

Summaries

DARIUSZ FOSZCZ, TOMASZ NIEDOBA, TADEUSZ TUMIDAJSKI

Analysis of Possibilities of Forecasting the Results of Polish Copper Ores Beneficiation with Applied Technology Taken Into Account • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The paper presents the proposal of methodology of Polish copper ores beneficiation results forecasting. The widely applied types of beneficiation curves were discussed, which were the basis for forecast. To this purpose, four various approximations of relations $\gamma = \gamma(\beta)$ were taken into consideration. It was stated that they give various effects by transferring to curve $\varepsilon = \varepsilon(\beta)$ what is caused by high sensitivity of ε on changes of β . The second applied method based on dependency of parameters describing certain beneficiation curve on contents of lithology types in feed. The Dell and Fuerstenau curves were applied to this purpose. The obtained results were then evaluated, indicating that the full forecast of the results is practically impossible to obtain because it depends on too many factors.

Keywords: *beneficiation, beneficiation curves, forecasting*

DARIUSZ FOSZCZ, DANIEL SARAMAK, TADEUSZ TUMIDAJSKI, TOMASZ NIEDOBA, TOMASZ GAWENDA

Possibilities of Adjusting the Adequacy of Grained Materials Particle Size Distribution Approximation • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The approximation adequacy of particle size distribution curves for various grained materials is very significant in many industrial processing investigations. The authors propose in the paper various approaches to this issue, indicating advantages and disadvantages of classical and non-classical statistical analyzes. On the basis of selected results of particle size distributions of certain grained material, the classical forms of approximated formulas were presented, i.e. GSA, Weibull and log-norm distribution functions. It was indicated that the acceptance of proper maximum particle size is difficult to determine and leads to application of the so-called censored distribution functions. Furthermore, the non-parametrical methods of approximation were applied, such as orthogonal Fourier series and kernel methods. Their application results usually in better adequacy of approximation, but they cannot be the basis for technological interpretation. Furthermore, the approximation by the least squared method was performed with application of weights. The best approximation results were obtained for the logistic distribution function.

Keywords: *approximation, statistical analysis, particle size distribution*

AGNIESZKA GALA, STANISŁAWA SANAK-RYDLEWSKA

Sorption of Metal Ions from Aqueous Solution on Natural Waste — Literature Review • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

This article presents a review of selected literature data on sorption of metal ions on different natural materials (e.g. fruit stones, nut shells, tobacco dust, algae, seaweeds). The review allows conclude that removal of toxic metals by means of natural sorbents is very promising method. Organic materials used in this process were found to be competitive with refer to commonly used sorbents (e.g. activated carbons). Additionally, important advantage of organic sorbents is possibility of their regeneration.

Keywords: *Sorption, toxic metals, natural sorbents, waste*

ALEKSANDRA GÓRECKA-ZBRONŃSKA, DANIEL ZBRONŃSKI

Comminution of Quartz Sand Grains on the Laboratory Stand of Target-Jet Mill • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The experimental results of comminution process selected size fractions of quartz sand on the laboratory stand of target-jet mill are presented in the paper. Experiment stand makes possible to comminute grains accelerated by the air jet with a single impact, using stationary target. Determined particle size distribution of product makes possible to estimate of quality and efficiency of comminution process. On the basis of experimental results the probable explanation of comminution mechanism of grains in the target-jet mill is presented. The analysis showed that comminution in the mill takes place as a result of percussive cracking and superficial attrition of grains.

Keywords: *comminution, quartz sand, target-jet mill*

ANNA HÓLDA, EWA KISIEŁOWSKA, TOMASZ NIEDOBA

Influence of Heavy Metals on Soil Microflora • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The purpose of the research presented in the paper was to conduct the heavy metals contents in area of tannery plant and to determine their influence on soil microflora. The soil samples were collected to this purpose from the area, which was surrounded by the industrial buildings from one side (tannery, galvanic plant and chemistry plant) and by river Wilga and two small ponds from three remaining ones, which supposedly collect the sewers from these plants. The collected samples were then chemically and microbiologically analyzes. The contents of metals as Cu, Cd, Pb and Zn were determined by coulometric method. On the basis of conducted analyzes it was proved that soil on the researched area was polluted by heavy metals. Mainly chromium contents in every sample was high what means that the tannery wastes occurs in the area of collecting samples. The investigation proved the influence of heavy metals on soil microflora. Various sorts of microorganisms have various tolerance on high metals concentration. The most resistant were ferruginous, nitrificative and denitrificative bacteria, the less resistant were meso- and psychrophilic bacteria and fungi.

