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Jelínek P., Buchtele J., Mikšovský F., Káš V., Straka P. and Sýkorová I.	Degradation Process of Coal Pyrolysis Products during Moulding of Castings from Graphitizing Alloys	9
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Abstract

The project objective was to create a laboratory model for research on coal and accessory carbon substances. In the first stage the model laboratory unit has to perform one step pyrolysis with mass balance of solid, liquid and gaseous products, evaluation of their separation and subsequent chemical and physical characteristics. In the second stage to perform two step pyrolysis with solid product (coke) separation and to characterize pyrolytic carbon and secondary pyrolytic gas. To carry out comparison tests of pyrolytic carbon from two step pyrolytic laboratory unit and pyrolytic so-called lustrous carbon from a traditional C.I.A.T.F standard test. Alternately carry out comparison pyrolysis with brown coal and bituminous coal and their co-pyrolysis with three accessory carbonaceous substances in the mode of variant fractions of accessory substance in a mixture.

Roubíček V., Buchtele J., Káš V., Kaloč M., Klika Z., Kolat P., Leško J., Pechoč J., Straka P. and Weiss Z.	Ecologically Acceptable Utilisation of Domestic Coal Resources	15
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Abstract

The following issues were investigated in three separate stages: coal mass transformation during burning processes, thermokinetic coal study and coal pyrolysis with organic waste. Coal organic and mineral components in a set of 26 samples was analysed and following their burning under different laboratory conditions the processing impact on trace element volatility was evaluated. During regular plant burning in Power Station phase transitions of mineral components were evaluated. The extractability of trace elements from ash was evaluated at the laboratory level. Thermal analyses procedures were monitored kinetic parameters of coal burning. Also assessed was the process control of burning different types of coal in individual types of industrial furnace and their impact on harmful substance distribution. At laboratory units co-pyrolysis processes of coal and organic waste were modeled. Mass balances and co-pyrolysis product evaluation were primarily focused on evaluation of mixed waste plastics.

Straka P., Buchtele J., Endrosová J. and Machovič V.	Structure of Maceral Fractions of Czech Bituminous Coals	19
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Abstract

Four Czech coals and their maceral fractions were characterized and studied from point of view of chemical structure. The oxygen, sulfur and nitrogen functionalities of maceral fractions of the coals were determined by the instrumental methods (DRIFTS-PLS, XPS). Also solid--phase NMR parameters were determined. On the basis, models of chemical structure of coal fractions were constructed and energies of these structures were calculated by computational chemistry methods. Moreover, the influence of oxygen on technological parameters of coal was described and discussed.

Pechoč J., Stoklasa J., Mucha P. and Adámek S	Kinetics of Bridge Flocculation	23
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Abstract

In scope of the grant project bridge flocculation has been investigated, that results from particle agglomeration in suspensions, caused by high-molecular polymers. The photometric method has been developed for monitoring instantaneous local properties of suspensions directly at the time of flocculation. The observed changes in optical properties of suspensions are caused by the process of particle agglomeration and from speed of the changes the kinetics of bridge flocculation has been studied. By this method it is possible to observe the kinetics in various stages of flocculation.

From measurement at the beginning of flocculation it has been found, that the process begins immediately after mixing the suspension and the polymer solution and it has been confirmed, that the flocculation speed is dependent on the stirring intensity since the start of agglomeration.

Measurement of kinetics by the photometric method has been applied for finding suitable conditions of the bridge flocculation of real suspensions with wide particle size distribution. The usage of developed technology helps to optimise conditions in cases, where the processes of bridge flocculation are applied and it has been proved, that it is more sensitive comparing to usual indirect methods of evaluation on base of sedimentation properties of flocs and purity of the remaining water.

Sýkorová I., Brus J., Opluštil S., Machovič V., Stejskal M., Kubelka J., Bek J., Čermák I., Melichárková E., Daněk V. and Žáková B.	Czech Republic Coal Composition and Structure	35
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Abstract

Within the GA AV CR Project No.3046607 rank, maceral composition, chemical composition and structural parameters obtained through FTIR spectrometry and NMR analysis at coals from the Czech Republic Palaeozoic and tertiary continental basins were determined. Results were applied not only for characterisation of seams and basic types of brown and bituminous coals but also for study of palaeoenvironment of peat moors, coalification processes and for coal classification.

