

## **Stripping voltammetry for metals and metalloids speciation in natural waters**

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Stripping voltammetry is a unique tool for detection and speciation of heavy metals and metalloids in natural waters. This analytical method consists of two stages: a deposition step where the metals of interest are accumulated at the electrode surface followed by a stripping step which removes them from the electrode. The signal is obtained during the stripping step but is largely dependent on the experimental parameters used during the deposition step. In natural conditions, the different stripping techniques are mainly responsive to the free metal ion and complexes that are both mobile (high diffusion coefficient) and voltammetrically labile (high dissociation rate). In contrast with chromatographic techniques where the signal is characteristic of one species, the voltammetric signal is a combination of several species. However, these species all have a fast dissociation rate, which, makes them highly reactive in the environment and knowledge of their concentration is important to assess the potential toxicity of a given sample.

Although the identification of the ligand cannot be determined by voltammetry, titration of the sample with the metal of interest gives insight on the complexing capacity (ligands concentration and corresponding stability constants) allowing an estimation of the free metal ion concentration. In addition, due to the deposition step, stripping techniques are very sensitive with detection limits often in the low ppt range. Analysis can often be done with minimum or no sample perturbations, thus preserving the original speciation. Finally, the complete analytical system is compact and can be miniaturised for in-situ analysis, i.e. directly in the water column.

This talk will first introduce the fundamentals of stripping voltammetry and will exemplify the advantages and limitations of some of the different techniques through environmental studies taken from the literature. The second part will focus on recent advances in the inorganic speciation of As and/or Sb in groundwater and seawater. A new method for the As(III) detection which has been tested in the laboratory on different groundwaters and used on-site in West Bengal (India) will be introduced. In sea water, levels of As(III) and Sb(III) determined at natural pH and without any reagent addition will be presented for the first time.