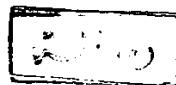


**Studies on Acid Nitrilotriacetate  
Complexes of Some Divalent  
Metal Ions**



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E.H

**THESIS  
SUBMITTED BY**

**EMAN HAMED SAYED ESMAIL**

**B.Sc. (CHEMISTRY) 1992  
(FIRST CLASS HONOURS DEGREE)**

52394

**TO**

**CHEMISTRY DEPARTMENT  
FACULTY OF SCIENCE  
AIN SHAMS UNIVERSITY**

**IN PARTIAL FULFILMENT OF  
THE REQUIREMENTS FOR  
M.Sc. DEGREE IN CHEMISTRY  
1996**



كلية العلوم

٩٦/٩/١٢

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خواري




# **Studies on Acid Nitrilotriacetate Complexes of Some Divalent Metal Ions**

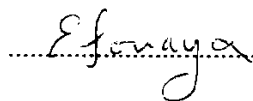
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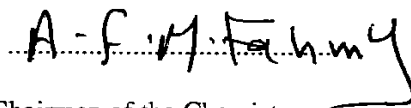
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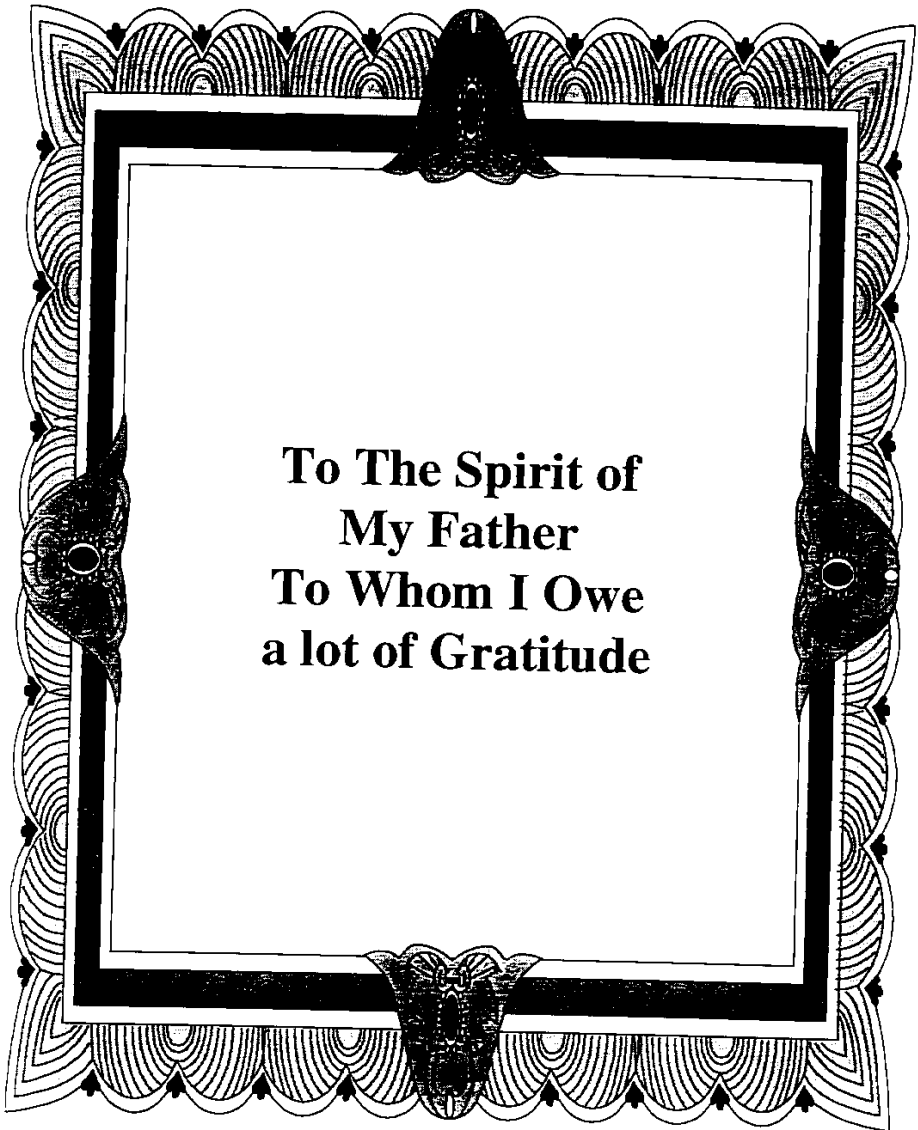
  
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Department.



## **ACKNOWLEDGMENT**

I wish to express my deepest gratitude to Prof. Dr. E. R. Souaya and Prof. Dr. N. E. Milad for suggesting the problem and for their continuous guidance and help during the course of study. I am also indebted to Prof. Dr. S. K. Tobia for his guiding discussions.

Thanks are due to Prof. Dr. A.F.M. Fahmy, chairman of the chemistry department for the facilities at his disposal and to the members of the chemistry department who did not hesitate to offer scientific help each in his field of interest.

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# ***ABSTRACT***





## Abstract

The present work describes a study on nitrilotriacetic acid and eleven of its 1:1 divalent - metal acid salts. I.R. measurements suggested that the acid exists in the Zwitter - ion form which allows the existence of intermolecular hydrogen bonding. This finding was confirmed by nmr study.

I.R. measurements together with elemental analysis showed that all the solid 1:1 divalent - metal acid complexes are water free. They all have <sup>distorted</sup> tetrahedral structures which was confirmed by magnetic measurements. Absorption bands, for M-O and M-N bonds, <sup>vibrations</sup> were assigned and were compared with those recorded in literature for some divalent metal amino acid complexes.

The pKa values for the acid complexes were determined titrimetrically by the method of Albert and Serjeant. The obtained values run parallel with those of the corresponding metal ions and also with the Irving-Williams order.

The vis-uv spectra of the Cu, Ni and Co complexes were measured. The 10Dq value for the Cu complex was calculated directly from the spectrum. The 10Dq values for the Ni and Co complexes were calculated using:-

- a) The equations on the energy terms for the triplet states for Ni and the quartet states for Co.
- b) The Tanabe and Sugano diagrams for the  $d^8$  and  $d^7$  systems respectively.

The values obtained for each 10Dq value by the two methods were compared with those present in the literature for other ligands.

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