Machovič V., Jehlička J. Urban OP., Hruška J., Sýkorová I., Borecká L. and Novotná M.	Organic Products Liberated into Surface Waters during the Weathering of Stockpiled Lignite	45
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Abstract

Lignite from Bílina (Northern Bohemian Basin) contains about 2.6 weight % of extractable humic acids. Coal is completely disintegrated after two years weathering of the experimental stockpile. In the course of weathering lignite is washed by rainwater and organic carbon-rich solutions are liberated. Effluents from lignite stockpiles contain up to 98 mg/l of dissolved organic carbon (DOC). Fulvic acids isolated using XAD-8 technique represent the most important hydrophobic macromolecular compounds. Their carboxyl content rise up to 15.4 meq/mg C. However, fulvic acids display no major influence on acid-base status of resulting solutions due to dominant sulfate production through pyrite dissolution. The calculated total output of DOC from the lignite stockpile is 323 g/year which correspond to 1.84 g/m² year.

Balík K., Sochor M., Pešáková V., Křena J., Glogar P. and Gregor J.	Carbon-Carbon and Carbon-Polymer Composite Materials as Components of Implants for Bone Surgery	57
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Abstract

The construction (reinforcement) of carbon/polymer and carbon-carbon fibre composite materials in the shape of plates as well as their technology were designed in such a way that the project led to plates that can, by their strength and stiffness achieved, perform a stable osteosynthesis of long bones (the plate+ screws+bone system strength depending on the healing degree will increase gradually thus enabling its continuous higher loading). The fact, that the stiffness of the composite plates can be altered in a largedscale by their reinforcement composition - thus influencing healing drocess positively, can be considered an advantage of them. The materials exhibited good biocompatibility with the tissue and bones of living organism, however, a release of carbon particles took place.

Kořková B., Glogar P., Hejzlarov H., Košek M., Krula M., Balík K., Černý M. and Gregor J.	Role of Carbon Fabric in Carbon-Carbon Composite Reinforcement	63
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Abstract

Methods of quantitative description of yarn crimp in carbon fabrics and in carbon composites reinforced with them have been developed. They are based on spline function and discrete Fourier transformation applied on sets of yarn co-ordinates scanned by image analyser on polished sections of the investigated materials. The methods provide a basis for modelling elastic properties of fabric reinforced composites. Dynamic tensile and shear moduli of planar composites were measured using the resonant frequency technique and some relations between elastic properties, reinforcement geometry, and composite processing parameters were established. Cylindrical composite shells were manufactured using specially designed braided carbon reinforcement. Their densification resulting in three types of secondary carbon matrix influenced the material rigidity to various extent.

Rudajev V.	Seismic Phenomena Induced by Mining	81
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Abstract

A complex geophysical and geomechanical investigation of the occurrence of induced seismic phenomena in the mine Kladno 2 - Mayrau was performed within the scope of the grant project of the Grant Agency of the Czech Republic No 105/96/1065 in the course of the investigation (1996-1998). In order to obtain the principles governing the occurrence of rockbursts in space and time, the results of seismic, seismoacoustic, convergence and geodetical measurements were used which were performed in the shaft pillar of the mine Mayrau. The interpretation of the data was performed simultaneously with the data on the course of the extraction (proceeding of the extraction, driving of entries, use of blasting). However, in the middle of the project the mining was terminated. The continuing measurements gave the possibility of solving the question of the fading of the rockburst activity. Field measurements were completed by laboratory experiments whose modelled the course of the instability of rocks and gave the possibility of testing forecast methods. The prediction of the occurrence of rockbursts was performed on the basis of the application of the method of neural networks.

Náprstek J., Schenk V., Fischer C., Fischer O., Kottnauer P., Pospíšil S. and Schenková Z.	Characteristics of the Random Excitation of Mechanical Systems	91
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Abstract

The aim of the project was to achieve a more realistic description of mechanical system excitations for engineered structures by random loading, particularly with respect to strong seismic waves used to the response analysis of mechanical systems. The methods of stochastic dynamics and the numerical simulation of seismic excitations were applied. The aim of this project should be achieved by interdisciplinary co-operation of two institutes, one of which is concerned with research in engineering seismology, the other with theoretical mechanics and its applications to the analysis of buildings and structures.

René M., Matějka D and Klečka M.	Petrogenesis of Granites of the Klenov Massif	107
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Abstract

The Klenov massif forms an independent trending body within the Moldanubian batholith and is separated from the main body of this batholith by metamorphic rocks of the monotonous group of the Moldanubian zone. The principal rock type of the Klenov massif are two-mica granites of the Deštná subtype. Granites of this subtype obviously postdated the porphyric two-mica granites of the Čímeř subtype. The granites of the Deštná subtype are closely associated with aplite granites and aplites which represent the youngest variety of granites of the Klenov massif. All varieties of the granites are typical peraluminous granites. A notable differentiation in the Rb/Sr ratio, the absence of negative Eu anomaly and a low value of the Th/U ratio are typical for the granites of the Deštná subtype. Granites of the Klenov massif were derived by partial melting of metamorphic rocks related in their composition to the Moldanubian biotite paragneisses with a varying garnet content. The granites to granodiorites of the Ševětín type can be assigned to the Freistadt-type granodiorites.