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BULETIN ŞTIINŢIFIC
AL CENTRULUI UNIVERSITAR NORD DIN BAIA MARE

SERIA D

Exploatări Miniere

Prepararea Substanţelor Minerale Utile

Metalurgie Neferoasă

Geologie şi Ingineria Mediului

Volumul XXIX Nr. 2

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COPPER, THE KEY ELEMENT IN THE DEVELOPMENT OF HUMAN COMMUNITY

IOAN BUD, IOSIF PASCA, SIMONA DUMA, DOREL GUSAT, ADINA BUD
Technical University of Cluj Napoca, North University Centre of Baia Mare, Faculty of Engineering, Romania

Abstract*: In Romania, copper ores have been exploited and recovered from the Bronze Age in the regions of Banat, Oltenia and Apuseni Mountains. The first exploitation of copper deposits exploited the ore from outcrop and on the measure that the excavation deepened the activity has been passed to the underground. In the last decades, vein copper ores have been operated through underground mining works and mineralization type stocks, maelstrom (porphyry copper), stocked in massive have been operated by surface mining works. While in the world production capacities were developing and other new were created, in Romania was taken the decisions to stop copper and other non-ferrous mining exploitation. In the same time, and more dramatic, processing plants were destroyed with major consequences for subsequent technological phases to obtain finished product. These aspects of mining activity closure have had a strong economic, social and environmental impact, affecting important communities in Romania. Through comparative analysis, regarding geo-mining, geo-political and international structures conditions, it was presented the case of Poland which has developed the production capacities by privatization of Kombinat Górniczo-Hutniczy Miedzi – KGHM, extending national and international activity.*

Key words*: copper, bronze, alloy, exploitation, capitalization, metals*

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REGARDING THE APPLICATIONS OF ANT COLONY OPTIMIZATION ALGORITHMS TO MUNICIPAL SOLID WASTE MANAGEMENT

ANDREI-ALIN CIORUȚA *, MIRELA COMAN **, BOGDAN CIORUȚA *
**Faculty of Science, North University Centre Baia Mare - Tehnical University Cluj-Napoca*
str. Victoriei, nr. 76A, Baia Mare
***Faculty of Engineering, North University Centre Baia Mare - Tehnical University Cluj-Napoca,*
str. Victor Babeș, nr. 62A, Baia Mare

***Abstract**: There is no denying that our environment and our society are constantly changing. However, as our environment changes, so does the need to become increasingly aware of the problems that surround it. All across the world, people are facing environmental problems every day. Some of them are small and affect a few ecosystems, but others are drastically changing the landscape of what we already know. Practically, our planet is poised at the brink of a severe environmental crisis.*
Current environmental problems make us vulnerable to disasters and tragedies, now and in the future. We are in a state of planetary emergency, with environmental problems piling up high around us. Unless we address the various issues prudently and seriously we are surely doomed for disaster. There are a few solutions applicable to the environmental problems at local level, such as: use of renewable resources, recycling, green transport, green energy, optimized waste collection and transport etc.
This paper performed on the one hand, an overview of various environmental engineering issues, and, on another hand, analyses the new possibilities to handle the municipal solid waste (MSW) management problems in terms of using the ant colony optimization (ACO) algorithms. According to this new methodology, the ACO algorithms-based on stigmergy and self-organization of individs- will provide the necessary information we need in order to configure and implement an optimized waste management routing.

***Key words**: environmental sustainability, metaheuristics, ACO algorithms, MSW management routing*

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TECHNOLOGICAL FILTRATION SYSTEM FROM THE THERMAL REFINING PROCESSES

JOZSEF JUHASZ, ELENA POP
Technical University of Cluj Napoca, North University Center Baia Mare,
62/A, Dr.Victor Babeş Street, 430083, Baia Mare, ROMÂNIA
jozsef.juhasz@cunbm.utcluj.ro

Abstract: *The technological process of obtaining raw copper process in which the basic operation, smelting nonferrous alloys melting is done in rotary furnace. The filtration of the hygiene gas from thermal refining of copper is substantially improved due to the use of advanced technologies for filtering, using filters with bags. The filter with bags consist of several compartments, each containing a large number of bags, suspended vertically in a metal lattice designed to maintain the bags open during gas filtration [1]. By using filter bags is obtain a clean technology, environmental clean emissions.*

Keywords: *smelting furnace, air pollution, filters.*

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REMARKABLE PARISIAN BUILDINGS UNDER PERMANENT TRANSFORMATION DUE TO THE REQUIREMENTS OF PRESENT-DAY SOCIETY

