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Facultatea de Resurse Minerale şi Mediu

NORTH UNIVERSITY OF BAIA MARE
Mineral Resources and Environment Faculty

BULETIN ŞTIINŢIFIC
AL UNIVERSITĂŢII DE NORD DIN BAIA MARE

SERIA D

Exploatări Miniere

Prepararea Substanţelor Minerale Utile

Metalurgie Neferoasă

Geologie şi Ingineria Mediului

Volumul XXVII Nr. 2

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Series D

Mining

Mineral Processing

Non-ferrous Metallurgy

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CONTENTS

THE BIO-SULFIDOGENIC TREATMENT OF SEWAGE SLUDGE AND PHOSPHOGYPSUM

[1]Leonid Plyatsuk, [1]Elizabeth Chernish, [2]Jaroslav Adamenko, [2]Taras Kachala, [2]Sofiia Pernerovska

[1]Sumy State University, [2]Ivano-Frankivs'k National Technical University of Oil and Gas

***Abstract**: The paper focuses on the study of sewage sludge transformation and determination the special characteristics of forming the microbially generated gas (MG gas) during bio-sulfidogenic treatment. The mixture of sewage sludge from sludge beds and excess activated sludge was used as feeding of the anaerobic microbiological degradation pilot plant. Phosphogypsum was used as the mineral sulfur-containing additive. After bio-sulfidogenic treatment organic complexes with heavy metals were destroyed and formed insoluble compounds of metal sulfide such as iron sulfide (marcasite), zinc sulfide (sphalerite), copper sulfide (covellite), nickel sulfide etc. Thus, heavy metals were transformed into the unavailable forms for plants. Variation of column length, temperature and velocity of the carrier gas were selected following conditions of gas chromatographic analysis. The qualitative and the quantitative composition of the MG gas were analyzed. The MG gas consisted such components as H2S – 46.8%; CO2 – 19.3%; CH4 – 25.4%; H2 - 2.8%; N2 – 5.7%.*

***Keywords**: heavy metals, bio-sulfidogenic treatment, sewage sludge, phosphogypsum, microbially generated gas*

LANDSLIDE INVENTORY MAPPING IN THE AREA OF THE SIGHISOARA MUNICIPALITY

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ABSTRACT*: The Sighişoara Municipality has a very big importance to the cultural, architectural and historical heritage of the Romanian people. It is the second largest municipality in the Mureş County since the 16th February 1968. The municipality has a very big importance in the area of Transylvania because of the tourism activity. As it is well known on the top of the Fortress Hill lies the Sighişoara fortress, the only inhabited medieval fortress in Romania. Because of it's big importance, now it is in the heritage of Unesco. But, despite the historical heritage of the area of, there is another thing that has an importance, but from a negative point of view. The slope instability problems in the area of Sighişoara affect almost all the slopes. The biggest problem is that it has affected also the integrity of the medieval citadel. Through the years some landslides have affected the citadel's walls. Some parts of the citadel walls were damaged and some are still being damaged. The slope instability also affects some areas of the town inhabited by people. Since the year 2000, because of geological, geomorphological, meteorological and anthropical factors, in the area of Sighişoara, some landslide activity has been spotted. It was clear that this was not a remote phenomenon. So, until the present time some landslides have been remoulding the landscape in the area. The present situation regarding the landslide activity in the area pointed that it was necessary that a landslide inventory map was to be made. From this map there can be made some observations regarding the area most prone to landslides in the area of the Sighişoara municipality. So aim of this paper is to present a landslide inventory and a landslide inventory map in the study area. From this map it can be concluded that in the areas prone to landslides there will always be raised the questions "When?" and "How?" the landslides will occur.*

KEYWORDS*: slope, stability, instability, inventory, mapping*

Buletin Ştiinţific al Universităţii de Nord Baia Mare
Seria D, Exploatări Miniere, Prepararea SMU, Metalurgie Neferoasă, Geologie şi Ingineria Mediului, vol. XXVII, Nr. 2, 2013

PRELIMINARY ECOLOGICAL TEST ON HEAVY METALS EFFECTS ON TRITICALE SEEDLING GROWING

Vasile Oros, Valeria Brezoczki
Technical University of Cluj-Napoca, North University Centre of Baia Mare

