



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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**THERMAL ANALYSIS, SOLIDIFICATION
BEHAVIOUR AND MICROSTRUCTURE OF
ALUMINUM – MAGNESIUM ALLOYS WITH ADDED
ZIRCONIUM AND SAMARIUM**

By

Karamullah Mohamed Ahmed Eisawi

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
METALLURGICAL ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

**THERMAL ANALYSIS, SOLIDIFICATION
BEHAVIOUR AND MICROSTRUCTURE OF
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ADDED ZIRCONIUM AND SAMARIUM**

Key Words:

Thermal Analysis, Grain Refining, Microstructure, Sm and Zr, Al-Mg Alloy

Summary:

A series of Aluminum Magnesium alloys with high and low levels Magnesium with addition of high and low levels of Zirconium and Samarium was prepared. Thermal analysis was implemented by using thermocouple K-type to investigate the effect of Zr and Sm addition. Microstructure was examined by optical microscopy and scanning electron microscopy. It was found that intermetallic phases are transformed into Chinese script structure when adding Sm for both high and low level of Mg addition in Al-Mg alloys.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been 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: Karamullah Mohamed Ahmed Eisawi

Date: .. /.. /2021

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Dedication

I dedicate this thesis to my parents. I dedicate this thesis to my father (Dr. Mohamed Eisawi) that dedicated all his life as an investment in raising us and hope this thesis to be one step towards his dream. I deeply dedicated this thesis to my mother (Mrs. Hoda Salem) that passed away in 2019. She wishes to see me with the Master degree certificate before going to the afterlife; I'm sure she is proud of me to obtain my Master degree and continue my path of teaching and research.

Acknowledgments

First and foremost, praises thanks to Allah, the Almighty, for his shower of blessings throughout my research work to complete the thesis successfully.

I would like to express my deep and sincere gratitude to my thesis supervisors, Prof. Waleed Khalifa and Prof. Mahmoud Tash, for giving me the opportunity to do research and providing invaluable guidance throughout this thesis. They have taught me the methodology to carry out the research and to present the research works as clearly as possible. It was a great privilege and honor to work and study under their guidance.

I would like to express my heartiest gratitude to Prof. Iman El-mahallawi for her golden advises and her valuable suggestions and corrections.

I would like to thank all my instructors and colleagues who supported me through my bachelor and master's studies.

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