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شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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بالرسالة صفحات لم ترد بالأصل

Minia University
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STUDY THE PARAMETERS AFFECTING THE PRODUCTION OF Al-Si ALLOYS FROM SODIUM FLUOSILICATE

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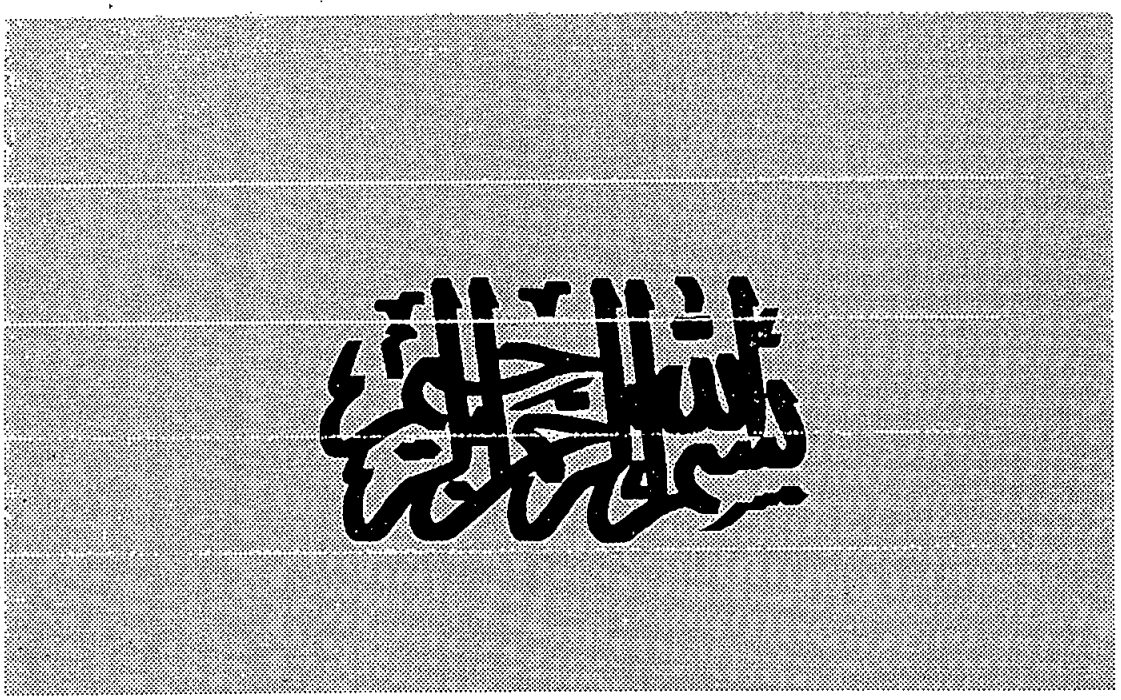

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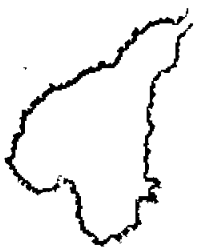

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ABSTRACT

Al-Si alloys, and sodium aluminium fluorides were obtained by reacting molten pure aluminium with sodium fluosilicate. Sodium fluosilicate (Na_2SiF_6) had been produced in Egyptian super-phosphate fertilizer plants as a by-product from air pollution emissions. The produced Al-Si alloy is of high quality, containing up to 20% silicon and less than 0.12 % Iron. Preliminary experiments were carried out to study the factors affecting the dissolved silicon in the produced Al-Si alloys and sodium aluminium fluorides, these factors are : temperature, mixing speed, sodium fluosilicate to aluminium ratio, feeding rate and particle size. The results obtained were correlated to establish some empirical formulas representing the silicon content in the produced alloy as a function of each factor. An attempt in this study was made to characterize the rate controlling step of the reduction reaction between sodium fluosilicate and molten aluminium in order to achieve the optimum operating conditions, and also to suggest an specific mechanism. Some tests were carried out on the produced Al-Si alloys as well as sodium fluosilicate. These tests are: chemical analysis, X-ray diffraction analysis, microscopic and mechanical examination. The obtained results indicated that these products can be used directly in casting shops or aluminium reduction cells in aluminum smelters. The pilot and semi-industrial applications were carried out using the results of laboratory scale, it can give a confidence to apply in a large scale.