Buletin Ştiinţific al Universităţii de Nord Baia Mare
Seria D, Exploatări Miniere, Prepararea SMU, Metalurgie Neferoasă, Geologie şi Ingineria Mediului, vol. XXVII, Nr. 2, 2013

TRACKING THE ORGANIC BURDEN OF THE WASTEWATER FROM THE WASTEWATER TREATMENT UNIT IN THE CITY OF BISTRIŢA

Brezoczki Valeria, Suci Simona, Bogdan Breban
Technical University of Cluj-Napoca, North University Centre of Baia Mare

***Abstract**: The paper intends to highlight the results obtained from the monitoring of the organic burden of the wastewaters from the sewage treatment unit in the city of Bistrita. The tracking of the parameters was performed over a period of one month, i.e. April 2012. the chemical analyses were done in the Laboratory of physical and chemical testing of the regional water and sewage operator SC AQUABIS SA Bistriţa. The parameters tracked for determining the organic burden of waters were the biochemical oxygen consumption (CBO_5) and the chemical oxygen consumption (CCO-Cr), determined by means of the potassium dichromate method.*

The analyses for the two parameters done at the entrance in and at the exist from the water treatment unit, i.e. at the evacuation point into the river Bistriţa, showed values that come under the provisions in force of the Technical Norms for Water Protection, namely NTPA 001/2002 regarding the setting of limits for the burden with pollutants of industrial and city wastewaters when evacuated into natural receptors, as well as NTPA 002/2002 regarding the condition for the evacuation of wastewaters into the towns' sewage system straight into the sewage treatment units.

***Keywords**: Organic burden of wastewaters, biochemical oxygen consumption, chemical oxygen consumption, wastewater treatment, technical norms for the protection of waters.*

Buletin Ştiinţific al Universităţii de Nord Baia Mare
Seria D, Exploatări Miniere, Prepararea SMU, Metalurgie Neferoasă, Geologie şi Ingineria Mediului, vol. XXVII, Nr. 2, 2013

THE EVOLUTION OF ZETA POTENTIAL IN THE COAGULATION PROCESS OF TREATED WATER DEPENDING ON THE DOSE OF ALUMINIUM

Elena Cical, Thomas Dippong , Gheorghe Vâtcă
Technical University of Cluj Napoca, North University Center of Baia Mare,

Abstract: *The zeta potential is a convenient way to optimize the dose of coagulant added to the water treatment process. Through the clotting process is achieved the removal of colloids from the water, a rather difficult process due to the small size of the particles. The most important aspect in efficient removal of colloids is the reducing of zeta potential by using coagulation. In the present work, it is studied the evolution of zeta potential and turbidity in the treated water coagulation process, using aluminum sulfate and alkaline aluminum polychloride reagent in the treatment process.*

Keywords*: zeta potential, turbidity, correlation , coagulation*

Buletin Ştiinţific al Universităţii de Nord Baia Mare
Seria D, Exploatări Miniere, Prepararea SMU, Metalurgie Neferoasă, Geologie şi Ingineria Mediului, vol. XXVII, Nr. 2, 2013

CLEAN TECHNOLOGIES FOR PROCESSING BRASSES AND BRONZES

JOZSEF JUHASZ
Techical Univercity of Cluj Napoca, North Univercity Center of Baia Mare

Abstract: *The technological process of obtaining raw copper, brass and bronze is a simple process in which basic operation, smelting nonferrous alloys melting is done in rotary kiln. By using filter bags to obtain a clean technology, environmental clean emission. Other machines are used for cooling the gas flow technology and retention of zinc oxide powder and tin in the oven resulting from oxidation reactions of zinc and tin that are part of the raw material supply of the oven. The basic principle is the use of filter bags woven membranes, permeable to gases, but will retain the dust.*

Keywords: *brass melting furnace, bags filters, emissions*

PROBLEMS OF STUDYING THE CARBONATE ROCK RESERVOIR BY THE COMPLEX GEOLOGICAL AND GEOPHYSICAL DATA AT GREATER DEPTHS

D.D. FEDORYSHYN[1], M.S.MAHAMBETOVA[2], I.O.PIATKOVSKA[1]

[1]Ivano-Frankivsk National Technical University of Oil and Gas
[2]Research and Design Institute JSC "Ukrnafta"

