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D-Glucopyranosides as Ligands in Nickel Complexes

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Dedicated to Professor Ingo-Peter Lorenz on the occasion of his 60th birthday

Crystalline nickel complexes with dianionic glucopyranoside ligands have been obtained by the reaction of methyl-D-glucopyranoside (Me-β-D-Glcp) or sucrose (Suc) with the cellulose solvent Ni-tren, an aqueous solution of [(tren)Ni$(OH)_2$], 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_3tren, the N,N',N''-trimethyl analogue of Ni-tren. The metal-binding site is the O^3,O^4 diolate in [(tren)Ni(Me-β-D-Glc$p$3,4H$_{-2}$)] $\cdot$ 5.5 H_2O; in [(tren)Ni(Suc2',3'H$_{-2}$)] $\cdot$ 6 H_2O, hydrogen-bond-supported O^2,O^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$_{-2}$)] $\cdot$ 5 H_2O but without the support by an intramolecular hydrogen bond.

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