LIST OF CONTENTS

Page

ACKNOWLEDGMENT i

ABSTRACT ii

LIST OF CONTENTS iii

LIST OF FIGURES vii

LIST OF TABLES xi

CHAPTER:

1. INTRODUCTION 1

2. LITERATURE SURVEY 5

2.1. Aluminium silicon alloys and their uses 5

2.1.1 Properties of Al-Si alloys 7

2.1.2 Methods of production: 8

2.2 Preparation of Al-Si alloys from sodium fluosilicate 11

2.3 Sodium fluosilicate(S.F) 14

2.4 Cryolite 16

2.5 Modification 19

3 EXPERIMENTAL 23

3.1 Materials 23

3.1.1Aluminium 23

3.1.2 Sodium fluosilicate 23

3.2 Crucibles and furnaces 25

3.2.1 Crucibles 25

3.2.2 Furnaces 25

3.3 Experiments Procedure 29

3.4 The factors affecting the production of Al-Si alloy and fluorine salts 30

3.4.1 Effect of temperature 30

3.4.2 Effect of mixing speed 31

3.4.3 Effect of (S.F)/Al weight ratio 31

3.4.4 Effect of feeding rate 31

3.4.5 Effect of particle size of (S.F) 32

3.5 kinetics study 32

3.5.1 Effect of mixing speed on the reaction rates 33

3.5.2 Effect of particle size on the reaction rate 34

3.5.3 Effect of (S.F)/Al wt. ratio on the reaction rate 35

3.6 Evaluation of the produced alloys and salts 35

3.6.1 Microstructure of aluminium silicon alloys 35

3.6.2 Mechanical testing 36

3.6.3 X-ray diffraction analysis 38

3.7 Pilot and semi-industrial scale application 40

4. RESULTS AND DISCUSSION 43

4.1 The factors affecting the production of Al-Si alloy and fluorine salts 43

4.1.1 Effect of temperature 43

4.1.2 Effect of mixing speed 45
4.1.3 Effect of (S.F)/Al ratio 48
4.1.4 Effect of feeding rate 50
4.1.5 Effect of particle size 52

4.2 kinetics study 54
4.2.1 Effect of mixing speed on the reaction rate 59
4.2.2 Effect of particle size on the reaction rate 66
4.2.3 Effect of (S.F)/Al wt. ratio on the reaction rate 73

4.3 Evaluation of the produced alloys and salts 80
4.3.1 Evaluation of the produced Al-Si alloys 80
4.3.1.1 Chemical analysis 80
4.3.1.2 X-ray diffraction analysis 82
4.3.1.3 Microscopic examination 84
4.3.1.4 Mechanical testing 96
4.3.2 Evaluation of the produced sodium aluminium fluorides 99
4.4 Applications 101
4.4.1 Pilot scale application 101
4.4.2 Semi-industrial scale application 103

5. CONCLUSION AND RECOMMANDATION 106
5.1 Conclusions 106
5.2 Recommendations 108

REFERANCES 109

APPENDICES 117

Appendix A 118

Appendix B 129

SUMMARY IN ARABIC 132

LIST OF FIGURES

Figure Page

3.1 Schematic diagram shown the Crucibles and agitating rod 26

3.2 Experimental setup 27

3.3 Photo for experimental apparatus 28

3.4 Dimensions of tensile strength specimen 37

3.5 Photo for induction furnace which used in pilot scale 39

3.6 Schematic diagram for semi-industrial equipment. 42

4.1 Effect of temperature on the Si content in both the produced alloys and sodium aluminium fluorides. 44

4.2 Effect of mixing speed on the Si content in both the produced alloys and sodium aluminium fluorides. 47

4.3 Effect of Na_2SiF_6/Al ratio on the Si % in both the produced alloys and sodium aluminium fluorides. 49

4.4 Effect of Feeding rate on the Si content in both the produced alloys and sodium aluminium fluorides. 51

4.5 Effect of particle size on the Si % in the both produced alloys and sodium aluminium fluorides. 53

4-6 X-ray diffraction pattern showing the thermal behavior of sodium fluosilicate 56

4.7 The dependence of Si % dissolved in alloy on time at different mixing speeds. 61

4.8 The dependence of Si % dissolved in alloy on time at different particle size. 62

Figure Page

4.9 The dependence of Si % dissolved in alloy on time at different Na_2SiF_6/Al ratio. 63

4.10 Arrhenius plot of rate constants for dissolved Si % in alloys at different mixing speed. 64

4.11 Variation of activation energies with mixing. 65

4.12 Effect of time on Si % in the produced alloy at varying temperature and particle size 5 mm. 69

4.13 Effect of time on Si % in the produced alloy at varying temperature and particle size 25 mm. 70

4.14 Arrhenius plot of rate constants for dissolved Si % in alloys at different particle size. 71

4.15 Variation of activation energies with particle size. 72

4.16 The dependence of Si % dissolved in alloy on time at different temperatures at Na2SiF6 /Al ratio 0.5. 76

4.17 The dependence of Si % dissolved in alloy on time at different temperatures at Na2SiF6 /Al ratio 1.5. 77

4.18 Arrhenius plot of rate constants for dissolved Si % in alloys at different Na_2SiF_6/Al ratio's. 78

4.19 Influence of Na_2SiF_6/Al ratio's on activation energy. 79

4.20 X-ray diffraction pattern for the produced Al-Si alloy. 83

21-1 Micrograph for as cast produced Al-Si alloys containing 4.3%Si; X 500; etched by 0.5% HF 86

21.2 Micrograph for as cast produced Al-Si alloys containing 4.7%Si; X 500; etched by 0.5% HF 86