Keywords: *soil, heavy metals, toxic metals, soil microflora*

ANNA HÓLDA, EWA KISIEŁOWSKA, TOMASZ NIEDOBA

Participation of Microorganisms in Effluent Transformation • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The paper presents the chemical analysis as well quantitative and qualitative microbiological analysis of sludge stored in the area of municipal wastewater treatment plant. Furthermore, the influence of microorganisms on sludge properties was investigated. By application of ASA method, the following metals contents were determined: magnesium, calcium, lead, cadmium, copper, nickel, mercury and zinc. Furthermore, the biogenous factors were determined, as ammonium nitrogen, overall nitrogen and phosphor. The influence of microorganisms on sludge was also investigated. To this purpose the results given from daily and 3-weekly sludge were compared. The conducted chemical analysis proved that after 3 weeks of storage, concentrations of heavy metals were lowered what may be caused by biochemical activity of microorganisms, which growing amount prove this observation.

Keywords: *sludge, microorganisms, utilization*

TOMASZ KALETKA, MARIAN KURZAC, BARBARA TORA

Flotation of Mixture of Coal From Jankowice and Chwałowice Mines • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The aim of this paper is to define the influence of the admixture of coal from the KWK Chwałowice on the results of flotation in the KWK Jankowice. Research has been carried in the laboratory scale, using two types of collector: Montanol and RF55. Chwałowice coal flotates better than Jankowice coal

Keywords: *coal flotation, KWK Jankowice, KWK Chwałowice, shareable flotation*

EWA KISIELOWSKA, ANNA HOŁDA, TOMASZ NIEDOBA

Removal of Heavy Metals From Coal Medium with Application of Biotechnological Methods • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The important ecological issue is environmental pollution by heavy metals, which are highly toxic substances for living organisms. The paper presents the problems of possible applications of microorganisms in processes leading to removal of heavy metals from various environments, including coals. The processes occurring with participation of microorganisms as biosorption, bioaccumulation, biotransformation, bioprecipitation, biocrystallization and bioleaching, which can be practically applied in removal of heavy metals from coals connected with their recovery were described in the paper. Furthermore, the examples of interesting works from this area of scientific interest, conducted in various research units in Poland were presented.

Keywords: *heavy metals, bioleaching, microorganisms, Acidithiobacillus ferrooxidans bacteria, Acidithiobacillus thiooxidans bacteria, mildew*

ELŻBIETA KONOPKA, EWA KISIELOWSKA

Evaluation and Utilization of the Environmental Conditions in Mineral Dressing by (Bio)Hydrometallurgical Method • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

These are results of research on the possibility of enrichment uranium-bearing shales (black shales and walcchia shales), which at a comparable, trace level of metal-bearing were strongly differed in their geochemical environments, which developed as a result of different compositions of microflora. Research was carried out on the dynamics of growth of micro-organisms most frequently represented in each of the geochemical environments and the associated with varying effectiveness of the leaching. It demonstrated that the enrichment of two radically different raw-shale materials using the biotechnical methods is possible, if taking into account every time changeable, individual and particular method, using the natural biogeochemical conditions of the raw material.

Keywords: *metal-bearing shales, uranium, microorganisms, enrichment*

DAMIAN KRAWCZYKOWSKI, ALDONA KRAWCZYKOWSKA

Influence of Material Density on Balancing of The Hydraulic Classification Products Given by Hydrocyclones on The Basis of The Results of Laser Analyses of Granulation • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The paper concerns the problem of balancing of hydraulic classification products of fine-grained materials on the basis of particle fractions contents in products determined by laser diffraction method. The investigation contained the experiment of classification of fine-grained materials of different densities in hydrocyclones, analysis of particle size distribution of classification products by laser method, determination of the method adequacy and calculations balancing the yields of classification products and their comparison with yields determined in experimental way.

Keywords: *laser granulometric analyzes, balance of classification products*

MAREK LENARTOWICZ, BEATA GRYNKIEWICZ-BYLINA

Laboratory Tests of Flotation of Coal with the Use of RfK-X Flotation Agent • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

Flotation agents determine floatability of coal slimes and decide whether or not flotation can be used as a method for coal slimes beneficiation on an industrial scale. Presently, complex flotation agents are used by the coal industry because they play a role of collector, frother and promoter. Results of laboratory tests of flotation of coal of type 34.2 and 35.1 with the use of new RfK-X comprehensive flotation agent, developed in KOMAG Institute of Mining Technology in collaboration with ReaFlot Sp. z o.o., were presented in the paper. Presented results of flotation of coal from two coal mines and analysis of usefulness of RfK-X flotation agent enabled to conclude that its use allows to obtain coal products of required quality.

