Peng, B., Chan, P.K.L.  
Flexible organic transistors on standard printing paper and memory properties induced by floated gate electrode  

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Abstract
Integrating electronic devices with unconventional substrate has been a popular research direction. Among these substrates, cellulose fiber paper has advantages in low-cost, recyclable and bio-degradable. We demonstrated directing printing of all contact electrodes on standard untreated Fuji Xerox printer paper without using planarization layer. The screen-printed gate electrodes based on silver nanoparticles can smooth out the paper substrate surface by two orders of magnitude and allow us to use parylene and DNTT as the dielectric and active layer directly. The transistors show average mobility of 0.297 cm² V⁻¹ s⁻¹ and on/off ratio larger than 10⁵. The low leakage current allows us to demonstrate memory properties by employing the floated gate method. The devices show excellent memory retention time for more than 10,000 s. The unique flexibility and combustibility of the organic transistors on paper substrate manifest their applications as next generation of green electronics. © 2013 Elsevier B.V. All rights reserved.

Author Keywords
Cellulose fiber paper; Floated gate; Memory; Screen-printing

Index Keywords
Cellulose fiber, Floated gate, Low-leakage current, Memory retention time, Orders of magnitude, Organic transistor, Planarization layers, Silver nanoparticles; Data storage equipment, Dielectric materials, Refractory metal compounds, Silver, Substrates, Textile fibers; Printing; Cellulose Fibers, Paper, Silk Screen Printing, Silver, Substrates, Textile Fibers

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Selection of biodegradable plastics, i.e. biologically degradable materials, appears to be a possible solution for an ever growing production of plastic wastes as the biodegradable plastics shall have a substantially lower environmental impact and be able to at least partially substitute the production of plastics from oil derivatives. Currently, a promising direction seems to be the development of a polymer on the base of lactic acid, called polylactic acid (PLA). Packaging made from the material, mainly drinks bottles, could be used on a mass basis in the future. Such generated waste will have to be recycled, which shall bring problems connected with separation of biodegradable material from common plastics. This paper deals with the issue of separation of PLA from PET (polyethylene terephthalate). Mixing the above mentioned plastics in the recycling process leads to their devaluation. Due to the occurrence of PLA material the quality of the feedstock decreases during recycling PET bottles. The currently implemented research at the Institute of Environmental Engineering of Mining Faculty - Technical University of Ostrava examines the possibilities of separating the two materials by means of flotation. This method has brought a partial success, more effective results are expected after its optimization.

Author Keywords
Biodegradable plastics; Flotation; PET; PLA

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Janošková, K., Müller, G.

**Biosorption of cadmium from aqueous solutons using orange peel, walnut and hazelnut shell**

Technical university in Košice, Slovakia

**Abstract**
Biosorption of Cd(II) ions from aqueous solutions has been studied and determined to adsorption capacity. The experimental data obtained from batch equilibrium tests have been analyzed by three two-parameter (Freundlich, Langmuir and Temkin) isotherm models, four three-parameter (Redlich-Peterson, Sips, Toth and Khan) isotherm models and kinetic models including the pseudo-first order and pseudo-second order. The adsorption data fit well with Temkin isotherm for orange peel and Freundlich isotherm for walnut and hazelnut shell. Maximum experimental adsorption capacity was found to be 13.947, 8.57 and 8.847 mg/g for orange peel, walnut shell and hazelnut shell, respectively. Experimental kinetics data was well-fitted for pseudo-second order for all adsorbents and correlation coefficient for kinetics was above 90%. © SGEM2011 All Rights Reserved by the International Multidisciplinary Scientific GeoConference SGEM.

**Author Keywords**
Biosorption; Cadmium; Isotherm; Kinetic

**Index Keywords**
Adsorption capacities, Adsorption data, Batch equilibrium, Correlation coefficient, Experimental kinetics, Freundlich isotherm, Pseudo second order, Temkin isotherm; Biosorption, Cadmium, Citrus fruits, Exhibitions, Isotherms, Kinetics, Shells (structures); Cadmium compounds

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Technical university in Košice
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Abstract
There is a steadily growing trend of looking for new possibilities of CCPs utilization with the aim to substitute non-renewable natural resources. The Research Institute of Building Materials has been interested in these problems for a long time and it has been solving many projects in this field. One of them is Research centre for integrated system development concerning utilization of by-products of energy resource mining and processing. In addition to ecological and technological questions, this project also describes economic assessment of newly designed building products made from CCPs. Economic point of view is often a barrier for successful entry into a market. This paper mainly focuses on economic utilization of fly ashes in production of artificial aggregates and dry mortar mixes.

