

Preparation of Al/CNT nanocomposites by Mechanical Alloying Process with different raw material using a Traditional ball mill with DEM simulation

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Carbon nanotubes (CNTs) based composite materials have gained a great deal of attention from both scientific and industrial community owing to the fascinating properties of CNTs. The present study investigated the successful fabrication of Al/CNT nanocomposites using a traditional ball mill (TBM) technique with an optimized condition with (DEM). Various important parameters of TBM have been systematically explored that CNTs have been used to reinforce to improve the properties of the composite materials. We used three different samples which including, un-milled Al, un-milled Al with CNT and milled Al with CNTs. In addition, DEM simulation carried out ball motion and calculate force and energy of balls under the same condition as that of actual milling experiments. The results were systematically analyzed using scanning electron microscopy (SEM) and field emission scanning electron microscopy (FESEM). After compacting, Al/CNT nanocomposite sintered in a vacuum tube furnace at various sintering conditions.

Keywords: Al/CNT nanocomposites, Traditional ball mill, Sintering, DEM simulation