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**Poly(1-vinylimidazole) functionalized magnetic ion imprinted polymer for fast and selective extraction of trace gold in geological, environmental and biological samples followed by graphite furnace atomic absorption spectrometry detection**

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**ABSTRACT** In this study, poly(1-vinylimidazole) functionalized gold ion imprinted polymer coated magnetic nanoparticles (MNPs@PVIM-Au-IIP) were prepared and characterized. The adsorption behaviors of the prepared MNPs@PVIM-Au-IIP towards gold ions (Au(III)) were studied, it was found that MNPs@PVIM-Au-IIP has good selectivity, high adsorption capacity ( $185.4 \text{ mg g}^{-1}$ ) and fast adsorption kinetic for Au(III). Based on it, a new method of ion imprinted magnetic solid phase extraction (II-MSPE) coupled with graphite furnace atomic absorption spectrometry (GFAAS) detection was proposed for the analysis of trace Au(III) in real samples with complicated matrix. Factors affecting MSPE including sample pH, desorption reagent, elution concentration and volume, elution time, sample volume and adsorption time were optimized. With high enrichment factor of 100-fold, the detection limit of the proposed method is  $7.9 \text{ ng L}^{-1}$  for Au(III) with the relative standard deviation of 7.4% ( $c=50 \text{ ng L}^{-1}$ ,  $n=7$ ). In order to validate the accuracy of the proposed method, the Certified Reference Material of GBW07293 geological sample (platinpalladium ore) was analyzed, and the determined value was in good agreement with the certified value. The proposed II-MSPE-GFAAS method is simple, fast, selective, sensitive and has been successfully applied in the determination of trace Au in ore, sediment, environmental water and human urine samples with satisfactory results.

**Keywords:** gold ions; ion imprinted magnetic material; magnetic solid phase extraction; graphite furnace atomic absorption spectrometry; complex matrix samples

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