

Simultaneous preconcentration and determination of trace metals (V, Ni, Ti, and Ga) in environmental samples by high resolution continuum source electrothermal atomic absorption spectrometry.

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Abstract

In this work is presented a simple, sensitive, low-cost method for direct and simultaneous determination of V, Ti, Ni and Ga by electrothermal atomic absorption spectrometer (ETAAS) in aqueous environmental samples (tap and seawater samples). The system is based on the retention of the analyte on a novel adsorbent material based on the coupling of magnetic nanoparticles (MNPs) and graphene oxide (GO) functionalised with methylthiosalicylate (MTS) that provides selectivity to interact with transition metals in solution, M@GO -MTS.

The detection limits achieved with the method were $0.9 \mu\text{g L}^{-1}$ for Ti, $0.6 \mu\text{g L}^{-1}$ for V, $0.04 \mu\text{g L}^{-1}$ for Ga, $0.75 \mu\text{g L}^{-1}$ for Ni. The accuracy of the proposed method was demonstrated by analysing two certified reference materials and by determining the analyte content in spiked environmental water samples. The results obtained using this method were in good agreement with the certified values of the standard reference materials and the recoveries for the spiked tap water and seawater samples were between 90% to 120%.

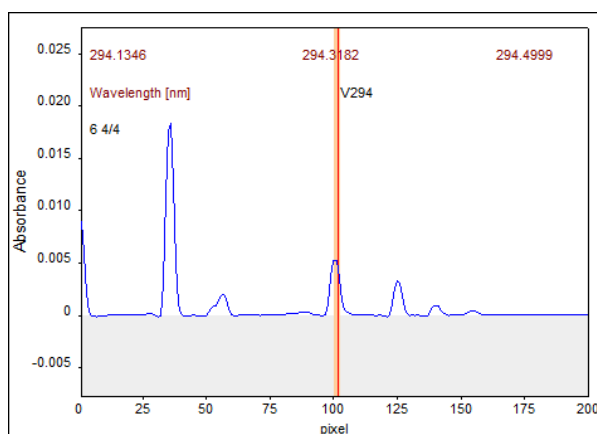


Figure 1. Atomic lines in the same spectral window for V, Ti, Ni and Ga.

Keywords

Magnetic solid phase extraction (MSPE), CS-HR-GFAAS, magnetic nanoparticles (MNPs), graphene oxide (GO), methylthiosalicylate (MTS).

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