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Synthesis and characterization of mechanically milled nanocomposites—carbon nanotube-reinforced aluminium

ABSTRACT. Ever since the discovery of carbon nanotubes (CNTs), their interesting properties have captured the interest of researchers for commercial applications. Exceptional mechanical properties, with an average elastic modulus of 1–2 TPa and fracture strength of 200 GPa, provide the motivation for CNTs to be used in service conditions requiring high strength-to-weight ratios. The present research aims at the incorporation and characterization of CNT-reinforced aluminium nanocomposites. High energy ball milling was used to embed CNTs in a soft and ductile aluminium matrix. Milled powders having CNTs sandwiched in between aluminium grains were characterized using scanning electron microscopy (SEM) and X-ray diffraction (XRD). The results revealed the presence of CNTs at the aluminium powder cold weld interfaces, which was further confirmed by diffraction analysis.

Keywords: carbon nanotubes, nanocomposites, scanning electron microscopy, X-ray diffraction

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