

[PP 3.3]

Lead (II) Speciation in a Polluted River: Dissolved Fraction

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Soluble Pb(II) speciation in a polluted river was studied using differential pulse anodic stripping voltammetry (DPASV) technique. Three sampling sites were selected: Braga (B)(downstream the pollution sources), Foz (F) (near the river mouth) and an intermediate point called Louro (L). Studies have been done with samples collected in different times of the year, namely Spring, Summer, Autumn and Winter.

Centrifuged and filtered samples were titrated with Pb(II) and the labile metal concentration measured by DPASV.

Results have been compared to those obtained in buffered electrolyte solution, at a similar ionic strength and pH. From the plots $\Delta Ep (=Ep_s - Ep_c)$, where Ep_s and Ep_c are the peak potentials for free and complexed metal ion) versus total metal concentration in solution, we can conclude that soluble metal complexes are labile or quasi-labile because peak potential shifts toward anodic values, with increasing metal concentration (Leeuwen, 1987; Buffle, 1988), as has been checked before for sample collected in spring time (Botelho *et al*, 1994).

An increase in the current with the increase in metal ion concentration has been noticed, although peak currents are always smaller than the calibration plot, so the complexes have diffusion coefficients smaller than the free metal ion, $D_{ML} < D_M$. From titration curves D_{ML} values have been estimated.

Potentiometric titration has been followed with a glass electrode and the concentration of the active sites (C_H table 1), has been determined from inflection points of the titration curves, assuming that the metal ion and the proton have affinity for the same sites.

From DPASV experiments it was determined the mean stability constant and the differential function for the Pb(II) complexes in each sample.

Obtained results show that, due to the high pollution level, weather only influences slightly speciation in the less polluted site (F). Low stability constants were obtained for lead soluble complexes in wet weather conditions (winter).

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