ELECTRO-OXIDATIVE LEACHING OF PITCHBLENDE MINERALS FOR URANIUM EXTRACTION AND DETERMINATION BY SPECTROPHOTOMETRY IN A FLOW INJECTION ANALYSIS SYSTEM.

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A method for uranium extraction from pitchblende minerals samples by electro-oxidative leaching was developed. An electro-dissolution cell associated to an on line sampler system was designed and tested in order to evaluate the influence of current density, leaching time, temperature, slurry density and the nature and concentration of the electrolyte on the electro-oxidative leaching process. A flow injection analysis system (FIA) was further coupled to the sampler system and physico-chemical conditions were optimized for uranium determination in the leachate by spectrophotometry using arsenazo III as a colorimetric reagent. The flow analysis system used in the uranium determination yielded analytical curves with a linear behavior (R = 0.999) in the concentration range of 0.05 to 2.0 mgL^{-1}, a relative standard deviation of 5.5 % (at 0.1 mg L^{-1}), a detection limit of 0.02 mgL^{-1} and an analytical throughput of 60 determinations per hour. The results obtained by the developed methodology for the uranium electro-oxidative extraction from pitchblende minerals samples showed a good agreement (R = 0.999) with the results verified after total dissolution in wet acid open vessel method. Uranium extraction efficiencies up to 98 % were achieved for one minute leaching time, with a good reproducibility. The electro-oxidative extraction system showed advantages in relation to the conventional technique, such as: possibility of automation of all analytical process, use of lower sample amounts, more swiftness in the uranium extraction and use of lower amounts of acids.

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NEUTRON ACTIVATION STUDY OF GOLD-DECORATED SINGLE-WALL CARBON NANOTUBES

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Single-wall carbon nanotubes (SWNT) were synthesized by arc discharge technique of doped graphite electrodes, purified by burning the amorphous carbon and removing the metals with hydrochloric acid (HCl). The nanotubes were also functionalizated with carboxyl groups (-COOH) by ultrasonification with nitric (HNO_3) and sulphur (H_2SO_4) acids. The nanotubes were then decorated with gold by reducing chloroauric acid ($HAuCl_4$) with UV and hydrazine (N_2H_4). Atomic Force Microscope (AFM) images confirmed the decoration with the hydrazine route. The gold concentration in the samples was analyzed by neutron activation.

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LIMING AND PLANT AGING INFLUENCE ON MICRONUTRIENT UPTAKE IN BRACHIARIA DECUMBENS FORAGE

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Brachiaria decumbens is the main forage in pastures of several Brazilian regions. The effects of liming and plant age on micronutrient uptake by the forage of a degraded Brachiaria decumbens pasture under restoration process, were studied in São Carlos —SP, southeastern Brazil, under altitude tropical climate. Experimental design was a random block (100 m^2), with 6 replications and 3 treatments. Each block received the following treatment: (a) 0 t/ha of limestone with NK; (b) 2 t/ha of limestone applied on soil surface with NK and maintenance of 1 t/ha per annum; (c) 8 t/ha of limestone applied once on soil surface with NK. Forage samples were collected 14 cm above soil surface, each 36 days in the rain season. Instrumental neutron activation analysis (INAA) followed by gamma-ray spectrometry was the analytical method used to determine the micronutrient content. In some cases, Co Fe, Mn and Zn were negatively affected by increasing limestone doses. The opposite effect was observed for Cl. Decreases of Cl, Co and Mo uptake in forage were enhanced with plant aging.

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