Studies on Acid Nitrilotriacetate Complexes of Some Divalent Metal Ions

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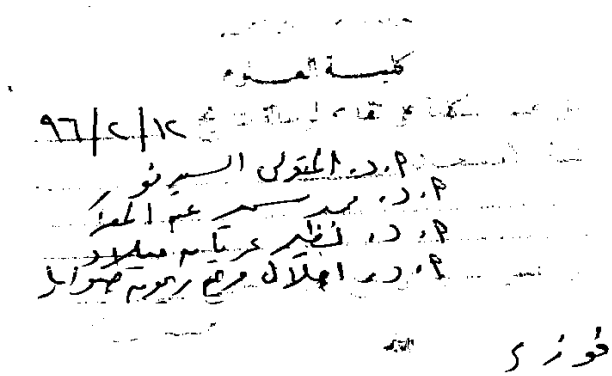

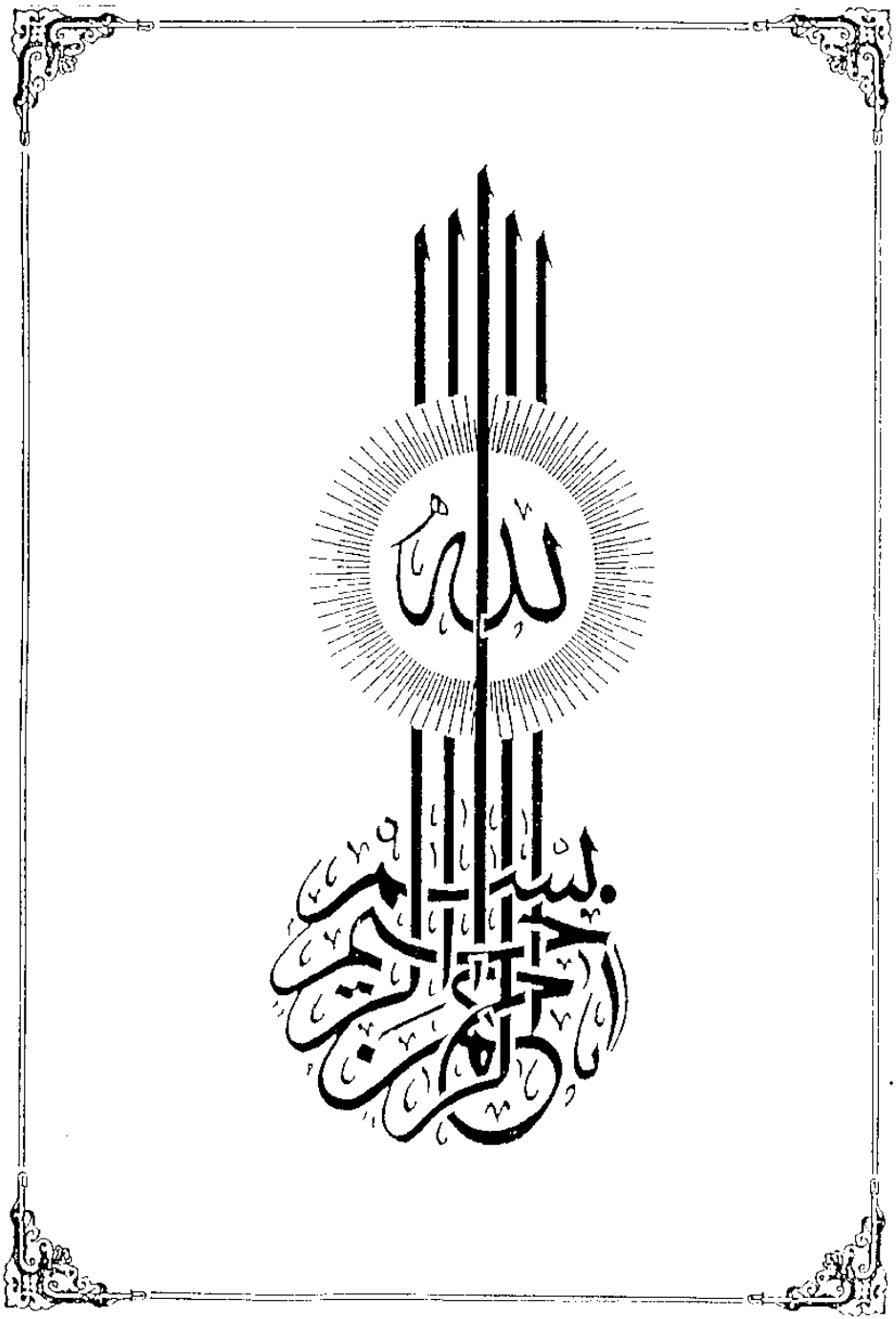

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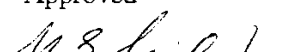

