

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

" وَقُلْ أَعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ
وَالْمُؤْمِنُونَ "

صَدَقَ اللَّهُ الْعَظِيمُ

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
Heba Aly Abdel latef Aly El-Kelesh
Scholarship student**

**Central Metallurgical Research and Development Institute (CMRDI)
Cairo-Egypt**

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APPROVAL SHEET FOR SUBMISSION

Title of the M.Sc. Thesis:

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

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

The thesis has been approved for submission by the supervisor:

Dr. M. S. Morsi

Chemistry Department
Faculty of Science
Cairo University

Signature:

Prof. Dr. Mahmoud I. Nasr

President, Central Metallurgical
Research & Development
Institute (CMRDI)

Signature:

Prof. Dr. Rifaat Hassan Hilal

Chairman of Chemistry Department

Faculty of Science, Cairo University



Cairo University
Faculty of Science

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. Volumetry
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”**

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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.

Supervisor:

Dr. M. S. Morsi
Chemistry Department
Faculty of Science
Cairo University

Prof. Dr. Mahmoud I. Nasr
President, Central Metallurgical
Research & Development
Institute (CMRDI)

Prof. Dr. Rifaat H. Hilal
Chairman of Chemistry Department
Faculty of Science - Cairo University

DEDICATED TO MY FAMILY

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