Ain Shams University

Faculty of Science

Chemistry Depatrment

Preparation, characterization and biological activity study on polydentate Schiff base ligands and their chelates with some transition metals and their applications in the determination of Fe(III) in the natural water samples

Thesis Submitted

By

Ahmed Badr Kamel Mohamed Gad

(B.Sc., Chemistry, 2006)

(M.Sc., Inorganic Chemistry, 2010)

To

Chemistry Department

Faculty of Science

Ain Shams University

For

The Degree Of

Ph.D., Inorganic and Analytical Chemistry

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بسم الله الرحمن الرحيم

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Approval sheet for submission

Name of candidate: Ahmed Badr Kamel Mohamed Gad.

Degree: Ph.D., Inorganic and Analytical Chemistry

Thesis Title: "Preparation, characterization and biological activity study on polydentate Schiff base ligands and their chelates with some transition metals and their applications in the determination of Fe(III) in the natural water samples."

The thesis has been approved for submission by the supervisors:

Supervisors

1-Prof. Dr. Mostafa H. Khalil, …….

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3- Dr: Eman H. Ismail, ……

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ABSTRACT

Name: Ahmed Badr Kamel Mohamed Gad.

Title of Thesis: "Preparation, characterization and biological activity study on polydentate Schiff base ligands and their chelates with some transition metals and their applications in the determination of Fe(III) in the natural water samples."

Degree: Ph.D of Science in Inorganic and Analytical Chemistry, Faculty of Science, Ain Shams University, (2012).

This work had been carried out to investigate the coordination behaviour of bisaldehyde organic ligand and three Schiff bases derived from it with different coordination sites, towards some bi- and trivalent metal ions like Ni(II), Co(II), Cu(II) Zn(II), Cr(III) and Fe(III). The solid chelates of L^1, L^2, H_2L^3 and H_2L^4 were prepared and subjected to many analytical techniques such as elemental analyses, IR, ^{1}H NMR and solid reflectance spectra, magnetic moment, molar conductance, X-Ray powder diffraction (XRD), thermal analyses and spectrophotometric techniques. The chelates were found to have octahedral geometry. The ligands (L^1, L^2, H_2L^3 and H_2L^4) and their binary chelates were subjected to thermal analyses (DTG and TG) and the different activation thermodynamic parameters, namely E^*, ΔH^*, ΔS^* and ΔG^* were calculated from their corresponding DTG curves to throw more light on the nature of changes accompanying the thermal decomposition process of these complexes. The biological activity of the ligands and their complexes were also screened. The ligands are utilized for spectrophotometric determination of spiked Fe(III) in natural water samples under optimal experimental conditions applying the recovery calculations.

Key Words: Schiff base ligands complexes, Elemental analyses, Spectroscopy, Thermal analyses, XRD, Biological activity and Recovery calculations.

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