VALERIA MIRELA BREZOCZKI[1], GABRIELA FILIP[2]
Technical University of Cluj Napoca - North University Centre of Baia Mare, 62A Dr. Victor Babes Street, Baia Mare, Romania

Abstract*: This paper approaches a series of transformations continually undergone by an important number of classical or contemporary French buildings, which have always been remarkable due to their uniqueness and grandeur. The focus of the discussion are five representative buildings of French society: the Versailles Palace, the Grande Arche de la Défence, the Georges Pompidou National Art and Culture Centre, also called the Beaubourg, the D'Orsay Museum and the Luvru Museum.*
All these architecturally impressive buildings (with architectural style ranging from classical to neoclassical to non-conformist) host a wide range of historical, cultural and artistic items of patrimony. The evolutionary requirements of present-day society have imposed continuous transformations as regards the use of these buildings; these changes represented a perfect binder between the wide public and art, history and culture. The most remarkable aspect is the large number of permanent workshops and themed evends carried out within these museums, or in their gardens, for pupils, students, for the continuous formation of teaching staff, as well as for the wide public.
The link between these buildings and the environment is achieved by means of majestic gardens located around the museums, which surprise in terms of the wide variety of plants, the atypical shape of tree crowns (round, conical, triangular), and last but not least the connection between the green areas and the works of art they contain (sprinkler fountains, bas-relief, sculptures etc.).
Beside these museums I have noticed non-conformist artistic elements as well, determined by a series of paintings and buildings which combine the classical with the contemporary and create an optical illusion effect in the viewer, a technique called "trompe l'œil''. This is the case of the melting building in Paris, to which an impressive number of artists contributed.

Keywords*: cultural patrimony, permanent workshops, plant diversity*

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COMPARATIVE STUDY OF THERMAL DECOMPOSITION OF SEVERAL ASSORTMENT OF INFANT FORMULA

THOMAS DIPPONG[1*], BARBARA GATI[1], CRISTINA MIHALI[1], FIRUTA GOGA[2]

[1]Technical University of Cluj Napoca,North University Center at Baia Mare, Department of Chemistry and Biology,76 Victoriei Str, 430122 Baia Mare, Romania
[2]Babes-Bolyai University, Faculty of Chemistry and Chemical Engineering, 1 Kogălniceanu Str, 400084 Cluj-Napoca, Romania
** Corresponding author: dippong.thomas@yahoo.ro*

Abstract*: The aim of this paper was to use the thermal analysis to study the thermal behaviour of several assortment of infant formula (powder milk for babies) as a result of decomposition by analysing the components that would form, the chemical processes that occurs as a result of the loss of mass on thermogravimetric (TG) charts, which can be correlated with the thermal effects on the (Differential Thermal Analysis) DTA curves. This paper proposed a study of the thermal decomposition regarding proteins, casein, lactose and fatty acids. We are attempted to correlate the residual mass resulted as final product of the controlled thermal decomposition with the residues obtained by calcination in the determination of ash. The thermal analysis of the assortments of milk powder showed differences between the water content which was evaporated in the first step of the thermal analysis, the quantity of lactose, protein and fatty acids.*

Keywords*: infant formulas, thermal decomposition, TG, DTA, protein, lactose, fatty acids*

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DETERMINATION OF ANIONIC SURFACTANT BY POTENTIOMETRIC TITRATION WITH SURFACTANT SENSIBLE ELECTRODES

CRISTINA MIHALI[1], GABRIELA OPREA[1], THOMAS DIPPONG[1*], ELENA CICAL[1]

[1]Technical University of Cluj-Napoca, Faculty of Sciences North University Center at Baia Mare, Department of Chemistry and Biology, 76 Victoriei Street, 430122 Baia Mare, Romania
** Corresponding author: dippong.thomas@yahoo.ro*

***Abstract**: Anionic surfactants are a class of compounds with important applications in many industrial processes, in agriculture, research and also in household and personal care. They are largely used but they are released in the environment where they act as pollutants. The analysis of surfactant concentration is required in the surfactants industry, in the quality control and also in the environment monitoring, especially in surface water. Potentiometric titration of anionic surfactants is an attractive alternative method of anionic surfactants determination to the titration with chemical indicators or to the extractive spectrophotometric based on methylene blue complex.*

***Keywords**: anionic surfactants, ion selective electrodes, potentiometric titration, lauryl sulphate, cethyltrimethyl ammonium bromide*

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HYDROGEOLOGICAL STUDY OF THE BAIA MARE WATER SPRINGS USED AS DRINKING WATER SOURCES

