بسم الله الرحمن الرحيم

" وقل اعملوا فسيرى الله عملكم ورسوله والمؤمنون"

صدق الله العظيم

The Influence of some Impurities on the Metallic Iron Whiskers Formation during Wüstite Reduction

A Thesis submitted
For
Partial Fulfillment of the Requirements of the Degree of Master of Science in Chemistry

To
Chemistry Department- Faculty of Science
Cairo University

Submitted by
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2009

APPROVAL SHEET FOR SUBMISSION

Title of the M.Sc. Thesis:

The Influence of some Impurities on the Metallic Iron Whiskers Formation during Wüstite Reduction

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Statement

Beside the work carried out in this thesis, the candidate has attended and successfully passed a final examination of M.Sc. Courses during the academic year 2005-2006 in Nonorganic chemistry covering the following topics:

1.	Molecular structure	**8.**	Thermodynamics	**15.**	Electrode kinetics
2.	Quantum chemistry	**9.**	Statistical thermodynamics	**16.**	Volummetry
3.	Advanced analytical chemistry	**10.**	Molten metallurgy	**17.**	Mechanisms of inorganic chemistry
4.	Physical polymers	**11.**	Nuclear chemistry	**18.**	Solar energy
5.	Adsorption	**12.**	Catalysis and colloids	**19.**	Chelatimetry
6.	X-ray diffraction and thermal analyses	**13.**	Group theory	**20.**	German language
7.	Advanced inorganic chemistry	**14.**	Electrochemistry		

ABSTRACT

Name: **Heba Aly Abdel Latef Aly El-Kelesh**

Title of thesis: "**The Influence of some Impurities on the Metallic Iron Whiskers Formation during Wüstite Reduction**"

Degree: **M.Sc. Thesis, Faculty of Science, Cairo University, 2009.**

In iron making processes, the iron ore mainly in pelletized shape is charged to the production furnaces. Swelling in these pellets takes place during reduction and leads to the disintegration of iron ore pellets which causes irregularities in blast furnace operations. Previous work indicates that swelling of iron ore pellets mainly takes place during metallization in the wüstite-iron reduction stage. Also, most of the relevant literature points out to the iron filaments (whiskers) growth on the wüstite phase during metallization as the main reason for that abnormal swelling.

Therefore, the objective of this project is to clarify the whisker formation mechanism. This will be done by studying the most important parameters that control the whisker growth and also the parameters that affect the reduction behavior.

Key Words: wustite reduction, whisker formation, K_2O effect, Basicity effect.

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DEDICATED TO MY FAMILY

ACKNOWLEDGMENT

I wish to express my thanks and gratitude to ***Dr. Mohamed Saber****, chemistry Department, Faculty of science, Cairo University for his continuous interest and unfailing bits of advice.*

I am greatly grateful to ***Prof. Dr. Mahmoud Ibrahium Nasr*** *for guidance, advice, helpful information, valuable discussion and continuous encouragement throughout the course of this work. I am particularly pleased to thank* ***Dr. Mohamed Bahgat*** *for guidance, support and encouragement and especial assistance I have received from him through the valuable discussion, continuous advices and finite helping to get succeeded in my study.*

The candidate would also like to extend her deep thanks to ***Prof. Dr. A.A. EL-Geassy****,* ***Dr. Khaled Saad*** *and all the members of Iron making Lab. (CMRDI).*

A special thanks is given to my husband for his great support and also to my family for their continuous encouragement.

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