

The effect of different raw material properties on the two kinds of metal-based nanocomposites by a planetary ball mill with DEM simulation

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Metal-matrix composites (MMCs) are advanced material characteristics like light weight, high strength, high stiffness, and widely used composite materials in aircraft, aerospace, and automobiles, electronics, and medical industries. Carbon nanotube (CNT) based composite materials have gained a great deal of attention from both scientific and industrial communities owing to the fascinating properties of CNTs. The present research reports the successful fabrication of two different metal-based composites, one is copper (Cu) based CNT nanocomposites, another is aluminum (Al) based CNT nanocomposites using a planetary ball mill (PBM) technique with an optimized condition. The morphology and surface of the powders were characterized using scanning electron microscopy (SEM) and field emission scanning electron microscopy (FESEM), respectively. A simulation of the three dimensional motion of balls in the planetary ball mill for the research of milling mechanism has been carried out by DEM simulation. The results were analyzed in terms of velocity distribution, impact force and energy.