Abstract**:** *Authors in article consider the possible allocation of depth productive carbonate reservoir rocks according to geophysical well logging data. Authors give mathematical models of petrophysical relationships that are characteristic of carbonate rocks and the possibility of using broadband acoustic logging for carbonate reservoirs.*
Keywords*: depth occurrence, geophysical surveys, carbonate rocks, petrophysical models, broadband acoustic logging.*

STUDY REGARDING THE CONCENTRATION OF ALUMINIUM AT GILĂU WATER TREATMENT PLANT

Cristina Iacob, Anagabriela Fărcaş
Technical University of Cluj-Napoca, Faculty of Building Services

Abstract: *Fulfilling the regulations concerning water quality involves protecting water sources against contamination, an adequate treatment solution and assuring the safety in the water distribution system. This paper presents a study made at Gilău Water Treatment Plant, in Cluj County concerning the concentration of aluminium. Measurements have been performed on the aluminium concentration in the water sources and in the raw water (at plant inlet), revealing the periodic occurrence of high aluminium concentrations, very often ranging between 100 and 300 µg/l, sometimes even reaching 600-700µg/l. Subsequently, the treated water has been analyzed during various treatment stages and the aluminium concentration has been measured using graphite furnace electro thermal atomic absorption spectroscopy. The conclusion to be drawn is that the use of aluminium sulfate in coagulation leads to increased concentration of aluminium in treated water, above the concentration in raw water which, in turn, periodically records high amounts. Thus, it is recommended to consider, only in relatively high turbidity periods, the usage of other reactants, e.g. polymerized reactants, with a lower concentration of aluminium, or iron based reactants, such as ferric chloride.*

Keywords*: water quality, water source, water treatment plant, aluminium concentration, optimization.*

Buletin Ştiinţific al Universităţii de Nord Baia Mare
Seria D, Exploatări Miniere, Prepararea SMU, Metalurgie Neferoasă, Geologie şi Ingineria Mediului, vol. XXVII, Nr. 2, 2013

CONSIDERATIONS ABOUT CONSTRUCTIVE AND FUNCTIONAL CHARACTERISTICS OF THE ANAEROBIC BAFFLED REACTION FILTER

DAN MUREȘAN
Minstall Cluj-Napoca, Romania

Abstract *Household wastewater treatment is a technical problem of major importance for all human communities, because the avoidance of environmental pollution, respectively the pollution of ground waters must concern to an equal extent all the members of local communities. At the moment, because of particularities of small sized towns, the local treatment of household wastewater flows becomes a necessity, using extensive solutions by the use of anaerobic biological processes of decomposition of organic matters and mineralization of sludge. In this context the searching of new technologies for wastewater treatment is a dynamic process, integrating in this process the technology of anaerobic baffled reactor.*

Buletin Ştiinţific al Universităţii de Nord Baia Mare
Seria D, Exploatări Miniere, Prepararea SMU, Metalurgie Neferoasă, Geologie şi Ingineria Mediului, vol. XXVII, Nr. 2, 2013

CONSIDERATIONS ABOUT DESIGN METHODOLOGY OF THE ANAEROBIC BAFFLED REACTION FILTER

DAN MUREȘAN
Minstall Cluj-Napoca, Romania

Abstract *Anaerobic biological filter reactor, is one of sustainable technical solutions, which on the one hand, integrated in a wastewater treatment system extensively, using natural treatment processes, energy consumption can be "zero" and on the other hand can ensure the implementation of decentralized or local solutions of household wastewater treatment plants, specific communities or suburban areas to small.*

Buletin Ştiinţific al Universităţii de Nord Baia Mare
Seria D, Exploatări Miniere, Prepararea SMU, Metalurgie Neferoasă, Geologie şi Ingineria Mediului, vol. XXVII, Nr. 2, 2013

MODELLING OF THE TECHNOGENIC TRANSFORMATION OF HIGHLY MINERALIZED WATERS UNDER CONDITION OF AQUIFER CONTAMINATION

Saban V.Z., Semchuk Y. M., Mayevskyy B.J., Melnyk O.D.
Ivano-Frankivsk national technical university of oil and gas

