A novel material for Sb speciation in aqueous samples

Irene Morales-Benítez [1]*, Juan Carlos García-Mesa[1], Pablo Montoro-Leal[1], Mª del Mar López Guerrero[1]
Elisa Vereda Alonso[1]

[1]University of Málaga.

* email: irenemb@uma.es

Abstract

In this work, a new double-reactor method for the analysis and speciation of trace amounts of Sb^{III}/Sb^{V} in environmental samples has been developed combining online magnetic solid phase extraction (MSPE) with graphite furnace atomic adsorption spectroscopy (GFAAS).

Two novel materials have been developed for the Sb speciation, both based on magnetic graphene oxide (M@GO), one functionalized with PSTH (M@GOPS) and another one functionalized with MeI (M@GONIO). These materials present different behaviours towards the Sb species; M@GONIO presents good adsorption capacity for both Sb^{III} and Sb^{V} meanwhile M@GOPS is selective for Sb^{III}. The materials are confined in a knotted reactor. Reactors are coupled to a FI manifold connected to a hydride generator which is the last step before the sample introduction in the GFAAS. The eight-port valve allows the sample load in both reactors at the position A, and the elution of the reactors is developed in position B.

Moreover, several flow and chemical variables were optimized by multivariate central composite designs (CCD). The optimized method offers good sensitivity and precision. Thus, new adsorbents have demonstrated to be useful for the preconcentration and speciation of Sb^{III}/Sb^{V}.

Keywords
Antimony; Speciation; MSPE; MGO; GFAAS; Online; Water pollution

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