IOAN DENUȚ[1,2], SORINA BOIER[3], ALEXANDRA SÎNGEORZAN[1]

[1]„Victor Gorduza" County Museum of Mineralogy Baia Mare, bd. Traian, nr. 8, Baia Mare
[2]Faculty of Engineering, North University Centre of Baia Mare - Tehnical University of Cluj-Napoca, str. Dr. Victor Babeș, nr. 62A, Baia Mare
[3]S.C. Hard Rock Infrastructuri S.R.L., str. Ferăstrăului, nr. 61-63, Baia Mare

***Abstract**: Within this study the water quality coming from the public springs in the Baia Mare area was analysed and monitored in terms of microbiology and physical and chemical composition. The purpose was to determine the quality of the drinking water given the real danger to human health that infested water consumption presents. The water samples that were studied were taken from six locations (Nistru, Sănătății, Usturoi, Firiza, Chiuzbaia, Baia Sprie). For the samples a series of water quality parameters were determined such as nitrate ion content (NO3) , nitrite (NO2-) , ammonia , iron, manganese , sodium, potassium , nickel , calcium, index of pH and conductivity as well as a number of microbiological parameters .The most important potability condition, from a bacteriological point of view, is the total lack of pathogens. Given the relatively laborious methods for highlighting their presence in water and their instability , we performed several indicators such as aerobic plate which grows to 37 ° C , total and faecal coliforms and faecal streptococci. All the analyzes were conducted under an accredited laboratory in the department for water quality control.*

***Keywords**: hydrogeological study, Baia Mare water springs, physical, chemical and bacteriological parameters, potability.*

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COMPUTER SOFTWARE ECOSYSTEM ASSESSMENT OF ENVIRONMENTAL STATUS AND SAFETY OF LIFE AND POPULATION OF CARPATHIAN REGION AND PODOLIYA

DENIS ZORIN

Ivano-Frankivsk National Technical University of Oil and Gas
76019, 15 Karpatska st., Ivano-Frankivsk, Ukraine

Abstract. *The method of quantitative estimation of the ecological condition of natural and anthropogenic geosystems and security of the population in the zone of oil and gas fields on the basis of computer programs has shown that there is a possibility of calculating the quantitative assessment of threats to the existence of natural geosystems and safety of human life, which are calculated according to the new computer zaproponovan6ymy authors' Computer program estimates the concentration range of life safety and environmentally sound interval concentrations of pollutants that have developed in areas hazardous man-made objects - oil and gas fields. This requires reasonable sampling of the network components of the environment, their analysis of the content specific to a region of pollutants, the calculations of figures and rankings based on their areas of environmental states: normal, satisfactory, tense, complicated, unsatisfying, pre-crisis, complicated.*
For each of those proposed environmental measures - immediate, efficient, long, etc.

Key words*: natural and anthropogenic geosystem, environmental condition, the concentration range, oil and gas fields, ranging areas, safety of life.*

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EFFICIENCY AND OPPERATING COSTS OF SOME OF THE LARGEST WASTEWATER TREATMENT PLANTS IN ROMANIA WITH ESTIMATION THE POSSIBILITY OF WASTEWATER QUALITY IMPROVEMENT

THOMAS DIPPONG[1*], CRISTINA MIHALI[1], IOAN LEITNER[2]

[1]Technical University of Cluj Napoca,North University Center at Baia Mare, Department of Chemistry and Biology,76 Victoriei Str, 430122 Baia Mare, Romania
[2]SC Apaserv Satu Mare SA, Gara Ferăstrău, str. Gara Ferăstrău Street nr.9/A, Satu Mare, România
[*] Corresponding author: dippong.thomas@yahoo.ro

Abstract: *The paper presents a comparison between the efficiency and operation costs of six largest wastewater treatment plants in Romania. The main facilities of the six wastewater treatment plants are presented (Constanta, Iasi, Cluj, Satu Mare, Brasov, Sibiu). Some technological parameters about the sewage and the dimensions of the wastewater treatment plants relative to equivalent population are discussed in the first part of the paper. The efficiencies related the main physicochemical parameters of the considered wastewater treatment plants are presented. The analysed physicochemical parameters after the biological step were: biochemical oxygen demand (BOD), chemical oxygen demand (COD), ammonia concentration, total nitrogen content and also phosphorus content of domestic and industrial wastewaters of the influents, of the effluents after the mechanical stage and of the effluents of the wastewater treatment plants treatment plant.*
Second part presents the technological strategy for better energy efficiency by increasing the specific production of biogas, taking into account technical and economic aspects related to operation and maintenance costs. Also the strategy with the operators intend to improve the biological treatment stage by reducing considerable the nitrogen and phosphorus content are presented.

