

**PETROLEUM PRODUCTS:
TECHNOLOGY, INNOVATION, MARKET**

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Modification of oil road binders by adding crumb rubber

Abstract. One of the serious problems associated with environmental pollution is to increase the volume of waste from the disposal of worn-out tires. To solve this problem crumb rubber obtained during the processing of used tires are used as a modifier of the properties of oil road binder. The use of crumb rubber in road construction is a promising, but strictly regulated direction of improving the performance of asphalt concrete mixtures for hard coatings of various categories.

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Condition of production and application of petroleum pitches of different function in Russia

Keywords: petroleum pitches, coke-oven coal tar pitches, binding, treating, fibre-forming pitches, carbon fibers, carbon constructional materials, industrial production.

Abstract. Oil pitches are a valuable raw material for various industries, the demand for them is considerable and amounts to tens of thousands of tons per year. Depending on the application, the stoves are divided into binder, impregnating, briquette, fiber-forming, special for the production of nanomaterials; raw materials for coking.

As the binding and impregnating in the domestic technologies of anodic mass and electrodes, carbon composite materials, coal tar pitch is traditionally used. Recently, due to the rapidly growing demand for carbon and graphite materials for non-ferrous and ferrous metallurgy, nuclear power and rocket and space industries, the cessation of the supply of petrochemicals and coke from Ukraine shows a shortage of coal tar pitch. In addition, the quality of pitch on the basis of coal tar constantly decreases, which is associated with an intensification of the processes of coking coal and a non-optimal composition of coal blends. Coal tar is characterized by a rather high content of benzopyrene (1.2-4%), which causes their carcinogenic activity. In the world practice, attempts are known to transfer enterprises to use oil pitches. In the USA, Japan, England, France, China and other countries with developed oil refining, industrial production and application of wide range oil pitches are established. In Russia there is no industrial production of petroleum pitches, despite the fact that in any field of application oil pitches compete with coal tar pitch, differing from them by higher reactivity in thermochemical processes and less carcinogenicity. Replacement of coal tar pitch with oil leads to reduction of the technological cycle, saving of heat and energy resources, improvement of the environmental situation at the carbon-producing plants by eliminating carbonic carcinogenic components from the production cycle and expanding the raw material base of the industry of carbon structural and carbon-carbon composite materials. To date, the production of oil pitches and products based on them in the Russian Federation is extremely demanded and justified from the point of view of the huge reserves of natural raw materials and the great need for composite materials for the modernization of a significant number of industries.

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Thermolysis of high-viscosity oils in order to reduce the viscosity and receive synthetic oil

Keywords: high viscosity oil; liquid phase thermal cracking; product of thermolysis; fractional composition; physical and chemical and structural characteristics of close cut fractions; residue that boils down at temperature higher than 400°C; chemical activity of cracking process.

Abstract. We have conducted the research of the thermolysis process of high viscosity Ashalchi oil. The breakdown test of the original oil and its product of thermolysis, results of close cut fractions analysis have shown the effect of formation of distillates that boil down within the range of 46-320°C, growth equal to 19.6% mass. Is observed. It is found that during thermolysis the yield of residue, that boils down at the temperature higher than 400°C, is reduced, that has lower content of sulphur (by 0.44%) and has higher density. The chemical activity of the cracking process is discussed.

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Monitoring of chloraides content in oil field in Tatarstan

Keywords: Central Processing Facility, chloride content, desalting.

Abstract. The materials provided by central oil treatment facility in Tatarstan on chloride content in oil were reviewed and analyzed. The time-related changes of chloride content in oil with have a polyextreme character and vary substantially. Based on the monitoring results provided recommendations for improving oil treatment from chlorides and reducing water consumption.

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Synthesis of n-(cyclohexen-3-ethyl)-phenol and its aminomethylated derivatives

Keywords: antioxidant, dimerization, cycloalkenylation, catalyst Ceockar-2, vinylcyclohexen.

Abstract. Reactions of cycloalkenylation of phenol with 3-vinylcyclohexene in the presence of zeolite-containing catalyst Ceockar-2 and amination of received *para*(cyclohexen-3-ethyl)phenol with formaldehyde and anilines were examined at continuous laboratory installation. Obtaining target products of 2-hydroxy-5(cyclohexen-3-ethyl)benzol-anilines on the continuous installation is carried out in two stages. Target product's *para*(cyclohexene-3-ethyl)phenol's were identified by ¹H NMR and IR absorption methods. The influence of temperature, molecular ratio of phenol to vinylcyclohexene (VCH) and volumetric flow rate on yield and composition of the reaction product *para*(cyclohexene-3-ethyl)phenol was studied, as a result were found optimal conditions providing maximum yield of the desired product. Optimal conditions for carrying out the reaction of phenol's cycloalkenylation with 3-vinylcyclohexen in the presence of Ceockar-2 catalyst are: 120°C temperature, molecular ratio of phenol to 3-vinylcyclohexene 1:1 mol/mol and volumetric flow rate 0.5 h⁻¹. *para*(cyclohexene-3-ethyl)phenol's yield under these conditions is 67,6% of the theory for taken phenol and selectivity – 91,3% by the target product. It is established that in diesel fuel an insignificant (0.5 mg/100 sm³) precipitate forms when an aniline-based compound is synthesized; and when anti-oxidant based on 2,6-diisopropylaniline is added the precipitate doesn't form. The obtained products were tested as antioxidants for diesel fuel and satisfactory results showed the effectiveness of their application.

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ANALYTIC METHODS FOR OIL and PETROLEUM PRODUCTS

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State working standard unit of pressure in the range from 0 to 160 kPa in the field of measurements of the saturated vapour pressure of liquids

Keywords: measurement standard, saturated vapour pressure.

Abstract. Presents the results of research, development and implementation of working standard for the measurement of the saturated vapors pressure of liquids. Given the characteristics of the standard. Justified by the novelty, relevance and importance the working standard in this section of measurement.

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The analysis stability control using shewhart control control charts

Keywords: Quality analysis result, variation, chance causes, assignable cause, state of statistical control, Shewhart control charts, interpretation rules, control limits.

Abstract. The key instrument of analysis stability control is Shewhart control charts with control limits $\pm 3\sigma$ and warning limits $\pm 2\sigma$. The interpretation of Shewhart control charts should be carried out by RMG 76 (interstate standardization recommendations). Shewhart control charts displays the process state by means of variation and center position So it's preferable to analyze and use Shewhart control charts in pairs: one moving range chart displays the difference from one point to the next, another one, the individuals chart, displays the individual measured values. The average chart (\bar{X} -chart) and range charts (R-chart) are used for test stability control if a subgroup, consisted of several results, is obtained as a result of the control procedure. The individual observations chart (X-chart) and moving range control chart (Rm-chart) are used for the test stability control if a subgroup, consisted of only one result, is obtained as a result of the control procedure.

The algorithm analysis stability control consists of the two main stages. At the first stage there are several problems that should be solved: information acquisition, experimental chart compiling, step by step progress in the controlled state. This state is obtained by the successive repetitions of identification (assignable causes) - correction (of data) - recalculation (control limits) up to the moment when all the preliminary data will be subject to the chance causes impact. At the first stage the control charts of the first type with indefinite control limits are created.

At the second stage monitoring of the analysis process state is carried out. Various control procedures are realized, the results of which are plotted on the chart and compared with with the predicted ones at the first stage of the process control limits. The procedures depend on the return period of work samples test quantity. At the second stage the control charts of the second type with the definite control limits are created.

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