Author Keywords
Building products; Coal combustion product; Economics

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  Technologie przeróbcze uszlachetniania, zawierajqeych części palne, popiolów lotnych z węgli kamiennych spalanych w elektrocieplowniach
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Material transportation by belt conveyors is widely used in many industrial branches including mining plants. Belt conveying development during the last year was oriented mainly on construction of belts. The consequence of this is the improvement of its manufacture qualities bringing down the costs for their exchange and maintenance. Despite the fact that there are some theoretical calculations based on standards it is common in the industry that the belt is not properly selected or it is overdesigned or number of its types is too large what can lead to increased costs for its storage. The paper describes the optimization of number of belt types in mining company SIDERIT, s. r. o. Nižná Slaná by the method of modernization and unification of belts under practical skills and projecting based on theoretical calculations.

Author Keywords
Belt optimization; Conveyor belt designing; Material flow; Mining industry

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Abstract
Main obstacle using of fly ashes in building, that is its main consumer, is the residue of unburned coal; it is expressed of loss on ignition - LOI. In present, the valid STN and EU standard limits the content of LOI to 3 - 5 %, in national conditions maximum 7 %. Application of processing technologies also has to assure utilization of fly ash that provides a possibility of complex utilization of individual products obtained by modification. By means of corona separation, based on different conductivity of individual fly ash elements, it is possible to separate unburned coal particles. The fly ash sample from black coal burning in melting boiler that was deposited on fly ash deposit, content of LOI of dielectric particle 6,45 % at 61 % weight yield was achieved. In the samples taken from dry taking of fly ash the non-conducting product contained 7,72 % of LOI at 73 % of weight yield.

Author Keywords
Fly ash; High tension separation; Magnetic separation; Unburned carbon

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The use of industrial waste as a secondary raw material in restoration plaster with thermal insulating effect

Abstract
The article describes the results of an experimental research dealing with the use of industrial waste in the form of secondary raw material - polyurethane foam after the end of its life cycle, as a 100% substitute of filler in restoration plaster with thermal insulating effect. The article presents the formulas of restoration plaster and its properties. They are: mortar consistency, volume weight, strength characteristics, thermal conductivity coefficient, coefficient of capillary water absorption, porosity and resistance against salts. © (2014) Trans Tech Publications, Switzerland.

Author Keywords
Physical and mechanical properties; Plaster; Recycling; Rigid polyurethane foam

Index Keywords
Binders, Plaster, Recycling, Restoration, Rigid foamed plastics, Thermal conductivity, Thermal insulating materials; Capillary water absorption, Experimental research, Physical and mechanical properties, Rigid polyurethane foams, Secondary Raw Materials, Strength characteristics, Thermal conductivity coefficient, Use of industrial wastes; Strength of materials

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Silarova, P., Pertile, E., Surovka, D.

New medium heavy-based sorbent porosorb based on industrial waste

Institute of Environmental Engineering, VSB-Technical University of Ostrava, Czech Republic

**Abstract**
The theme of this article is concerned with the utilization of waste from grey cellular concrete production. This waste is crushed by swing-hammer mill and the final waste product is sanitary crushed material with grain size of 0.5 - 2 mm. This crushed material was tested for sorption and neutralizing capacity. The results obtained were compared to those sorbents currently used in practice. It has been shown that the new sorbent achieves the same level, in some cases higher, as usual sorbents. © SGEM2013 All Rights Reserved by the International Multidisciplinary Scientific GeoConference SGEM.

**Author Keywords**
Cellular concrete; Sorbent; Waste

**Index Keywords**
Cellular concretes, Crushed materials, Grain size, Waste products; Concretes, Exhibitions, Sorption, Wastes; Sorbents

**References**
Ondova, M., Stevulova, N.  
**Benefitsofcoalflyashutilization in the area of a pavementbuilding**  

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**Potential of selected industrial wastes in civil engineering applications**  
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Electrokinetic potential for characterization of nanosctructured solid flat surfaces


Kolská, Z.a, Kasálková, N.S.b, Siegel, J.b, Švorčík, V.b

Abstract

Electrokinetic potential (zeta potential) is a characteristic parameter for description of the surface chemistry of solid flat materials and it can be used for a fast analysis of materials modified by different chemical or physical methods. Due to its sensitivity, zeta potential is able to distinguish surface modified by coating with monolayers of various materials or nanostructures created after plasma treatment. Also metal nanostructures deposited on surfaces can be characterized by zeta potential. It can also be used for isoelectric point determination of materials. We present data on zeta potential in 0.001 mol/dm3 KCl at constant pH ≈7.0 and also in pH range (2.5-7.0) for isoelectric point determination for pristine polymers PET, PTFE, PS, LDPE, HDPE, PLLA, PVF, PVDF, PMP and polyimides (Upilex R, Upilex S, Kapton). The zeta potential of selected polymers, modified by plasma and by chemical coatings (e.g. by biphenyldithiol or polyethylene glycol) or by gold deposition was measured too. Zeta potentials of these modified materials were also studied to confirmation that electrokinetic analysis is acceptable method for their fast description. © (2013) Trans Tech Publications, Switzerland.