Keywords: *coal flotation, RfK-X agent, hard coal*

MAREK LENARTOWICZ, DANIEL KOWOL, MICHAŁ ŁAGÓDKA

Method of Selection of Screen Decks for Pulsatory Water Jigs • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

Additional control of parameters of pulsating water flow in a system of distribution of compressed air that is delivered to each pulsating chamber, is required to increase efficiency of washing process. Type of jig's screen decks is one of factors that decide about efficiency of coal feed washing process. Present results from laboratory tests on impact of screen deck parameters on pulsating movement of water have shown that proper selection of screen deck has positive impact on characteristics of oscillating water flow. The paper presents a proposal of the method for selection of screen decks of KOMAG jigs developed on the basis of laboratory tests carried out in KOMAG Institute of Mining Technology. Range of application of screens of different parameters, presented on the basis of laboratory tests results and analysis of separation process in pulsatory water jigs, in relation to washed material characteristics and conditions of washing coal feeds, has shown that it is possible to increase washing efficiency through a proper adaptation of screen deck design for two main technological operations i.e. separation of material and product discharge.

Keywords: *water jigs, screening areas, oscillatory water flow*

ALEKSANDER LUTYŃSKI

Foresight for Prioritized and Innovative Hard Coal Waste Disposal Technologies • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

Work performed in the scope of a project "Foresight for prioritized and innovative hard coal waste disposal technologies" which is carried out by Research Consortium i.e. Institute of Mechanized Construction and Rock Mining as a coordinator, AGH University of Science and Technology and Silesian University of Technology as partners is presented. Genesis, assumptions, goals and stages of a project are presented. Results analysis of innovation of proposed technologies of waste disposal and work plan for the further stages of the project are shown. For the purpose of analysis five criteria of innovation level were adopted. Particular criteria were attributed to following weights describing its importance: Criterion of current technological (technical) level referred to other advanced technical domains (materials, automation, information technology, management, etc.) — weight: 0,25; Criterion of technology efficiency referred to external conditions — weight: 0,15; Criterion of technology versatility referred to technology and application conditions — weight 0,10; Criterion of negative environmental impact minimization — weight: 0,25; Criterion of occupational safety and health — weight: 0,25. Each of the beneficiation technologies had a preferential grade scale in the range of 0 to 3. Particular grades were attributed to the following technological advance: 0 — useless technology, 1 — technology with limited usability, 2 — useful technology, 3 — very useful technology.

Keywords: *Foresight, hard coal waste, innovative disposal methods*

ALEKSANDER LUTYŃSKI, JAN SZPYRKA

Disposal of Fine Tailings from Hard Coal Beneficiation • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

In the article the issues related to fine tailings produced as a result of hard coal beneficiation process are presented. The amount of waste produced as a result of coal extraction, features of fine tailings and mineralogical-petrographic composition are given. Possible methods of fine tailings usage are also presented. Results of research of fine tailings from three coal slurry impoundments of energetic coal, one flotation tailings pond of coking coal and one water pond are shown. Presented results allow to assess the possibility of tailings usage. It was demonstrated that coal slurries from energetic coal can be used as a fuel for fluidized bed combustion. The results of research show that it is possible to reprocess flotation tailings stored for a long time in a pond using again flotation methods. It is necessary however to choose the right froth agent and its proper concentration in a process. It was also demonstrated that tailings deposited in a water pond have properties that allow their energetic usage. The purpose and assumptions of a new development project "Identification of energetic potential of coal slurries deposits in national fuel balance and strategy of technological development in the range of their usage" carried out by Institute of Mechanized Construction and Rock Mining division "Centre of Waste Disposal" in Katowice in cooperation with Department of Mineral Processing and Waste Disposal of Silesian University of Technology are presented. The purpose of a Project is to assess the possibility of including existing coal slurries deposits into national fuel balance. A project

is in accordance with 2006/21/WE Directive of European Parliament and Commission regarding the management of waste from extractive industries and Act from 10th of July 2008 (Dz.U. z 2008 r. Nr 138, poz.865) regarding extractive waste that transposes Directive 2006/21/WE into polish regulations.

