



## Solid phase extraction of trace amounts of palladium in environmental water samples on multi-walled carbon nanotubes as a new sorbent: comparison with activated carbon

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### ABSTRACT

A solid phase extraction procedure is proposed for the separation and preconcentration trace amounts of Pd (II) in aqueous medium by using a column of multi-walled carbon nanotubes (MWCNTs) modified with 1-(2-pyridylazo)-2-naphthol (PAN). The elution was carried out with 5.0 mL of 2 mol L<sup>-1</sup> thiourea in 4 mol L<sup>-1</sup> HCl. The amount of eluted Pd (II) was measured using flame atomic absorption spectrometry. The influences of the various experimental parameters, including pH, eluent type, concentration of eluent, amount of sorbent, and interfering ions on the recovery of palladium ions were investigated. The detection limit for palladium under the optimum condition was 1.0 ng mL<sup>-1</sup> with enrichment factor of 100 and the relative standard deviation was 1.89% (*n*=6, *C*=0.5 µg mL<sup>-1</sup>). The method was applied for the determination of Pd (II) in water samples. The enrichment performance of the method using modified MWCNTs as preconcentration sorbent was also compared with PAN-modified activated carbon.

**Keywords:** Multi-walled carbon nanotubes; Palladium; Preconcentration; Flame atomic absorption spectrometry; Solid phase extraction

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