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

By

Heba SaadAbd 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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Under the Supervision of

Dr. **Mahmoud A. Adly**

Associate Professor, Mechanical Design and Production Engineering Department

Faculty of Engineering, Cairo University

Dr. **Ayman Hamada El Sayed**

Researcher of powder technology laboratory, Central Metallurgical for R & D institute (CMRDI)

Dr. **Ahmed Yehia Shash**

Assistant Professor, Mechanical Design and Production Engineering Department

Faculty of Engineering, Cairo University

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Approved by the Examining Committee

Dr. Mahmoud A. Adly ……(Thesis Main Advisor)
Associate Professor, Mechanical Design and Production Engineering Department, Faculty of Engineering, Cairo University

---

Prof. Dr. Abd El-Halim El-Habak…….…….……(Internal Examiner)
Professor of Mechanical Design and Production Engineering Department, Faculty of Engineering, Cairo University

---

Prof. Dr. Wafaa Abd El Raouf Metwally……(External Examiner)
Central Metallurgical for R & D institute (CMRDI)

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2018

Engineer's Name: Heba Saad Abd El-Halim Herzallah
Date of Birth: 22-12-1983
Nationality: Egyption
E-mail: Heba.saad@hotmail.com
Phone: 01001156194
Address: 2 EL Kablat street El Amrya, Cairo, Egypt

Registration Date: 1-10-2012
Awarding Date: 2018
Degree: Master of Science
Department: Mechanical Design and Production Engineering

Supervisors:

Assoc. Prof. Dr. Mahmoud A. Adly
Dr. Ahmed Yehia Shash
Dr. Ayman Hamada El Sayed
Central Metallurgical For R&D Institute (CMRDI)

Examiners:

Assoc. Prof. Dr. Mahmoud A. Adly……....(Thesis Main Advisor)

Prof. Dr. Abd El-Halim El-Habak…… (Internal Examiner)

Prof. Dr. Wafaa Abd El Raouf ……..…… (External Examiner)

Central Metallurgical For R&D Institute (CMRDI)

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 Date :

Signature:

Dedication

To my parents and my sister

ACKNOWLEDMENTS

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

Firstly, I would like to express my sincere gratitude to my advisors Prof. Dr. Mahmoud Adly, Dr. Ahmed Shash and Dr. Ayman El Sayed for the continuous support of my master study and related research, their patience, motivation, and immense knowledge.

I would like to thank my parents for allowing me to realize my own potential. All the support they have provided me over the years was the greatest gift anyone has ever given me.

I would like to thank my colleague and brother Mustafa El Sayed for his effort in helping and his support to finish the thesis in the fullest.

Special thanks for the great effort done by Dr. Wafaa Abd El Raouf who proved to be a dedicated and committed person to her students and to her work. I owe her all respect and I appreciate all her efforts which cannot be expressed by word

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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