Keywords: *hard coal, fine tailings*

EWA MAŁYSA, ANNA IWAŃSKA

Influence of Velocity of the Air Bubbles on Results of the Coal Flotation • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The paper presents results of studies on influence of the air bubbles velocity on results of the coal flotation in solutions of 1-hexanol and the technical reagents; centifroth, flotanol, montanol and octanol. The reagents applied are the surface active compounds and therefore they adsorb at the solution-mineral grain and solution-gas interfaces. Due to their adsorption at the solution-gas interface the velocity of the rising bubbles can be lowered from 32,7 cm/s in tap water to ca. 16 cm/s in solutions of the reagents studied. For each of the reagents studied there was determined a definite concentration above which the bubble velocity started to be constant. These concentrations are different for the reagents studied and for example in the case of 1-hexanol this concentration (10^{-1} g/dm³) is 100 times higher than that one (10^{-3} g/dm³) needed in the case of the technical reagents. A correlation between variations of the flotation results and the bubble velocity was observed in the case of 1-hexanol. The coal recovery was increasing when the bubble velocity was decreasing with 1-hexanol concentration. In the case of the technical reagents the bubble velocity was lowered to the value of ca. 16÷17 cm/s at their lowest dosage of 250 g/Mg applied in the flotation tests. It indicates that even this low dosage of the technical reagents was sufficient for a complete retardation of fluidity of the solution-gas (bubble surface) interface.

Keywords: *1-hexanol, technical reagent, coal flotation, bubble velocity*

JOLANTA MARCINIAK-KOWALSKA

The Meaning of Mineral Processing in Coal Gasification • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The paper discuss the national coal resources and origin of trace elements in coal and their characteristics. The pollution associating coal deposits and coal gasification processes were discussed. Furthermore, the purpose of coal gasification and possibility of application of mineral processing methods as the most efficient ones to obtain coals prepared to gasification were presented.

Keywords: *hard coal, lignite, coal resources, clean coal technology, coal gasification process*

ANDRZEJ MITURA

Initial Investigations over the Possibilities of Worked Oils Application as Component to Fuel Production • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The paper presents the law regulations concerning directions and possibilities of application and treating the worked oils. The initial results of investigations over oil applications as component to fuel production were presented, taking into consideration other wastes as coal slurry, wood shavings and sludge.

Keywords: *wastes, worked oils, fuel*

REMIGIUSZ MODRZEWSKI, PIOTR WODZIŃSKI

Oscillating Motion of a Double-Frequency Screen • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The present study demonstrates the results of the research programme carried out at the Department of Process Equipment, Technical University of Lodz, and concerns double-frequency screens. It is widely known that the

shape of trajectory in the oscillating motion of the screen has a relevant meaning for obtaining of the best processing properties of the machine. Therefore, the trajectories of oscillating motion, which will lead to the intensive segregation of the grain layer moving on the sieve, have been searched for a long time. Seemingly, it is possible to obtain a double-frequency screen. Two rotational vibrators of the same or different static moments are applied for the drive of such a screen. As the name indicates, it is a screen which is characterised by two different rotational speeds of those drive vibrators. Presented investigations were aimed at the determination of the experimental screen kinematics on a semi-technical scale. On the basis of the research results the design assumptions of the industrial machine aimed at fine-grained screening have been elaborated.

Keywords: *screen, screening, sieve*

ALICJA NOWAK, BARBARA TORA, ZBIGNIEW TAJCHMAN, BARBARA PESZKO

Investigation on Possibilities of Glass Recycling Residue Utilisation in Sandstone Aggregate Production
• Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

Glass recycling uses less energy than manufacturing glass from sand, lime and soda. Every metric ton of waste glass recycled into new items saves 315 additional kilograms of carbon dioxide from being released into the atmosphere during the creation of new glass. Glass wastes, which can be recycled not are allowed to contain: monitors, window glass: car glass, mirrors, lamps, crystal articles, ceramics, glass decorative units, ceramic waste of china, breakage, soil, metals, glass from kinescope lamps. The results of investigations were introduced over possibility of utilization of glass wastes which can not be used as standard glass breakage. The proposal of residue of glass waste recycling as sandstone aggregate compound was tested.

