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Electroanalytical stripping methods, which involve initial preconcentration of the chemical species at an electrode, are simple and inexpensive. Anodic stripping voltammetry (ASV) has been used extensively to determine metals in environmental samples. Trace metals, such as cadmium and lead, are reduced onto a hanging mercury drop electrode, and are then determined oxidatively by scanning to more positive potentials. Determinations can be made at even lower concentrations by using a (rotating) mercury film electrode (MFE) where the metals cannot diffuse far into the mercury from the surface. Cathodic stripping voltammetry (CSV) originally involved oxidizing mercury to form an insoluble mercury salt of the determinand: the mercury ion was reduced during the negative-going potential scan.

Metal ions and organic species can be determined with a new form of CSV, in which accumulation is achieved by the adsorption of a metal complex or an organic species at an HMDE. This method has two advantages over ASV: the convenient HMDE can be used at the lowest determinand concentrations because the complex cannot diffuse into the mercury, and a wider range of metal ions can be determined. In some cases organic species are adsorbed as copper(I) or copper(II) complexes. The versatility of the method was illustrated also by the following. Molybdenum and tin both adsorb as tropolone complexes, but are reduced at the same potential. To determine them selectivity tin is accumulated reductively at -0.8 V, the potential is switched to -0.4 V to reoxidize tin which is adsorbed instantly as its tropolone complex, and the potential scan is initiated before the molybdenum tropolone complex can accumulate (Van den Berg *et al.* 1989). Platinum is determined above 0.04 pM concentrations by adsorption of its formazone complex which catalyses the reduction of hydrogen ion at -1.04 V (Van den Berg & Jacinto 1989). Synthetic food colouring matters may be determined and partly identified (from shifts of reduction potential on adding surfactants) at the 10^{-9} M level (Fogg *et al.* 1986). Accumulation can be effected on adsorbed polymer films or after derivatization.

References

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