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HPLC/Hydrate Generation AAS Coupling for the Speciation of Sb(III) and Sb(V) in Wastewaters

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Abstract: A comparative study was made with two HPLC columns of different lengths (PRP-X 100, 250 mm \times 4.1 mm id and PRP-X 100, 100 mm \times 4.1 mm id) coupled to HGAAS for the speciation of inorganic Sb(III) and Sb(V) species. The effects of eluent concentration and pH on the retention times of Sb species in both columns were investigated. The separation of Sb species was realized by using 50 mmol/L citrate solution at pH 4.0 as the eluent. The retention times were 2.0 min and 10.0 min in the 250 mm column, and 1.4 min and 3.6 min in the 100 mm column for Sb(V) and Sb(III) respectively. The hydrides were produced by adding 1% NaBH₄ and 5.0 mol/L HCl solutions. The absorbance was linearly related to the Sb(V) concentration in the range 2.0-100 μ g/L and to the Sb(III) concentration in the range 4.0-100 μ g/L. The detection limits obtained for Sb(V) and Sb(III) were 1.0 and 0.8 μ g/L respectively. Since certified standards for antimony in aqueous solutions are not currently available, the accuracy of the method was checked by the analysis of both species in several spiked water samples. The optimized experimental conditions were applied for the speciation and determination of the species in mining industry wastewaters.

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