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Potentiometry, Stability and Thermodynamics of Diethyltin(IV) Dichloride with Some Selected Biomolecules

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The interaction of diethyltin(IV), DET, with selected bioligands having a variety of model functional groups was investigated at 25 A degrees C and ionic strength 0.1 mol center dot dm(-3) NaCl using the potentiometric technique. The hydrolysis constants of the DET cation and the formation constants of the complexes formed in solution were calculated using the MINIQUAD-75 program. The stoichiometry and stability constants for the complexes formed are reported. The results show the formation of 1:1 and 1:2 complexes with amino acids and DNA constituents. The dicarboxylic acids form 1:1 complexes. The peptides form both 1:1 complexes and the corresponding deprotonated amide species [Et₂Sn(LH-1)] (1:1). The participation of different ligand functional groups in binding to organotin is discussed. The concentration distributions of the various complex species were evaluated as a function of pH. The standard thermodynamic parameters Delta H A degrees and Delta S A degrees, calculated from the temperature dependence of the equilibrium constants, were investigated for the interaction of DET with thymine as a representative example of DNA constituents. The effect of ionic strength and solvent on hydrolysis constants of DET, protonation equilibria of thymine and its complex formation with DET were investigated and discussed.

Keywords

Author Keywords: Complex formation equilibria; Diethyltin(IV); DNA; Peptides; Amino acids; Speciation

KeyWords Plus: GLYCINE METHYL-ESTER; BIO-RELEVANT LIGANDS; MAGNETIC RESONANCE; DNA CONSTITUENTS; COMPLEX-FORMATION; AMINO-ACIDS; COPPER(II); HYDROLYSIS; KINETICS; SPECTROSCOPY

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