**Formation of particle-size distribution of potassium chloride by temperature-cyclic treatment of dust fractions**

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**Keywords:** potassium chloride, temperature-cyclic treatment, phase ratio, particle-size distribution, medium size.

# Abstract. Effect of phase proportion liquid/solid on halurgie potassium chloride small fractions temperature-cyclic treatment in saturated potassium and sodium chlorides solution was investigated. It was established that these factors have significant influence on crystallization mechanism and granulometric composition of producing potassium chloride. During crystallization stage particles agglomeration process dominates blocks crystallization growth process when phase proportion liquid/solid is less than 13. In those cases, when potassium chloride is completely dissolved in heated suspension at the stage of crystallization dominates the growth process of crystallization units. The greatest consolidation of crystals of potassium chloride occurs when the ratio of the phases, the liquid/solid is equal to 13.

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**Features of distribution of rare earth elements from solutions of phosphoric acid in their sorption with sulphocationite**

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**Keywords**: phosphoric acid, ion exchange, rare earth elements, sulfonic cationite KU-2, wet-process phosphoric acid.

**Abstract.** Today, comprehensive processing of apatite concentrate with sulfuric acid with simultaneous sorption of rare earth elements from industrial wet-process phosphoric acid is the most easily feasible and promising. Distribution of individual REE depending on their atomic number in the process of their sorption with sulfonic cationite KU-2 from solutions of reactive cleanliness phosphoric acid and technical wet-process phosphoric acid obtained with sulfuric acid processing of apatite concentrate in dehydrate and hemihydrate modes was studied. Data was obtained on distribution of calcium, iron, aluminum and titanium - the related impurity components. Kinetic data was obtained on sorption of REE at different temperatures and concentrations of phosphoric acid.

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**Obtaining of high viscosity sodium carboxymethylcellulose**

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**Key words:** Drilling mud, alkali cellulose, sodium carboxymethyl cellulose, degree of polymerization, inhibitor, degree of substitution, dynamic viscosity, water loss.

**Abstract.** Studied the effect of certain inorganic type cellulose destruction inhibitors on degree of polymerization of alkali cellulose, as well as on synthesized sodium salt of carboxymethylcellulose basic quality indicators, such as degree of polymerization, dynamic viscosity, mud solution water loss mud etc. Demonstrated, that good inhibitory properties towards cellulose have a sodium and magnesium sulfur-containing salts, in particular sodium sulfite and magnesium sulfate. Joint using of sodium sulfite and stearic acid in the synthesis of sodium salt of carboxymethylcellulose, allows obtaining products with higher degree of polymerization and dynamic viscosity, which in turn have a positive effect on heat treated mud solutions water loss indicator. Obtained thus sodium salt of carboxymethylcellulose can be efficiently used as in oil and gas exploration, and also in other industries.

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**Methodical essentials of reliability calculation and assurance of complex gas distribution systems from metal and polyethylene pipes**

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**Keywords**: gas distribution system, reliability, safety, polyethylene pipes

**Abstract**. The paper gives up to reliability and safety of the gas distribution systems. It defines the objectives for the study of that subject as well as methods for their achievement. In the paper are given some numerical values of reliability indexes, they are compared for steel and polyethylene pipes. The problem of the reliability and safety of the gas distribution systems have clearly expressed features differing from other objects of the unified gas supply system. A study of the reliability is very important for the following reasons. The use of polyethylene pipes in the building distribution systems is one of the most perspective directions of development of gasification. A leader in this scope of work is Limited Company «Gazprom transgaz Kazan". Polyethylene pipes enable to reduce the cost and time of construction and increase the longevity of the networks. Processing of a representative sample of gas distribution systems failures showed that intensity of failures for polyethylene pipes is about 6 times less than steel. The main cause of failures for polyethylene gas pipes is anthropogenic effects − mechanical damage during excavation and agricultural work. For reliability and safety indexes, calculation worked out the mathematical models realized in special computer complexes.

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**The technique of computer hardware and the rapid assessment of gas leaks in detachable structural devices distribution systems**

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**Keywords:** gas distribution system, estimation of volume of gas leaks, the mathematical model of the source function of gas leaks, group method of data handling

**Abstract.** The technique of computer hardware and the rapid assessment of gas leaks in detachable structural devices distribution systems is suggested . Estimates of the volume of natural gas leaks in time according to hardware-instrumental rapid measurement of gas concentration at certain points of the local area of the leak using developed by the authors, the mathematical model of the "restoration of the source function", which allows to recalculate the volume concentrations of leaks in the stream. The technique allows changing the actual values of methane leakage in the local area, by express measurements, carried out conversion of the actual volume of leaks that has important theoretical and practical significance for improving energy and resource efficiency in gas distribution systems.

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**Factors affecting carotenoid biosynthesis by yeast Rhodotorula rubra**

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**Keywords:** carotenoids, *Rhodotorula rubra*, β-carotene, torularhodin.

**Abstract.** It is shown that the composition of cultural medium, lightning and hydrogen peroxide affect the activity of carotenoid pigments synthesis (β-carotene, torulin, torularhodin) by yeast *Rhodotorula rubra*. The ratio of mineral components of the medium, a carbon and nitrogen sources, in which the degree of accumulation of carotenoids is increased by more than 2 times was found. Blue light irradiation has the stimulatory effect on the biosynthesis of carotenoids, namely activity of synthesis torularhodin is increasing. Also an increase in the accumulation of carotenoids is observed adding of hydrogen peroxide in the fermentation medium. On the basis of the established in the experiment similarity of action of blue light and hydrogen peroxide on the synthesis of carotenoids by yeast *Rhodotorula rubra* a similar mechanism of action of these two factors is suggested.

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**Investigation of the structure, properties and sorption activity of carbonaceous sorbents based on cellulose products**

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**Keywords:** buckwheat shell, carbonaceous material, modification, yield of product, sorbents, sorption activity, sorption of oil and oil products.

**Abstract.** The method of obtaining of cellulose-containing sorbent based on buckwheat shell with using chemical and physical modification was developed. The chemical applied was capable to structure the cellulose-based polymers. It provides increasing the yield carbonized structures when exposed to elevated temperatures. The physical modification provides the development of the porous structure of the sorbent during heat-treated material. The sorption activity of the modified buckwheat shell with respect to iodine, methyl orange, methylene blue tests was estimated. A sorption capacity for electrolytes which allows to estimate the relationship of heat treatment temperature, type of porous structure and sorption capacity was also found. Sorption capacity of the developed materials was measured. It amounts to 4,5 g/g for oil and 4,3 g/g for used motor oil.

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