeneous dispersion of the CNT in the composites at the micron scale appears to be a key parameter for improving the mechanical properties. This could be achieved using highenergy ball milling through the mechanisms of plastic deformation and cold-welding, and was demonstrated from Raman spectroscopy cartography studies. Yield strength, ultimate tensile strength and micro-hardness of the homogeneous composites were increased by up to 54%, 60% and 33%, with respect to matrix alloys processed in the same conditions, and the coefficient of thermal expansion was decreased by 10%. The material strengthening was principally attributed to load transfer at the CNT/matrix interface. 190 pp. Englisch.



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