Keywords: *glass recycling, sandstone aggregate, glass production*

TOMASZ OLEJNIK, AGNIESZKA SUROWIAK,
TOMASZ GAWENDA, TOMASZ NIEDOBA, TADEUSZ TUMIDAJSKI

Multidimensional Coal Characteristics as the Basis to Evaluation and Adjustment of Its Beneficiation Technology
• Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

Quality of trade products (thick and medium assortments and fine coals) being produced in production cycle depends mainly on quality and state of coal deposits, methods of treating coal fields as well technologies of yield beneficiation. The high quality of coal beneficiation processes causes production of better concentrates and adjustment of quality and state of coal deposits by introduction proper methods of coal fields processing may lead to lowering amounts of wastes produced by mine as well lowering the charge for devices and machines of technological system. This may influence on lower failure rate and limitation of coal production costs. Generally, there are four basic coal beneficiation systems [12] taking into consideration their coal contents (coals classification), while the most complex beneficiation system is the one connected with coking coals. The paper presents the multidimensional analysis of coal on the basis of energetic coal and coal originated, among others, from mine "Bielszowice".

Keywords: *coal, energy, beneficiation, multidimensional analysis*

JOACHIM PIELOT

Analysis of Maximum Production Value in The Different Size Distribution of Power Coal in Jigs • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

Coal preparation plants are currently considering the introduction of more complex control procedures. Maximization of yields of desired quality saleable products or optimization of total economic effect of the plant production are main tasks for control systems at present. Design of such systems requires a thorough understanding of the whole technological process, its characteristics and interaction among unit operations in the plant. Computer simulation is a convenient tool for designing and evaluating complex coal preparation processes. It enables determination of expected results of coal processing and selection of an optimal strategy of the control of the whole plant [4]. In design of the coal preparation process control systems the computer simulation models are very useful. Computer

simulation allows considering, in an efficient way, various variants of technological system solutions, analysing conditions of preparation process course in case of commercial contracts changed and while raw coals characteristics are changed [4]. In the paper an application of computer simulation program for coal preparation processes analysis and their control has been presented. The integral part of this software is an algorithm of searching the function algorithm of control target, i.e. the maximum production function of preset quality. The procedure how to determine the maximum production value has been presented in four exemplary technological systems with one, two or else three jigs. Results of power coal enrichment in considered technological systems have been presented in the paper. For four version of technological scheme and different production foredesign the optimal separation densities for each jigs have been calculated. The basic difference between four technological systems is connected with different size distribution of raw coal. Relative production value in considered cases have been show.

Keywords: *coal jigging, control of technological processes, optimization of coal preparation processes*

JOACHIM PIELOT

Effects of Power Coal Preparation in Two Parallel Jigs • *Kwartalnik Górnictwo i Geoinżynieria* • z. 4/1, 2010

Stabilization of coal quality parameters is an important technological problem especially in the presence of variable raw coal characteristics such as coal size distribution and its washability. Local control systems for gravitational preparation processes have been introduced (the control of the density of separation in heavy media vessels and the refuse discharge in jigs) to compensate the influence of various disturbances on the performance of technology. The main task of these local control systems is to stabilize technological chosen parameters on the desired level, which makes it easier to keep the quality of coal within the limits of declared price and allows to control final products parameters according to the terms of the contract. Concentrates of steam or coking coal are often produced in a system of parallel processes of coal separation in heavy media vessels, jigs and flotation. In such a system there usually exists an optimal point of work (global extremum) for which the maximum amount of the final concentrate with desired ash content can be obtained. The final product of desired quality (ash content) can be produced for various set values of the densities of separation in both processes so that the blending of two components would give product of desired quality. Further analysis will show that the considered system has the characteristic of the extreme object i.e. that for the desired ash content in the product it is possible to choose optimal separation densities for which the system produces the maximum amount of the blend or the maximum value of the product [1]. In the paper an application of computer simulation program for coal preparation processes analysis and their control has been presented. The integral part of this software is an algorithm of searching the function algorithm of control target, i.e. the maximum production function of preset quality. In the paper is presented results of analysis part of coal preparation system, that is two jigs. These results relate detailed analyses one of certain of plant reviewed in the study [11]. Value of separation density was desired in one jigs, but in second jigs the value of separation density was calculated as optimum value. The density of separation in jigs can be changed indirectly, for instance by the adjustment of the float position linked with refuse removal gate. Relative values were given to the production for examined cases of enriching.

