



Cairo University

**EFFECT OF CARBON NANO TUBES (CNT) AND SILICON CARBIDE
(SiC) ON MECHANICAL PROPERTIES OF PURE ALUMINUM
MANUFACTURED BY POWDER METALLURGY**

By

Heba Saad Abd El-Halim Herzallah

A Thesis Submitted to the Faculty of Engineering at Cairo University in Partial

Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

In

Mechanical Design and Production Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

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Keywords:

Powder metallurgy; carbon nano tube; Hot isostatic pressure; Aluminum matrix composite; Mechanical properties.

Summary:

This work has established that there is a need for more investigations on the Al-CNT and Al-SiC composites particularly for the addition of CNT and SiC to improve the mechanical and physical properties of Al composite. The objective of this study is to investigate the effect of carbon nano tube or silicon carbide particles addition on the physico-mechanical properties of Al-Matrix Composites.

Disclaimer

I hereby declare that this thesis is my own original work and that no work and no part of it has submitted for a degree qualification at any other university or institute .

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name : Heba Saad Abd El-Halim Herzallah

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Dedication

To my parents and my sister

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Praise is to Allah for without His will, this work would not have even started.

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Nomenclature

PM	Powder Metallurgy System
HIP	Hot Isostatic Pressure
MWCNT	Multiwall Carbon Nano Tube
Hv	Vickers Hardness
HEBM	High Energy Ball Milling
SPS	Spark Plasma Sintering
HPT	High Pressure Torsion Technique
CVD	Chemical Vapor Deposition
AMC	Al Matrix Composites
HRTEM	High resolution transmission electron microscopy
FMWCNTs	Functionalized multiwall carbon nano tubes
CTE	Coefficient of thermal expansion
MOCVD	Metal Organic Chemical Vapor Deposition