Summaries

JANINA GRODZKA, *ANDRZEJ POMIANOWSKI*

How Thermodynamics and Mechanics See Microscopic and Molecular Nature of Wetting · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

Recent studies on wetting lead to the two most important conclusions:
1) description (estimation) of wettability needs the knowledge of not only the macroscopic wetting angle but also of the nature of molecular aqueous films that occupy surfaces of all solids;
2) mechanical equilibrium of the wetting process is generally much more rapidly established than the thermodynamic equilibrium of the whole system. In consequence, the macroscopically measured wetting angle is different from the equilibrium angle, when the thermodynamic equilibrium and the formation of the molecular water film on the solid are not attained.

Rapidly proceeding investigations of molecular wettability, carried out with the use of AFM (atomic force microscopy), will lead in the near future to unification of the theory and practice of wetting, and in particular will solve the question of the hysteresis of wetting, resulting from changes in the structure of water, directly adjacent to the surfaces of solids.

Keywords: *wetting, hydrophilicity, hydrophobicity, contact angle, hysteresis, water structure, solid surface*

MAREK LENARTOWICZ

The Relationship between Surface Tension of Wetting and Ash Content of Fine Coal Particles · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

Surface tension of wetting in products obtained from sampling of IZ type flotation machines by film flotation method has been investigated. The obtained results allowed to calculate the equations of regressions which characterize the dependence of surface tension of wetting of particles on the ash content of different rank of coal with the comparatively high correlation coefficient. The equations describing this dependence and research results let us carry out considerations about the relationship between surface properties of particles (surface tension of wetting) and the ash content in the particles. The outcomes of surface tension of wetting calculations of given particles fractions and their ash content showed independently that there exists certain dependency. When the ash content of particles rises, the surface tension of wetting is also higher. This dependence may be used for analysis of work of flotation machines.

Keywords: *coal flotation, IZ type flotation machine, surface tension of wetting, film flotation*

ALEKSANDER LUTYŃSKI

Noise Measurements at Production Stands of the Coal Processing Plant · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

In the article measurements of noise level in hard coal processing plants are presented. Apparatus and results of noise measurements at selected thirty six production stands characteristic for coal processing plants are presented. The results of investigation of five employees subjected to noise while moving at the plant are described.

Keywords: *noise, devices measuring noise level, hard coal processing*

JOLANTA MARCINIAK-KOWALSKA, EDYTA WÓJCIK-OSIP

Investigations of Using Possibilities of Lamella Packets to Flotations • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2007

The paper presents the results of coal suspensions flotation laboratory research in the cell with lamella packets. In the presented investigations, the lamella packets of various working surface and various inclination angles (60° and 90°) were applied. The obtained results of laboratory research show that the effect of, approximately 5 times, increasing of flotation cell surface cause the growth of process efficiency, sustaining the comparable ash contents in flotation concentrates. This may cause the improvement of flotation process economics in future. The applications of packets with inclined to surface by angle 90° influence only on the stabilization of flowing conditions, slightly improving the process efficiency in comparison to the flotation without lamella packets.

Keywords: *flotation of coal suspension, lamella sedimentation, lamella packets*

TOMASZ NIEDOBA

The Evaluation of Ash Contents in Coal Beds by Application of Non-Parametric Statistical Methods • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2007

The paper presents the distribution of ash contents in coal, treated as the mixture of distributions taken from the individual coal beds. In purpose of their approximation, apart from traditional log-norm distribution function, the non-parametric statistical methods were applied: kernel method and orthogonal Fourier series method. The best results of approximation were then mixed and the risk probability of evaluating the ash contents in the whole deposit was estimated.

Keywords: *ash contents in coal, approximation, non-parametric statistical methods*

JOACHIM PIELOT

Estimation of Power Coal Enrichment in Cyclones with Recirculation of Intermediate Product • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2007

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. The procedure how to determine the maximum production value has been presented in two exemplary technological systems with recirculation of intermediate product. System analysis has been accomplished using computer simulation software of coal preparation processes, which makes possible multivariant analysis and estimation of effects of preparation operations of technological systems. 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. Results of power coal enrichment in technological system with recirculation of intermediate product have been presented in the paper. For two version of technological scheme and different production foredesign the optimal separation densities for each gravitational separator (water only cyclones and dense medium cyclones) have been calculated. Relative production value in considered cases have been show.

Keywords: *coal preparation technological system, control of technological processes, production optimization, recirculation of intermediate product*

ANDRZEJ PŁONKA, ZYGMUNT ŚMIEJEK

Non-conventional Solutions in Coal Processing • Kwartalnik Górnictwo i Geoinżynieria • z. 4, 2007

Considering and describing problems of raw coal processing the following conclusions can be reached:
— in common known and used technologies of coal feed preparation a technology modules for coal processing of grained building aggregates out of waste rock is not noted,
— so far disludging of raw coal feed in a washer jig before processing takes place for grain size exceeding 0,5 mm,
— so far processing in a washer jig is carried out for a majority of grain sizes over 0,75 mm,
— no effective proposal of classification and sludge dewatering for size over 0,05m are noted.

