Ain Shams University,
Women's College for Arts,
Science and Education,
Cairo. Egypt.

Effect of Alkali Sulphates on the Hydration Reactions of Some Cement Components

A Thesis
Submitted to Chemistry Department,
Women's College, Ain Shams University
In Partial Fulfillment of the Requirements for
The Degree of Master of Science.

Presented by
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(B.Sc. 2005)

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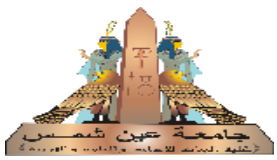

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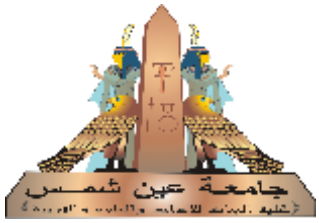
بسم الله الرحمن الرحيم

الحمد لله الذي له ما في
السموات وما في الأرض
وله الحمد في الاخره
وهو الحكيم الخبير

صدق الله العظيم

سوره سبأ الأيه (1)



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B. Sc. Graduation Date : May 2005

NOTE

The candidate has attended post graduate courses for one year in Inorganic and Physical Chemistry covering the following topics:-

1- Instrumental Analysis.

2- Thermodynamic Chemistry.

3- Quantum Chemistry.

4- Advanced Inorganic Chemistry.

5- Co-ordination Chemistry.

6- Nuclear Chemistry.

7- Photo Chemistry.

8- Spectroscopy.

9- Advanced reaction mechanism.

10- Electrochemical Analysis.

11- Kinetics and Catalysis.

12- English Language.

13- Molecular Structure.

She has successfully passed a written examination in these courses.

Head of Chemistry Department

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Praise and Thanks be to **Allah**, the most merciful for assisting and directing me the wright way.

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I wish to express my appreciation to everybody helped me during this work.

Nada

TO MY FAMILY

I AM Very Greatful

To all of them

For their Support,

Kindness

and love.

NADA

جامعة عين شمس
كلية البنات
للآداب و العلوم والتربية
قسم الكيمياء

أثر الكبريتات القلوية على تفاعل تأدرت بعض مكونات الأسمنت

مقدمة من

ندا إمام سعيد سليمان

للحصول على درجة الماجستير

في الكيمياء غير العضوية والتحليلية

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الجامعة : القاهرة

سنة التخرج : مايو ٢٠٠٥ م

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Effect of Alkali Sulphates on the Hydration Reactions of Some Cement Components

The hydration behavior of tricalcium aluminate has been studied in water and in different alkali sulphate solutions, namely 1%Na_2SO_4, 1%K_2SO_4 and 1%$MgSO_4$.

Also, the effect of gypsum and gypsum + lime on the hydration reaction of tricalcium aluminate at room temperature has been investigated in water and in the above mentioned sulphate solutions.

The hydration process was carried out in an excess amount of alkali sulphate solutions and followed for various time intervals from 2 minutes up to 7 days.

The results obtained from XRD analysis and SEM have revealed that the only phase found in all the systems was the ettringite phase except in the following two cases:-

1- In case of the hydration of tricalcium aluminate in water, the phase obtained was hydrogarente due to the absence

of sulphate ions.

2- In the presence of 1%$MgSO_4$ solution, the existing phases were tetracalcium aluminate hydrate and gypsum as a result of decreasing the alkalinity of the medium which retards the hydration reaction and prevents the ettringite formation.

In all cases, the results obtained from the X-ray diffraction analysis and SEM are in the good agreement with those appeared from the solution composition.

Keywords: Tricalcium aluminate, Hydration, Ettringite, Hydrogarente.

The following abbreviations are used in this work:

C_3A =Tricalcium aluminate , G=Gypsum , C=CaO

E=Ettringite , T_e=Tetracalcium , H_g= Hydrogarnete

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