

## CHEMICAL SPECIATION OF NICKEL – GLYCINATE COMPLEXATION

J A LIYANAGE

Department of Chemistry, University of Kelaniya, Kelaniya, Sri Lanka

E-mail: janitha@kln.ac.lk

### ABSTRACT

Analytical techniques which facilitate determination of concentrations of metal ions, solvated protons and hydroxo-complexes or equivalent can be used to study the complexation of metal ions and ligands.

Complex speciation measurements using glass electrode potentiometry, which allows a fast, reproducible determination of equilibrium concentrations is an electro-metric titration technique used for the determination of formation constants of ligands. The technique does not disturb the labile equilibrium between metal ions, ligands and protons.

The computer program ESTA (Equilibrium Simulation for Titration Analysis) is a complex and sophisticated speciation program used to analyse potentiometric titration data and to simulate equilibrium distributions of chemical species. This applies weighted least squares objective functions to analytical parameters such as titre volume and emf readings.

The chemical combination of nickel (II)-glycinate-proton system has been chosen and activities of component in the equilibrium system were kept constant by working in a medium of high and constant ionic strength of 150 mmol dm<sup>-3</sup> sodium chloride inert electrolyte medium, which approximates to that of most biological fluids, in order to express the formation constant in concentration terms.

The experimental protonation curve shows that the ligand has two protonation sites and formation and deprotonation curves show that the metal to ligand complexation ratio is up to 1:3. Estimates for the protonation and formation functions obtained were optimized and the refined constants were calculated. Results were further substantiated by the good superimposability of the experimental and simulated curves. The species distribution diagrams confirm that the complexation between nickel (II) and glycinate is up to 1:3.

**Keywords:** Speciation, Protonation, Nickel, Glycinate, Formation Constants, ESTA

### INTRODUCTION

Quantitative analytical techniques, which are able to monitor concentrations of metal ions, solvated protons and hydroxo-complexes or equivalent can be used to study the equilibrium complex formation between metal ions and ligands. Complex