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# Mechanical alloying, sintering and characterization of Al-10 wt% $Al_2O_3$ nanocomposite

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Al-10 wt% $Al_2O_3$ metal matrix composite (MMC) was synthesized by mechanical alloying technique. The effect of milling time and consequently the distribution of $Al_2O_3$ through the Al matrix, on the properties of the obtained powder composites were studied. X-ray diffraction (XRD) and transmission electron microscopy (TEM) were used to investigate their phase composition and morphology. The powders were cold pressed under 10 MPa and sintered in argon atmosphere at different temperatures (300, 370 and 470°C) for 1 h. The relative density and apparent porosity of the sintered samples were determined by Archimedes method, their microstructure was investigated by using scanning electron microscopy (SEM) attached with energy dispersive spectrometer unit (EDS) and their microhardness was measured. The results showed that no notification of phase changes during milling, and as the milling time was gradually increased the crystallite and particle sizes were decreased, while the internal micro-strain increased. It was also found that the relative density increased with increasing milling time and sintering temperature, while the apparent porosity decreased. The micro-hardness of the sintered composites increased with increasing milling time.

## Biography

Mahmoud Nasr El-Din Mohammed has completed his PhD from Al-Azhar University. He has published 5 papers in journals and conferences (some other papers are submitted to international journals). He is a PI and member in two NRC internal projects. He has suprvised MSc thesis. In addition, he participated in some conferences and workshops.

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