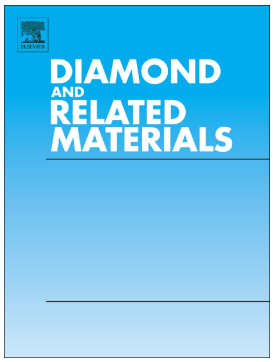

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The influence of CNTs on the microstructure and strength of Al-CNT composites produced by flake powder metallurgy and hot pressing method

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Abstract

During the mechanical milling of powders for the production of metal matrix composites, the work hardening of metals occurs along with the distribution of reinforcing particles, which reduces the ductility and formability of the powders. The use of milling for a short time, in addition to creating homogeneity for reinforcing particles on the surface of flaky metal particles, causes less work-hardening of powders and allows better densification of composite powders. In this research, aluminum- carbon nanotubes (Al-CNT) nanocomposites were fabricated using flake powder metallurgy and hot pressing method. The homogeneous distribution of carbon nanotubes in the aluminum matrix and density close to the theoretical density were obtained through the manufacturing process. After the addition of carbon nanotubes, the grain size of matrix phase reduced from 106 nm to 56 nm in 4 vol.% reinforcement. The increase of carbon nanotubes at 2 and 4 vol.% increased the yield strength and compressive strength from 176 MPa and 201 MPa to 241 MPa and 251 MPa and reduced the fracture strain from more than 20% to 4%, respectively. The increased strength depends

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