Keywords: *coal jigging, control of technological processes, optimization of coal preparation processes, parallel processes of coal separation*

IRENEUSZ PYKA, KRZYSZTOF WIERZCHOWSKI

Problems with Mercury Contained in Hard Coal • *Kwartalnik Górnictwo i Geoinżynieria* • z. 4/1, 2010

The paper concerns the issues associated with the mercury emissions to the environment during hard coal utilization processes. The basic reason for undertaking the topic of mercury in coal and for writing the paper was the disproportion between the statistical data on the amounts of utilized coal and the mercury emissions in the USA and Poland. The authors point out the divergence between published statistical data on mercury emissions in Poland. The divergence, possibly, results from the lack of reliable data concerning the mercury content in utilized coal. The literature review shows, that the mean mercury content in hard coals, exploited in Poland, can be assessed from 70 to 350 ppb. Such data divergences on the mercury content in Polish hard coals can not constitute the basis for reliable assessments of the quantity of mercury emitted to the air due to coal utilization. Additional difficulties have been arising from the lack of knowledge on the mercury distribution in raw coal and from only partial steam coal cleaning in Poland. There is also the lack of detailed knowledge concerning the behavior of mercury during the cleaning

of Polish hard coals. Additionally, the impacts of mercury bearing mining, coal preparation and power industry wastes, are poorly recognized.

Keywords: *hard coal, mercury, mercury load in coal, mercury emissions, mercury load and emissions limitation*

DANIEL SARAMAK

Analysis of Relationships Between Technological Parameters of Roller Presses with Using the Factor Analysis • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

Chosen issues concern the multi dimensional analysis and their potential application for modeling of comminution processes in roller presses were presented in the article. The comminution process in HPGR can be described with using many technical and technological parameters and indices, which are mutually connected. The presented approach assumes the investigation over the structure of analyzed variables, and presents the interpretation consisted in marking off the factors related to the input variables (operating parameters of the comminution process). The model characterizing the issue, obtained as a result of research, makes easier the interpretation of the process under analysis.

Keywords: *High-pressure Grinding Rolls, factor analysis*

ZBIGNIEW TAJCHMAN

The Influence of Environment Changes on Finest Particles Aggregation in Classification Process • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

In an ideal deterministic flowing determination process model, many assumptions are introduced, what often results in impossibility of determination a priori characteristics of the process. In classical process theory, the behavior of a single, separated circular particle is considered, without taking into account the interactions between particles themselves, as well particles and classifier walls. That makes the interpretation of the results determined for single particles as the results for their set inadequate. The paper presents what is the influence of hydrogen ions concentration changes in environment where the elutriation process occurs on the values of electro-kinetic potential on the basis of the materials. The changeable values of the suspension *pH*, influence significantly on the ability of finest particles coagulation aggregation, so on classification results.

Keywords: *vertical stream classification, physicochemical parameters, ultrafine grains*

ARKADIUSZ TOMAS, PIOTR MATUSIAK, MARIUSZ BAL

Automatic Industrial Sample Collectors for Friable Materials • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

Technologies of beneficiation being applied in mineral processing plant tend to getting final product of characteristics required by customer. The product control requires application of reliable and objective laboratory methods. The collection of control samples in qualitative analysis should be dependable on subjective analyst evaluation. That is why the sampling process is going to automation.

Keywords: *sample collectors, sample representativeness, sampling*

BARBARA TORA, PETER FECKO, ALICJA NOWAK, ZBIGNIEW TAJCHMAN

Investigation on Dependence of Grindability on Chosen Parameters of Hard Coal • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

One of the characteristic of coal which is important in energetic is coal grindability — use of energy needed for milling. This paper focuses on investigation of dependence of coal physicochemical characteristics on grindability

(Hardgrove index). 21 samples from Poland, Czech Republic, Russia and Colombia were examined. It was noticed that grindability depends only for coal which origin from one deposit.

Keywords: *Hard coal, grindability, Hardgrove index*

KRZYSZTOF WIERZCHOWSKI, IRENEUSZ PYKA

Correlation Between Mercury and Sulfur Contents for Some Raw Hard Coals Extracted in Poland • Kwartalnik Górnictwo i Geoinżynieria • z. 4/1, 2010

The paper discusses the correlations between the mercury content and the total sulfur content for hard coal exploited in 5 polish collieries. It has been revealed, that such correlation doesn't exist considering whole data population (for 5 collieries). The limitation of analyzed input data to the single colliery data set has enabled, for some coals originated from the single colliery, to reveal strong statistical correlation between the mercury content and the total sulfur content in coal. For these examples regression analyses can be used for the prediction of the mercury content in given coal basing on the known information on the total sulfur content in coal.

Keywords: *hard coal, mercury, sulfur, correlation*