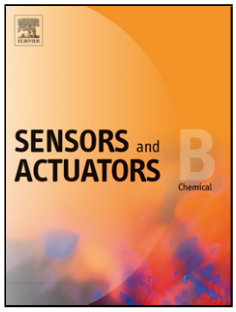

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A novel mercury-free stripping voltammetric sensor for uranium based on electropolymerized N-phenylanthranilic acid film electrode

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Abstract

A novel mercury-free electrochemical sensor was developed for cathodic stripping voltammetric determination of uranium. The sensor is based on a polymer coated glassy carbon electrode obtained by electropolymerization of N-phenylanthranilic acid using multicyclic voltammetry. The influence of several parameters such as concentration of the monomer, number of electropolymerization cycles, pH and accumulation time on the sensitivity of uranium measurement were studied. Under the optimal experimental conditions, the differential pulse cathodic stripping voltammetric peak current is proportional to the concentration of uranium in the range of 0.5 to 35 ng mL^{-1} with a detection limit of 0.15 ng mL^{-1}. The influence of several co-existing metal ions as possible interferences was investigated. The applicability of the method for real sample analysis was tested by determination of uranium in waste water from uranium conversion facility and natural water samples. The new polymer-based uranium sensor holds great promise for sensitive determination of this element in environmental and industrial samples.

Keywords: Uranium sensor; Environmental analysis; Electropolymerization; Cathodic stripping voltammetry; Modified electrode