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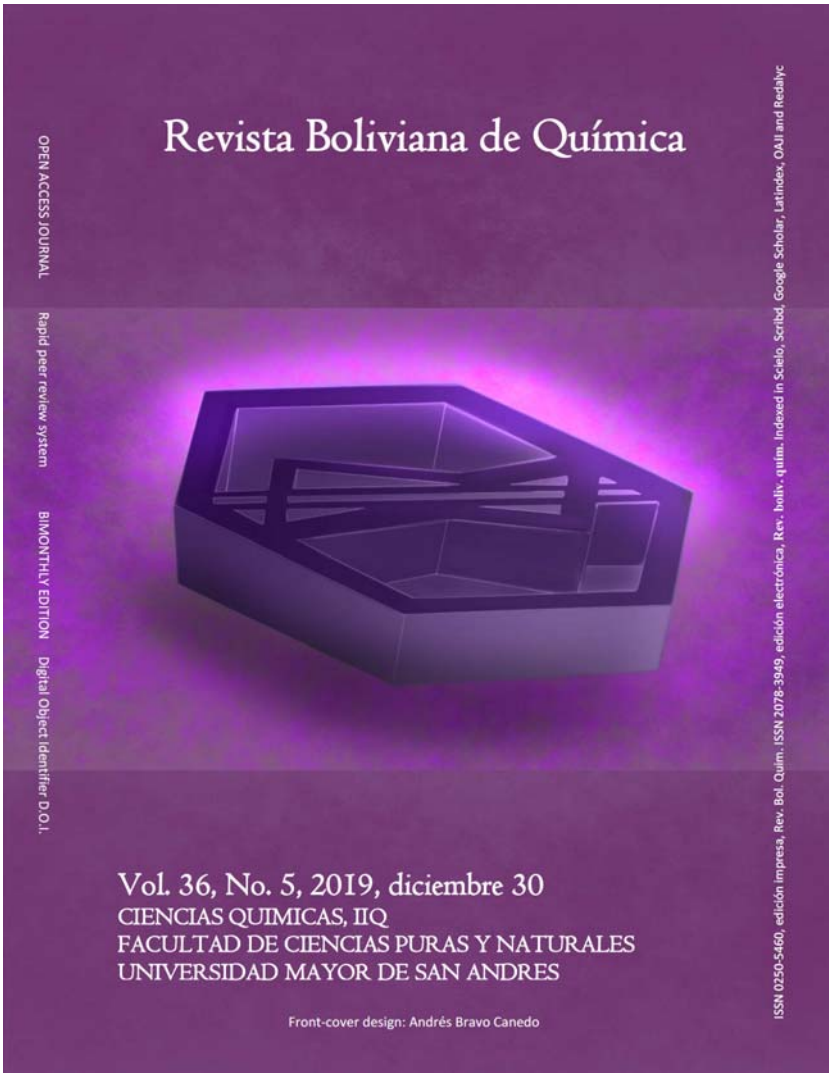
Abstracts



CONTRIBUTION TO THE KNOWLEDGE ABOUT MINIMIZATION OF CYANIDE CONSUMPTION IN GOLD MINING; OXIDIZING SALTS, AERATION AND OVERMOLDING FOR CYANICIDE MINERALS

CONTRIBUCIÓN AL CONOCIMIENTO SOBRE LA MINIMIZACIÓN DEL CONSUMO DE CIANURO EN LA MINERÍA DEL ORO; SALES OXIDANTES, AIREACIÓN Y SOBREMOLIENDA PARA MINERALES CIANICIDAS

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Keywords: *Cyanidation, Gold, Oxidation, Passivation.*

Palabras clave: *Cianuración, Oro, Oxidación, Pasivación.*

ABSTRACT

This research aims to contribute to the knowledge about the minimization of cyanide consumption in gold mining, mainly in complex minerals such as gold sulphides and gold auroarseniides; with the use of oxidizing salts. Cyanidation assays were performed varying the cyanide concentration, aeration, pH and particle size; salts of lead acetate and lead nitrate were used as passivants. In conventional cyanidation the reagent consumptions for these minerals are high; the use of passivating salts results in a reduction in the consumption of cyanide and other reagents, under the same control parameters and mineral overmolding process. Overmolding (closed milling circuit) is the process in which the mill uses a classifier whose thick product returns to the mill, and whose fine product passes to the next separation stage. This is applied after the metallurgical characterization of the sample by microscopy, observing the partial occlusion of the gold material in pyrrhotite matrix whose treatment requires high amounts of alkali and cyanide. The treatment with lead salts (passivation salts) that superficially alter the structure of

the gold sulphide mineral was applied, with a decrease in the interaction with alkali and cyanide and consequent decrease in its consumption. As a result of the cyanidation process with salts, a gold solution of 97.78% was obtained for 24 hours, in significant contrast to the conventional treatment without passivation salts that gave a gold solution of 84.50%. In another cyanidation experiment, a gold solution of 93% was obtained within 24 hours, from the ore pre-oxidized with air, while the auric solution was only 80% in the same period from ore without pre-oxidation.

In conclusion, a higher recovery yield of precious metal came from a pre-treatment of the mineral with passivation salts or by the aeration method, resulting in a good degree of particle release, with the consequent decrease in the consumption of cyanide and alkali.