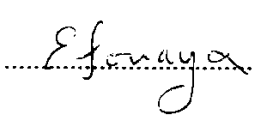

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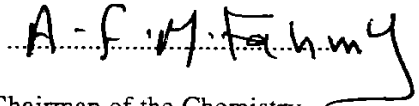

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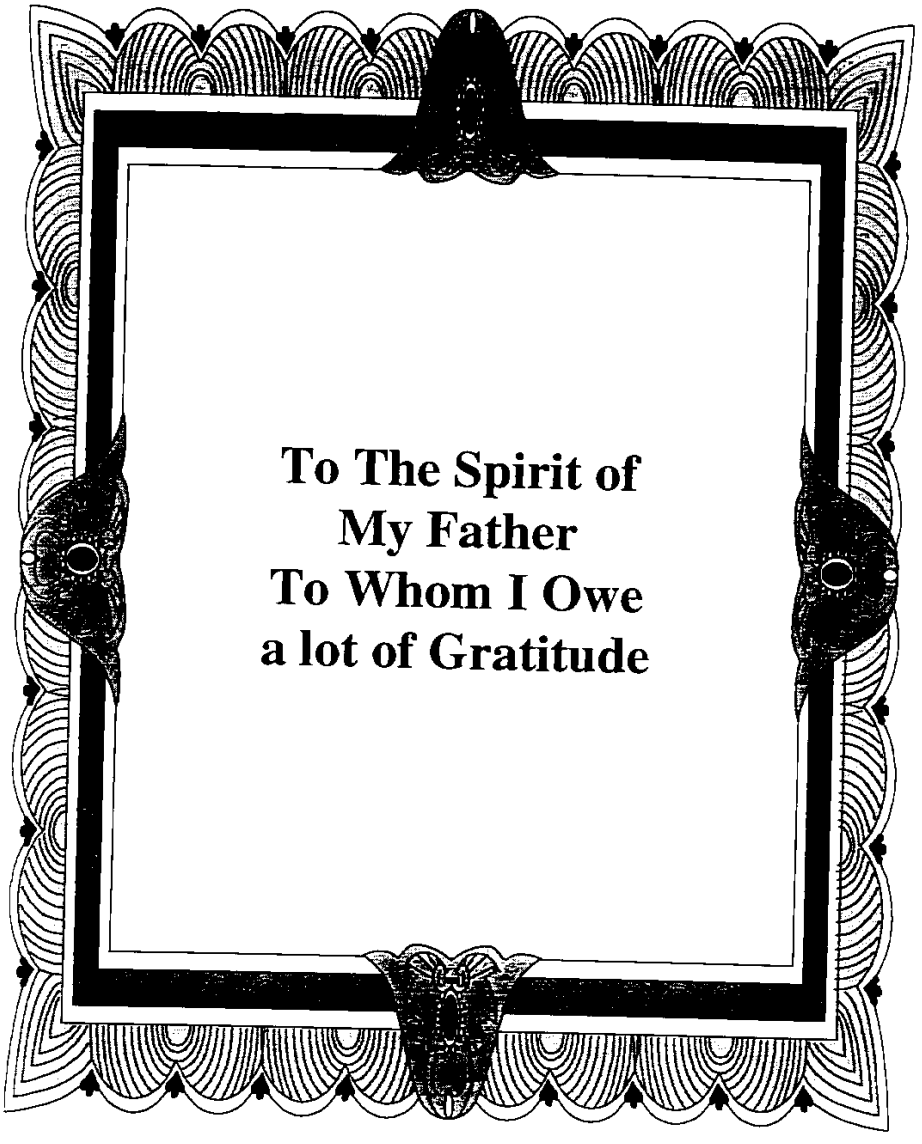

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Contents

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. measurments together with elemental analysis showed that all the solid 1:1 divalent - metal acid complexes are water free. They all have distorted tetrahedral structures which was confirmed by magnetic measurements. Absorption bands, for M-O and M-N bonds, vibrations 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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