Author Keywords

Cell adhesion and proliferation; Electrokinetic potential; Gold deposition; Plasma treatment; Polymers; Surface modification

Index Keywords

Electrokinetic analysis, Electrokinetic potentials, Gold deposition, Iso-electric points, Metal nanostructure, Modified materials, Plasma treatment, Pristine polymers; Cell adhesion, Characterization, Chemical analysis, Coatings, Deposition, Gold, Nanostructures, Plasma applications, Polyethylene terephthalates, Polyimides, Polymers, Surface chemistry, Surface treatment, Surfaces; Zeta potential

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Properties of gold nanostructures sputtered on glass
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**Variable surface properties of PTFE foils**  

Škvarla, J., Luxbacher, T., Nagy, M., Sisol, M.  
**Relationship of surface hydrophilicity, charge, and roughness of PET foils stimulated by incipient alkaline hydrolysis**  

Kasálková, N., Makajová, Z., Parízek, M., Slepička, P., Kolárová, K., Bačáková, L., Hnatowicz, V., Švorčík, V.  
**Cells adhesion and proliferation on plasma-treated and PEG-grafted PE**  

Slepička, P., Kolská, Z., Náhlík, J., Hnatowicz, V., Švorčík, V.  
**Properties of Au nanolayers on polyethyleneterephthalate and polytetrafluoroethylene**  

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The technology of the underground coal gasification (UCG) is still under development and provides alternative for conventional underground mining. UCG is the process, which can be attractive from environmental and economic aspect and is able to have a wide utilization in the future. This technology is less expensive than conventional mining. For research and good analyze of this process there was created the physical model of the gasifier, that simulate the conditions of the real coal-bed in geometric similarity. On created physical model was performed a several experiments represent a various underground conditions. In the gasification process the input is the coal (coal-bed) and oxidizer (mixture of the air and oxygen), which suitable combination provides the best conditions for gasification. One of the expected outputs from the coal gasification process is the high temperature in the coal-bed, which enable running of the chemical reaction needed for the syngas generation. The control of this temperature in the single places of the coal-bed would enable to control behavior of the chemical reactions so the burning queue proceeds. The measurement of the temperatures inside the coal-bed is still complicated because there is the high thermocouples mortality in aggressively hot environment. For this reason is needed to use mathematic -physical apparatus for indirect measurement of these temperatures. In this contribution is presented proposal of the indirect temperature measurement structure in the coal-bed that was verified in the laboratory conditions on the experimental gasifier. © 2013 IEEE.

Author Keywords
indirect measurement; physical model; temperatures simulation; UCG

Index Keywords
Gasification process, Geometric similarity, Indirect measurements, Laboratory conditions, Physical model, Syn-gas generation, UCG, Underground coal gasification; Carbonization, Temperature measurement, Thermocouples; Coal deposits

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Kinetic of particles gasifying at fluid bed,?

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This paper presents the situation of coal mining in Slovakia, focusing on the social-political aspects and environmental aspects of its sustainable development. In recent years, the mining of lignite and brown coal in Slovakia has been closely linked to the production of electricity and heat in the Novaky power plant. Domestic brown coal production covered more than three quarters of demand in the Slovak Republic in the last few years. The sustainability of coal mining in the coming years in Slovakia is closely associated with raw materials reserves, new mining technologies, the development of the Novaky power plant, and the government's commitments to national economic interests through securing the energy supply or state aid. Of course, of these factors must be considered in the context of international obligations, such as those related to climate and environment, particularly air protection. The three most important Slovak brown coal deposits are located in the Upper Nitra Basin. This territory includes areas in the 5 th and 4 th degrees of environmental quality, signifying a disturbed and very disturbed environment. Since coal is expected to remain the dominant fuel for electricity generation around the world, and in particular for many of the countries of Central and Eastern Europe, it is necessary to create conditions for the environmental sustainability of coal mining in the coming years within the context of international obligations. Both the security and the stability of the electricity network in Slovakia and maintaining employment levels in the Upper Nitra region play important roles in this discussion. Underground coal gasification (UCG) is a new mining technology and a technology for gas recovery in situ. A comprehensive evaluation of the impacts of underground coal gasification was carried out in addition to summarization of the expected impacts in terms of the significance and distribution of the time period. Based on a comprehensive assessment of the proposed action, it can be stated that it could bring a socially unacceptable risk to the area, specifically the significant impairment of health or the environment (groundwater and nearby hot springs in Bojnice). The implementation of operations could affect the population's health, since the partition is placed in close proximity to residential areas.

