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D-Glucopyranosides as Ligands in Nickel Complexes

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Crystalline nickel complexes with dianionic glucopyranoside ligands have been obtained by the reaction of methyl-D-glucopyranoside (Me-β-D-Glc\textsubscript{p}) or sucrose (Suc) with the cellulose solvent Ni-tren, an aqueous solution of [(tren)Ni(OH)\textsubscript{2}], tren = tri(2-aminoethyl)amine. Crystals of a nickel complex of α, α-trehalose (α, α-Tre) form after the reaction of the disaccharide with Ni-Me\textsubscript{3}tren, the N,N',N''-trimethyl analogue of Ni-tren. The metal-binding site is the O\textsubscript{3}, O\textsubscript{4} diolate in [(tren)Ni(Me-β-D-Glc\textsubscript{p3,4H\textsubscript{2}}) \cdot 5.5 H\textsubscript{2}O; in [(tren)Ni(Suc\textsubscript{2},3'H\textsubscript{2})] \cdot 6 H\textsubscript{2}O, hydrogen-bond-supported O\textsubscript{2}, O\textsubscript{3} chelation in the glucose part of the disaccharide is observed. The same metal-binding site as sucrose is exhibited by α, α-trehalose in [(tren)Ni(α, α-Tre2,3H\textsubscript{2})] \cdot 5 H\textsubscript{2}O but without the support by an intramolecular hydrogen bond.

Key words: Carbohydrates, Glucosides, Sucrose, Trehalose, Nickel Complexes, Crystal Structures