The proposals presented in this article, being a trial of its authors to optimize processing, are based on the following findings:

— raw coal quality when considering ash contain is decreasing, processing installations are not modernizing in a proper manner, therefore technology installation improvement requires constriction of new modules for stone removing which can not be carried out as per analogy to the existing solutions,
— common used desludging of raw coal has been replaced by effective process applied for grain size much bigger to the existing so far,
— processing in a fine jig is carried out for size over 0,2 mm,
— classification and dewatering of sludges being processed is carried out in an innovative manner for grain sizes over 0,05 mm.

This article presents new model of technology and equipment as well as modern approach to raw coal processing.

Keywords: *mineral processing, coal, mineral aggregates, enrichment, slurries, environmental protection*

DANIEL SARAMAK

Work Effects Simulations of Technological Copper are Preparation Systems with Using of Technological and Economical Criterious · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

Procedures of simulation are helpful in the analysis of processing plants work, which is the entire step for optimization of enrichment system work. The simulation can be carry out on the basis of either technological or economic criteria in dependence on need. Such procedure, additionally completed by the quality changeability analysis of ore (content of copper α) will be both more precise and based on realities of conducted enrichment process. In the article the simulating procedure conducted for three ore processing plants in KGHM based on real characteristics of enriched ores were presented.

Keywords: *simulation of enrichment processes, technological and economic optimization, cost of processing*

DANUTA SZYSZKA

Mechanical Flotation of Hydrophilic Particles in the Presence of Frother · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

The paper describes a method for assessment of ability of flotation frothers for mechanical entrainment during bubbling of air through suspension of hydrophilic particles. The method consists of measurement of particle recovery in laboratory flotation cell at various flotation times and frother concentrations. The result of the measurement is a characteristic number, which describes mechanical flotation of mineral particles after a long flotation time at such frother concentration at which the entrainment does not increases any further). The characteristic number for methylisobutylcarbinol (MIBC) characterizing the recovery of quartz in the investigated flotation machine was equal to 32%.

Keywords: *flotation, mechanical recovery, mechanical carryover, entrainment, frother*

BARBARA TORA, *MARIAN KURZAC*

The Possibility of Waste Utilization as Grinding Aids for Klinker Milling · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

The qualification of the possibility of waste utilization as milling aids for clinker milling is the aim of the work. The surface active substances which was the mixture poliglikols was the studied addition to milling. This substance this is the waste from the biodiesel production. The investigations were conducted in the laboratory bowl-roll mill, adapted to the measurement of energy consumption.

Keywords: *clinker, milling, milling aids, wastes poliglikol*

TADEUSZ TUMIDAJSKI, *DANIEL SARAMAK*, *TOMASZ NIEDOBA*

Mathematical Aspects of the Description and Estimation of Copper are Benefications · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

The investigations over ores selectivity are the basis for designing of technological systems of its enrichment, and also can be helpful at introducing changes of operating conditions for specific enrichment processes. The key

problem is working out the principles of industrial enrichment results forecasting on the basis of laboratory results. In this matter useful can be statistical investigations based on the approximation of selectivity curves as well as specification of parameters characterizing the enriched feed. The article is devoted to chosen issues connected with suitable use of selectivity curves.

Keywords: *ore enrichment, selectivity curves, approximation of selectivity curves, the level of mineral liberation*

PIOTR WODZIŃSKI

Elastic Rubber Suspensions for Screens and Vibratory Feeders · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

Elastic rubber suspensions are an alternative to steel springs (mainly helical springs) which are used in vibratory machines. The paper refers mainly to screens and vibratory feeders, which are generally applied in industry. The rubber suspensions in the form of e.g. rubber sleeves have been known and used for long in screens and vibratory feeders. Their advantages and disadvantages are generally known and therefore many machine-building plants use these elastic elements. However, beside basic elastic elements, there are also other ones which will be discussed in this paper. Their characteristic features are positive; the technology of their production is similar to that of rubber sleeves, but advantages of the operation should instigate machine designers' interest in them and should make them applicable in feeders and screens.

Keywords: *rubber suspensions, screening, mineral processing*

DANIEL ZBROŃSKI

Analysis of Comminution Mechanism of Grains in the Fluidized Bed Opposed Jet Mill · Kwartalnik Górnictwo i Geoinżynieria · z. 4, 2007

The basis of comminution mechanism of grains in the fluidized bed opposed jet mills aren't satisfactory explained. It results from the difficulties to determine the influence of all parameters process on the evolution of particle size distribution of milling product. The theoretical analysis and experimental results for grinding tests of limestone on the laboratory fluidized bed opposed jet mill are presented in the paper. The aim of research was to explain the influence of initial graining fed material on the comminution mechanism of grains in the grinding chamber of mill. The analysis showed that comminution in the mill takes place as a result of superficial attrition of grains, dynamic breakage of grains and cleavage of grain agglomerates.

Keywords: *grinding, fluidization, mechanism of comminution, fluidized bed opposed jet mill, limestone*