

Ionic Strength Effect on the Stability of the V(V) + IDA Complex

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Abstract In this research the interaction of dioxovanadium(V) with iminodiacetic acid has been considered at 25 °C and pH = 1.00–2.50 in an ionic strength range of 0.1 to 1.0 mol·dm^{−3} of NaClO₄ by UV spectrophotometric and potentiometric techniques. Only one species, VO₂H₂L⁺, was assumed on the basis of two stoichiometric models. The extended Debye-Hückel theory predicts the first order effects in simple electrolyte solutions. Interactions between the reacting species and the ionic medium are taken into account in the specific ion interaction model. Parabolic, specific ion interaction, and extended Debye-Hückel models have been compared and it has been shown that the parabolic model with two coefficients is satisfactory for this complexation reaction. The results have also been compared with the literature values.

Keywords Stability constant · Parabolic model · Extended Debye-Hückel theory · Specific ion interaction theory · IDA · Dioxovanadium(V)

1 Introduction

Vanadium is widely available to biological systems, therefore the coordination chemistry of vanadium has aroused considerable interest in view of its biochemical significance. On the other hand, some aminopolycarboxylic acid compounds such as iminodiacetic acid, (IDA) generally called complexones, are employed in many applications because of their strong sequestering ability towards almost all metal ions; moreover, solutions of boron-diethylenetriaminepentaacetic acid (DTPA) have been used for studies on micronutrient metals for plant growth [1]. Some examples of recent applications of aminopolycarboxylic ligands are: (1) in the cosmetic and pharmaceutical industries, as well as in the production

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