Keywords*: biogas, energy, monitoring, nutrients, wastewater treatment plant.*

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INTEGRAL ENVIRONMENTAL IMPACT ASSESSMENT OF PROJECTS USE WIND ENERGY

NATALIIA MOSKALCHUK, YAROSLAV ADAMENKO, LIUDMYLA ARKHYPOVA, OLEG MANDRYK

Ivano-Frankivsk National Technical University of Oil and Gas
76019, 15 Karpatska st., Ivano-Frankivsk, Ukraine

Abstract. *Alternative energy sources help to solve the problem of sustainable human development through the use of renewable resources and pollution abatement. Wind farms don't pollute the atmosphere, consume fuel and cause thermal pollution. However, there are some disadvantages of wind power. The authors have developed the methodology of the environmental impact assessment of projects and existing facilities of renewable energy, in particular wind farms. The parameters of defining the impact magnitude are proposed, namely spatial, time and impact intensity. Each of the three parameters is calculated according to the special scale with the use of criteria, developed for the respective scale grading. Impact magnitude on each environment component is proposed to assess for different sources. Impact magnitudes are defined on the basis of the resulting assessments for separate environment components. The typical scoring matrixes are developed. The obtained rates of impact magnitude allow to perform the integral environmental impact assessment on the components of the environment in terms of space, time and intensity, which will provide information about real or potential impact on the environment in general and help to decide whether it is acceptable.*
Keywords: *environmental impact assessment, projects wind energy, methodology.*

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MODELING POSSIBILITIES OF THE POPULATION GROWTH AND ITS IMPLICATIONS USING BIO-MATHEMATICS MODELS

BOGDAN CIORUȚA *, MIRELA COMAN **, VASILE BERINDE *

[*]Faculty of Science, North University Centre Baia Mare - Tehnical University Cluj-Napoca
str. Victoriei, nr. 76A, Baia Mare
[**]Faculty of Engineering, North University Centre Baia Mare - Tehnical University Cluj-Napoca
str. Victor Babeș, nr. 62A, Baia Mare

Abstract: *Ecological problems are nowadays of general concern. In particular, much attention is being paid to the problem of population growth and this has led also to an increase of interest in mathematical ecology at all levels. The growth of organisms in a favourable environment is typically modeled by a simple exponential function, in which the population size increases at an ever-increasing rate. This is because the model, at their most simple, assume a fixed net "birth" rate per individual. This means that as the number of individuals increases, so does the number of individuals added to the population. This description of population change pre-supposes that resources for growth are always adequate, even in the face of an ever-increasing population.*

In the real world, resources become limiting for growth, so that the rate of population growth declines as population size increases. There are several numerical (bio-mathematical) models that simulate this behaviour, and here we will explore a model termed generalized "logistic" growth. The generalized logistic differential equation, dealt with in this paper, is a classical, but still useful model for describing the dynamics of a one-species population in an environment with limited resources.

This paper deals with the theoretical analyse (definition, properties) and some applications of the dynamic systems treated under the generalized logistic equation formalism. Also, there are presented a variety of growth curves based on extended forms of the classical Verhulst logistic growth equation.

Key words: *population growth models, bio-mathematics, generalized logistic curve*

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THE MAIN PHYSICAL AND CHEMICAL PROPERTIES OF THE RADIOACTIVE PARTICLES EJECTED INTO THE ATMOSPHERE AT ACCIDENTS

MAKSIM KUSTOV, VLADIMIR KALUGIN, ALEXANDER LEVTEROV

National University of Civil Protection of Ukraine

Abstract: *Physical and chemical properties of radioactive matter which get to the atmosphere at accidents on the examples of accidents at Chernobyl and Fukushima nuclear power plants has been analyzed. The properties determining sedimentation intensity of radioactive matter by an atmospheric precipitation has been analyzed. The chemical composition and superficial properties of the radioactive matter released into the atmosphere has been determined by the accident mode process. The radioactive matter (emissions) has been shown to mainly consist of gaseous inert ^{133}Xe, chemically inert "hot particles" in the form of a $U_xO_y + ZrU_xO_y$ alloy, microparticles (organic and nonorganic) of dust with vapors of I_2, TeO_x, CsO_2 radioactive matter condensed on their surface, and microparticles of radioactive graphite.*

Keywords: *Fukushima, Chernobyl, Nuclear plant accident, Radioactive particles, Radioactivity-induced charge, Radioecology, Raindrop, Coagulation, Intensity of excretion.*

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