***Abstract** : The ways of forming the content of highly mineralized waters were investigated and studied, and the possible ways for contaminants incoming and migrating into fresh water were determined. According to the modelling results three basic models were drawn up – for baseline composition of active aqua exchange waters, salted waters and chloride solutions from the areas with standing regime.*

***Keywords**: migration, localization, pollution "from above", modelling, Dolynske deposit, rock, aquifer.*

Buletin Ştiinţific al Universităţii de Nord Baia Mare
Seria D, Exploatări Miniere, Prepararea SMU, Metalurgie Neferoasă, Geologie şi Ingineria Mediului, vol. XXVII, Nr. 2, 2013

TESTING THE EFFECTIVENESS OF HYDROCHLORIC ACID TREATMENTS RESERVOIR ROCKS OF LOWER PERMIAN DEPOSITS DNIEPER-DONETS BASIN

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[1]Lviv comprehensive research center UkrNDIgaz
[2]Ivano-*Frankivsk National* University of Oil and Gas

Abstract*: The example reservoir rocks lower Permian sediments of Hnidyntsivske oilfield Dnieper-Donets basin revealed that the effect of polymer-clay mud leads to a reduction the phase permeability to 4.2 times. There was testing the effectiveness of 14% hydrochloric acid by the proposed method. We found that the most effective is the processing of reservoir rocks, where the pore volume was forced out of filtrate and free oil. During which phase permeability increases more than 13 times compared with the initial. The described method takes into account the lithologic and petrophysical features of reservoir rocks and can be used successfully in other geological and technical conditions of occurrence of productive deposits. It was established that the presence mud filtrate and hydrocarbons in pore volume does not contribute to the effectiveness of hydrochloric acid treatments in the bottomhole formation zone.*

Keywords*: carbonate, filtration-capacitive properties, drilling fluid, the effective (phase) permeability, fluid saturation.*

THE EVOLUTION OF BIO-ALLERGENS IN THE ATMOSPHERIC AIR IN PARIS - FRANCE, BETWEEN 2011 AND 2013

Valeria Mirela Brezoczki
Technical University from Cluj Napoca, The North University Centre from Baia Mare, Dr. Victor Babes street, Baia Mare, Romania

Abstract: *This paper intends to highlight the need to know the evolution of the concentration of anaerobic particles (different types of pollen) in the atmospheric air, due to the negative effects they have on public health.*

The monitoring of bio-allergens was carried-out between 2011 and 2013, over a period of 52 weeks within a calendar year, from February until the end of September. The types of allergenic trees and plants that were studied were the sycamore tree, the alder tree, the birch tree, the cypress tree, the oak tree, the beech tree, the linden tree, the chestnut tree, the hazelnut tree, the ash tree, the olive tree, the willow tree, grain crops, the ribwort, and the ragweed. For experiments two Hirst volumetric traps for pollen were used; one of them was mounted on the roof of the Pasteur Institute in Paris and the other close to the Lyon railway station.

The effects of pollen particles from plants and trees on public health are multiple and depend on a series of interdependent factors, namely: the type and size of the pollen particle, the quantity of pollen the plant emits into the air, the allergenic potential specific to each plant, the sensitivity of the individuals exposed to the pollen, the hereditary factor etc. These effects vary from seasonal allergic reactions (sneezing, hay fever, conjunctivitis, rash etc.) to severe issues of the respiratory tract, such as asthma.

Allergy is a public health issue which affects a large percentage of the world population. According to the statistical data provided by the Ministry of Health and Social Affaires, France, regarding the occurrence of various types of allergies amongst the French population, apparently over 20% of the population suffer from various types of pollen allergies which require the need for specialized treatment during different times of the calendar year. Respiratory allergies are the most frequent chronic diseases amongst children, with over 2,000 annually recorded deaths mainly due to asthma.

The meteorological conditions recorded during the investigated years and the degree of chemical pollution of the atmospheric air in Paris were determined in the evolution of the researched aerobiological pollution.

In this field the regulations regarding the limitation of the concentration of pollen from plants and trees in the environmental air are being drafted, yet a series of sanitary, social and individual recommendations are implemented with the aim of considerably reducing or even preventing exposure to aerobiological pollution.

Keywords: *bio-allergens, pollen indicator, allergenic potential, public health*

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