**Investigation of the processes of mechanical activation of phosphate fines**

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**Key words:** shallow phosphorite, mechanical activation, digestible form of phosphates.

**Abstract.** The process of mechanical activation (MA) phosphate fines - substandard in chemical and granulometric composition of minerals was investigated. In samples after MA found a significant increase in digestible form P2O5 was found. That is associated with the processes of deformation of crystals and decrease the activation energy of dissolution of phosphate mineral. The results of chemical analysis of the starting material and the product information on specific surface and disperse composition using modern analyzersare presented. The product is significantly superior to the efficiency of conventional agrochemical phosphate fertilizer and may be a component of complex fertilizer phosphorus.

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**Investigate of a structure of the modified vermiculites by physical and chemical methods**

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**Key words**: vermiculite, positron annihilation spectroscopy, chitosan.

**Аbstract.** Vermiculites from Kovdorskiy (Karelia) and Koksharovskogo (Primorye), modified by acid, chitosan, were investigated by positron annihilation spectroscopy, density measurement, dye adsorption, the nitrogen adsorption BET and porosimetry. It was shown that the density of vermiculites after acid treatment varies compared to the density of the initial samples, depending on the concentration of acid. Internal volume of the micropores and the value of maximum adsorption of brilliant green change is directly proportional to the density of modified vermiculite. Kovdorskiy vermiculite under the action of hydrochloric acid is much more deeply destroyed compared with vermiculite of Koksharovskiy field in the similar conditions. At the same time, more extensive destruction of the layered structure of the Kovdorskiy vermiculite deposit yields of more efficient sorbents for sorption of sorbtion of basic nature.

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**Modeling and optimization of the process sulfuric acid leaching of manganese ores**

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**Keywords:** manganese recovery from ores, sulfuric acid leaching, mathematical modelling

**Abstract.** The article presents results of the development of a new method for iron-manganese ore beneficiation. Sulfuric acid leaching is studied. It was reviewed the patterns of leaching of the ore and its behavior depending on the consumption of acid, temperature, and duration. It is shown that for high extraction of manganese from these ores require quite hard mode leaching. A computer model of the leaching process is developed and optimization opportunities were analyzed. Performed a series of experiments on the agitation extraction of manganese from ore Usinsk Deposit using the developed mathematical model of the process of leaching allowed to indicate the direction of optimization of the real process in relation to the recommended fraction of granules, time leaching and acid concentration.

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**Mathematical modeling of a chemical reactor with different structures on the initial flow component and the reaction product**

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**Keywords:** structure of the flow, diffusion model, the Peclet number, stirred reactor, tubular reactor.

**Abstract.** The mathematical description of diffusive one-parametrical model on the example of simple chemical reaction is received. It basis on the experimental data and modern modeling methods, the engineering analysis. The analysis of the received mathematical model of the chemical reactor for simple elementary reaction is carried out at Peclet's various numbers of an initial component and a reaction product. New boundary conditions for diffusive model of structure of streams are removed. Comparison of the received results calculated on offered model, with results one-parametrical diffusive модельи, including with extreme cases of values of numbers of Peclet corresponding to ideal replacement and mixture is carried out. When distinction in molecular diffusion of components of reaction big it is necessary to solve system of the non-uniform differential equations of the second order with Peclet's various numbers on each component.

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**The use of ceramic high-porous block-cellular contact devices in the process of hydrogen isotopes phase exchange**

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**Keywords**: ceramic high-porous cellular materials (HPCM), contact mass-transfer devices, phase isotopic exchange, vapors of tritiumed water, detritiation, theoretical stage of separation

**Abstract.** The article presents the installation and process description of phase isotope exchange between tritiumed water vapors and liquid natural water, alternative to the process of adsorption drying in the scheme of air detritiation into hermetic space. As a nozzle for mass-exchange columns proposed a highly porous ceramic block-cellular contact devices. Slurry technology of their synthesis by method of duplication structure of polymer matrices and methods of application on the obtained ceramic frame hydrophilic zeolite layer was demonstrated. The results of research of ceramic mass-transfer contact devices efficiency in the process of hydrogen isotopes phase exchange in comparison with imported nozzle CY-type from company Sulzer Chemtech (Switzerland) are presented.

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**Granular materials and air methods of cleaning in pneumatic transport installations**

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**Keywords**: pneumatic, granular material, impurity, winnowing, air purification.
**Abstract**. Pneumatic transport apparatus for granulated materials are the basic element of the techgnique of polymeric material confection. When the polyethylene granulated particles are pneumatically transported under the high pressure, the particles interact with the reflected surfaces, as a result, the upper layer of the surface is generated and destructed. This processes lead to the creation of the impurities in the form of the dust, and fibers. The impurity enters to the reservuor, is separated into the walls due to the electric forces. Then the impurities are accumulated on the walls and the porous fibers are generated, which penetrates into the material. It leads to the decreasing of the final product quality and the air contamination. In this paper the stability of the purification systems for granulated materials and the air in the pneumatic transport apparatus are analyzed. The advantages of the centrifugal techniques the dust deleting compared with the gravitational techniques are shown. The characteristics of the apparatus are presented.

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**The investigation of equilibrium adsorption and adsorption kinetics neonol AF 9-10 on activated carbons from water**

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**Keywords:** activated carbon, adsorption isotherm, micropore volume, surfactants, solutions, static of adsorption, kinetic curves, activated carbon dosage, water treatment

**Abstract.** The adsorption isotherms of neonol AF 9-10 on activated carbons brands DAS Gidrosorb-ERM and F-300 were measured. The kinetic adsorption curves were determined, which are calculated on the basis of the effective diffusion coefficient. The priority development of a microporous structure in coal of DAS was shown. There were identified doses of activated carbons to reduce the concentration of surfactant neonol AF 9-10 in water. The advantages of activated carbon DAS in statics and kinetics of processes of adsorption organic pollutants from water were shown. Concluded that the effectiveness of activated anthracite in the water treatment process to the MPC.

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