



Heavy metals separation and determination in waters using MIS-FAAS by bismuth(III) hydroxide co-precipitation method

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ABSTRACT

Potable and urban waters, which is a vital resource, constitute the most basic research area of today. In the current study, a newly optimized co-precipitation method using bismuth(III) hydroxide has been examined for quantitative separation and preconcentration of iron(III), chromium(III), copper(II), cobalt(II), manganese(II), nickel(II), and cadmium(II) ions from water samples. Analytes were co-precipitated and after dissolving analyzed by micro-sample injection system flame atomic absorption spectrophotometry. The influence of variables such as sample volume, sodium hydroxide concentration, bismuth(III) concentration, matrix effects, etc. were investigated. The theoretical enrichment factor of the optimized method is 50. The precisions of within-day and intra-day for the analyte elements working real water samples were found in the range of 4.1–4.5. The limit of detections for the analyte elements were in the range of 0.8–9.5 µg/L. The limit of quantification of iron(III), chromium(III), copper(II), cobalt(II), manganese(II), nickel(II), and cadmium(II) ions were calculated to be 18.0, 21.0, 7.6, 6.8, 13.0, 27.0, and 1.1 µg/L, respectively. The analysis of the BCR-715 standard reference water sample demonstrated the procedure's accuracy, and the method was successfully applied to two different water samples and nine different plants as a real sample.

Keywords: Heavy metals; Co-precipitation; Bismuth(III) hydroxide; Waters; Atomic absorption spectrometry

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