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SYNTHESIS OF ZSM-5 ZEOLITE USING DIATOMITE AS PRECURSOR; ITS APPLICATION IN THE METHANOL TO HYDROCARBONS PROCESS (MTH)

SÍNTESIS DE ZEOLITA ZSM-5 UTILIZANDO DIATOMITA COMO PRECURSOR; SU APLICACIÓN EN EL PROCESO DE METANOL A HIDROCARBUROS (MTH)

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Keywords: *Methanol to hydrocarbons, Dimethyl ether, Olefins, Diatomite, H-ZSM-5.*

Palabras clave: *Metanol a hidrocarburos, Éter dimetílico, Olefinas, Diatomita, H-ZSM-5.*

ABSTRACT

Zeolite H-ZSM-5 is widely applied in the petrochemical industry, such as the synthetic process of methanol to hydrocarbons (methanol to hydrocarbons MTH). ZSM-5 zeolite is currently obtained through reagents and expensive processes, being available only a few cheaper alternative routes. In the present investigation, zeolite H-ZSM-5 was obtained from natural diatomite, then characterized, and finally tested in the synthetic MTH process. The natural diatomite was treated with sulfuric acid to perform hydrothermal synthesis with tetrapropyl ammonium hydroxide (TPA-OH). As a result, the H-ZSM-5 zeolite obtained had a Si / Al molar ratio of 23, it exhibited high thermal stability and showed Lowry-Brönsted and Lewis acid sites. The application of this zeolite in the MTH reaction showed a methanol conversion of 88%. The products were: dimethyl ether (DME) in 40%, olefins (mostly ethylene and propylene) in 40% and others in 20%. The reaction conditions were: 300 ° C, 1.2$L_{metanol}/g_{cat}h$ at atmospheric pressure (0.65 bar). The selectivity of the products can be modified in such a way that DME can be obtained preferentially, up to> 93%, by changing the operating conditions (temperature and space velocity). The use of natural diatomite as a starting material for the preparation of the zeolite H-ZSM-5 represents an attractive route and deserves further investigation for its application and development.

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VALIDATION OF A DETECTION METHOD OF PESTICIDES ORGANOCHLORINATED IN VINASSES, BY GAS CHROMATOGRAPHY

VALIDACIÓN PARCIAL DE UN MÉTODO DE DETECCIÓN DE PESTICIDAS ORGANOCLORADOS EN VINAZA, POR CROMATOGRAFÍA DE GASES

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Keywords: *Validation, Chromatography, Organochlorinated pesticides, Vinasses.*

Palabras clave: *Validación, Cromatografía, Organoclorados, Vinazas.*

ABSTRACT

The Argentinian alcohol industry generates about 10 L of vinegar / L of ethanol as waste. (COD = 70000 ppm). Recent studies in vinasses report the presence of organochlorine pesticides (OC) belonging to the "Dirty Dozen", a group of nine pesticide substances potentially dangerous to the environment and human health, namely DDT, dieldrin, aldrin, endrin, chlordane, heptachlor, mirex, hexachlorohexanes, and toxaphene, the list is gradually increasing with other pesticide substances.

Currently the effluent, after evaporation, is used as fertilizer and source of potassium in impoverished soils. The objective of the work was to validate a method that reliably quantifies the content of POs in vinasses in order to prevent their environmental recycling. The technique includes extraction, cleaning, concentration and chromatography. The validation consisted of establishing performance parameters from the injection of extracts, to the extrapolation of the results to samples of vinasse through recovery evaluations. The reference method was EPA 8080. Tests were planned to evaluate detection limits (LD) and quantification, linearity, precision, accuracy and recovery. The results obtained showed LD between 0.83 ppb (heptachlor) and 4.6 ppb (methoxychloro); appropriate linearity in the working range (average correlation factor of 0.995); Statistically acceptable accuracy and precision.

Recovery trials with added vinegar were between 75% for DDD and 120% for heptachlor epoxide A. The validated chromatographic method offers a good alternative to be applied in real samples, with reliable results, always accompanying with recovery test.

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DETERMINATION OF THE CONTENT OF PHOSPHORUS AND ARSENIC, AND OF OTHER CONTAMINATING METALS OF THE SURFACE WATERS OF THE COATA RIVER, AN AFFLUENT OF LAKE TITICACA, PERU

DETERMINACIÓN DEL CONTENIDO DE FÓSFORO Y ARSÉNICO, Y DE OTROS METALES CONTAMINANTES DE LAS AGUAS SUPERFICIALES DEL RÍO COATA, AFLUENTE DEL LAGO TITICACA, PERÚ

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Keywords: *Superficial waters, Water quality, Pollution, Evaluation, Phosphorus, Arsenic, Coata river, Perú*

Palabras clave: *Aguas superficiales, Calidad del agua, Contaminación, Fósforo, Arsénico, Río Coata.*

ABSTRACT

The contents of phosphorus, arsenic, aluminum, iron and manganese in the surface waters of the Coata River, tributary of Lake Titicaca, department of Puno, Peru, were measured. The measurements were made at two times of the year: sewer and avenue, and were applied at five strategic points on the Coata River, from the Independence Bridge in the city of Juliaca to its mouth on Lake Titicaca. The inductive coupling plasma (ICP) technique consisting of an ionization source and an optical emission spectrophotometer (OES) was used to determine the

elements. The measurements of the concentrations were made by atomic emission spectrometry. The maximum concentrations determined were: aluminum 1,043 mg / L, iron 0.856 mg / L, manganese 0.460 mg / L, arsenic 0.029 mg / L and phosphorus 10,287 mg / L, indices that exceed the permissible limits established in the Environmental Quality Standards of Ministry of Environment of Peru. The thus detected contamination of river waters has its origin in the uncontrolled and untreated discharge of wastewater and solid waste from the city of Juliaca, Puno, Peru.

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