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Adsorptive stripping voltammetry of surface active complexes of metal ions and inorganic ligands can be utilized for the direct metal speciation if combined with the anodic stripping voltammetry.

A tendency in electrochemical speciation of metals is to actually measure the concentration of the particular ionic species, rather than calculating the distribution from thermodynamic data, as well as to measure it in the concentration range as close to its level in natural waters as possible (1). A progress in these efforts was achieved with inert metal complexes (2), and here a possibility of a direct quantitative measurement of a surface-active, labile inorganic metal complex is demonstrated.

Adsorption phenomena may influence voltammetric measurements significantly. Complex species of metal ions and surface active ligands can be adsorbed to the working electrode surface (3-5). For a certain metal and a certain inorganic ligand, only one complex adsorbs, usually the neutral, or negatively charged one (4). Generally, the phenomenon can be utilized for the adsorptive accumulation of surface active substances (3,5). In combination with stripping techniques especially sensitive to adsorbates, such as the square-wave voltammetry and the pulse polarography, this method enables the determination of reactants in concentrations as low as 10^{-9} M (5). In the case of metal complexation with inorganic ligands, the adsorptive preconcentration is selective since only one complex species is surface active. It will be shown that the combination of the adsorptive stripping and the anodic stripping voltammetric techniques can be used for the direct metal speciation. The anodic stripping voltammetry is used for the determination of total metal concentration. The amount of metal ions bound to the surface active complex can be determined by the independent adsorptive stripping voltammetric measurements. The character of this complex can be estimated by comparing to the theoretical ionic species distribution graph (4). Besides, an influence of electroinactive, competitive, surface-active substance, such as T-X-100, is demonstrated. Possible application to the speciation of Bi (III) in seawater is discussed.

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