شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

وثائق لم ترد بلاصل

يصعب قراءة بعض الوثائق

METAL ION - α - AMINO ACID EQUILIBRIA IN SYNTHETIC SEAWATER

THESIS

Submitted to the Faculty of Science
Alexandria University
In partial fulfilment of the Requirements
for the Degree of M. Sc. (Chemistry)

BY

HANAN HAMED SHAKER ABD EL-HALIM

(B. Sc. 1988)
Research Assistant
National Institute of Oceanography & Fisheries

SUPERVISED BY

Prof. Dr. M. M. Osman
Professor of Analytical Chemistry
Faculty of Science
Alexandria University

Prof. Dr. M. F. Iskander
Professor of Analytical and Inorganic Chemistry
Faculty of Science
Alexandria University

Dr. N. J. Lees-Gayed
Lecturer of Analytical and Inorganic Chemistry
Faculty of Science
Alexandria University

Prof. Dr. H. I. Emara
Head of Marine Chemistry
National Institute of Oceanography and Fisheries,
Alexandria

Alexandria University
Faculty of Science
1994

To my mother
father
and brothers

NOTE

Besides the work carried out in this thesis, the candidate *Hanan Hamed Shaker* has passed successfully the following courses in partial fulfilment of M.Sc.degree:-

1- Inorganic Reaction Mechanisms
2- Symmetry and Group Theory
3- Instrumental Analysis
4- Chemical Equilibria
5- Electrochemistry
6- Chemical Kinetics and Reaction Mechanism
7- Thermodynamic in Solution
8- Solid State Chemistry
9- Quantum Chemistry
10- Polymer Chemistry
11- Organic Chemistry
12- Physical Organic Chemistry
13- German Language
14- Elementary Course in The Basic Language of Computer
15- Seminar and Oral Examination

Prof.Dr.M.M.Abd El Rahman

Head Of Chemistry Department

Contents

Acknowledgment

I express my heartfelt gratitude and appreciation to Prof.Dr. M.M. Osman, Professor of Analytical Chemistry and Dr. N.J. Lees-Gayed, Lecturer of Analytical and Inorganic Chemistry for their close supervision of this thesis and their valuable advice.

I also express my sincere thanks and appreciation to Prof.Dr. M.F. Iskander, Professor of Inorganic Chemistry and Prof.Dr. H.I. Emara, Professor of Marine Chemistry for their encouragement and continuous help.

I am deeply indebted to Dr. S.A. Kholeif, Lecturer in Analytical Chemistry for supplying me the SUPERQUAD and WSTD programs, performing some of the computation, valuable discussion and continuous help.

Thanks and appreciation are also given to the Dean of Faculty of Science for his continuous help and support.

My sincere gratitude is extended to the Chemistry Department, Faculty of Science for supporting me with all material facilities.

Abbreviations

asv	anodic stripping voltammetry
HL	glycine
HL'	α-alanine
NBS	National Bureau of Standared, Washington, D.C., U.S.A.
NPL	National Physical Laboratory, Teddington, U.K.

SUMMARY

Summary

This thesis is concerned with the acid-base equilibria of the amino acids glycine and α-alanine, as well as the complex formation equilibria of glycine with the divalent metal cations magnesium(II), calcium(II), cobalt(II), nickel(II), copper(II), zinc(II), cadmium(II) and mercury(II), and of α-alanine with cobalt(II), nickel(II), copper(II) and zinc(II).

The formation equilibria of the ternary complexes of glycine, α-alanine and each of the cobalt(II), nickel(II), copper(II) and zinc(II) ions are also considered. The medium used was an artificial seawater (of ionic strength 0.701 mol dm^{-3}), at temperature of 25.0 ± 0.1°C. Investigation of the selfionization equilibrium of water and the protonation equilibrium of the sulphate ion under the same conditions is also described in this thesis.

The thesis is divided into three chapters.

The first is an introductory chapter which explains the importance of equilibrium data valid for media approximating natural aquatic systems, and also briefly describes the various methods used to investigate speciation in aquatic environments. The literature on the protonation of glycine and α-alanine, their complex formation with the metals considered in this thesis, in natural seawater, artificial seawater and in media of ionic strength around 0.7 mol dm^{-3}, is surveyed.