

The association and complexation equilibria in the system D-glucitol-nickel(II)-water

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Abstract

A joint study using polarimetry, spectrophotometry, and mathematical modeling revealed the formation of 1: 1, 2: 1, and 4: 4 outer-sphere complexes of nickel(II) ions with neutral D-glucitol (H 6Glc-ol), viz., $\{[\text{Ni}(\text{H}_2\text{O})_6]^{2+} \cdot (\text{H 6Glc-ol})_{\text{aq}}\}^{2+}$, $\{[\text{Ni}(\text{H}_2\text{O})_6]^{2+} \cdot 2 \cdot (\text{H 6Glc-ol})_{\text{aq}}\}^{4+}$, and $\{[\text{Ni}(\text{H}_2\text{O})_6]^{2+} \cdot 4 \cdot (\text{H 6Glc-ol})_{\text{aq}}\}^{8+}$ in a weakly acidic medium. In aqueous solutions, D-glucitol forms tetramers. For each form, the constant of formation and the specific optical rotation was calculated. © 2010 Springer Science+Business Media, Inc.

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Keywords

aqueous solution, association, cluster, D-glucitol, equilibrium constants, mathematical modeling, nickel(II), optical activity, outer-sphere complexation, tetramer