**Author Keywords**
Coal mining; Employment; Environmental aspects of sustainable development; Social-political aspects of sustainable development

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Lapčík Jr., L., Fraštík, M., Lapčíková, B.

Impinging jet study of the deposition of colloidal particles on modified polycarbonate and poly(ethylene terephthalate) surfaces

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Abstract
Main focus of this study was on characterization of surface properties of virgin and 1,2-dipalmitoyl-sn-glycero-3-phosphocholine (DPPC) phospholipid layer coated poly(ethylene terephthalate) (PET) and polycarbonate (PC) planar articles. Surface properties were followed measuring static contact angles of wetting by means of sessile drop method and deposition of negative polystyrene (PS) colloidal particles followed by impinging jet method at defined flow regimes. It was found that phospholipid coating of both studied samples (PET, PC) let to the vigorous increase of the surface free energy. For coated samples major part of the surface free energy was dominated by polar component in contrast to the non-treated materials. Here the dispersive component was dominating. Results of the deposition experiments of polystyrene particles of 3 µm diameter correspond with trends obtained by contact angle measurements, i.e. the surface treated materials exhibited higher surface activity reflected in increased particle deposition rates. Simultaneously there was confirmed the fact, that with increasing magnitude of the Reynolds number of the dispersion flux the higher deposition rates were observed. © 2011 Elsevier Ltd. All rights reserved.

Author Keywords
Contact angles of wetting; Deposition kinetics; Impinging jet; Phospholipid layer; Poly(ethylene terephthalate); Polycarbonate; Polystyrene particles

Index Keywords
1,2-dipalmitoyl-sn-glycero-3-phosphocholine, Coated sample, Colloidal particle, Deposition experiments, Deposition kinetics, Dispersive components, Flow regimes, Impinging jet, Particle depositions, Phospholipid-coating, Polar components, Polystyrene particle, Polystyrene particles, Sessile drop method, Static contact angle, Surface activities, Surface free energy, Surface-treated materials; Characterization, Coated materials, Colloids, Contact angle, Deposition, Deposition rates, Ethylene, Free energy, Phospholipids, Polycarbonates, Polyethylene terephthalates, Polystyrenes, Reynolds number, Surface properties, Wetting; Surfaces

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In this paper analog input/output signals are used to control laboratory froth flotation machine using industrial panel PC. Data acquisition is provided by two Advantech PCI cards, while flotation control is based on connection of adjustable frequency drive further connected to AC motor for agitation control, mass flow controller for air flow control, pH and temperature transmitters with according probes for pH and temperature logging respectively. Process control is provided by graphical user interface programmed in MATLAB. This practical engineering design allows researchers to set parameter values prior to flotation test as well as log and save measured values for further processing.

**Author Keywords**
Automation; Data acquisition; Froth flotation; MATLAB; Signal processing

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Bestová, I., Heviánková, S., Zechner, M.  
Occurrence and removal of manganese from acid mine water [Występowanie manganu w wodzie kopalniowej oraz jego usuwanie]  

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b Sokolov Coal, Legal Successor, a.s., Staré náměstí 69, 356 01 Sokolov, Czech Republic

Abstract  
Apart from a high concentration of iron, mine water can also contain a higher concentration of manganese. Extraordinarily high concentrations can be found in acid waters from the surroundings of ore deposits, e.g. the water from the sulfitic ore deposits in Smolník contain up to 40 mg.l-1 of manganese. The legislation ordains discharge of water into surface water with a maximum concentration of manganese of 1 mg.l-1, and therefore it is vital to reduce the content of manganese in the mine water to a permissible value. Within the research work, a variety of demanganization methods were tested. In conclusion of the paper, so far most optimal method of manganese removal from acid mine water is suggested.

Author Keywords  
Demanganization; Manganese occurrence; Mine water

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Michalíková, F., Škvarla, J., Sisol, M., Krinická, I., Kolesárová, M.

Technologie przeróbcze uszlachetniania, zawierających części palne, popiołów lotnych z węgli kamiennych spalanych w elektrociepłowniach


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