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Conceptual conditions for transition enterprises petroleum refining industry to design by 5D-format, assessment of the feasibility of implementation and prospects

Keywords: design automation, information modelling, estimated cost, 3D, 5D modelling, BIM - building information model, capital spending sights, modernization refineries, investments, economic efficiency, reduction in working hours.

Abstract. The author review the current situation in the market of 3D software products of designing in petroleum refining industry. Described the new design format – 5D, in the context of future prospects and opportunities. Existing russian developments in the CAD system on the example of information modeling of constructions (BIM) are considered. The article showed the advantages and disadvantages of the russian developments dealing with designing in a format 5D. There is a description such problems as conversion information from 3D software modeling to the existing estimate programs. The overview and analysis of opportunities programs of estimating are cited. According to the analysis revealed the conditions of transition, the direction and prospect of development. The most effective solution to the problem of transition to the new design format is a practical method of content geometric element in 3D models. An assessment of the effectiveness in the implementing of a software module on the example of the automation design and estimate documentation on technological pipelines and valves is considered. The article showed the legal and technical aspects of the transition to the format of the design 5D in petroleum refining industry.

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Current Problems of the Use of Anti-knock Additives Based on Aromatic Amines

Keywords: gasoline, N-methylaniline, aromatic amines.

Abstract. The article discusses problems of the use of anti-knock additives based on aromatic amines when there is a ban of use of N-methylaniline in the Euro 5 gasoline by TR CU 013/2011. The article presents the evaluation of the currently used aromatic amines (aniline, toluidine, xylydine, anisidine) compared with N-methylaniline and provides recommendations for solving the identified problem.

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PETROLEUM PRODUCTS: TECHNOLOGY, INNOVATION, MARKET

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Thermal destruction of oil for the purpose of increasing the yield of the gasoline fraction and improvement of its quality characteristics using nanostructured metals

Keywords: fractional composition, distillation, thermal degradation, a catalyst, catalytic cracking, nanostructured metals, chromatographic analysis.

Abstract. In the article the method of increasing the yield of the gasoline fraction in primary oil distillation using a metals in nano-structured form. Obtained the results of analysis studies physicochemical properties and fractional composition naphta and recommendations for the use of metals in the nanostructured form during oil distillation. Shown increase in value octane number of straight-run gasoline using metalsin a nanostructured form. Reduced energy consumption in the distillation process, using a metals of nanostructured form.

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Investigation of synthetic zeolite NaX for adsorptive dearomatization of gasoline AI-80 in order to bring it up to standards Euro-5

Keywords: gasoline, adsorbent, synthetic zeolite NaX, dearomatization.

Abstract. In recent years, with more and more increasing number of over ground transport with internal combustion engines, the demand for fuel, including car's gasoline increases significantly. It is known, that vehicle exploitation emits a large amount of exhaust gases, containing in its composition substances such as carbon oxides, nitrogen oxides, and benzopyrene. The main source of benzopyrene are aromatic hydrocarbons, primarily benzene. In this regard, the content of aromatic hydrocarbons in auto gasoline must meet strict environmental requirements Euro-5.

In order to meet the European specifications of gasoline of Euro-5 became necessary to develop the processes of refining gasoline - partial dearomatization and denormalization.

To carry out the process of dearomatization of gasoline and bringing benzene content to required standards, gasoline distilled into two factions, from beginning of boiling - to 120°C and from 120°C – to end of boiling. For dearomatization of gasoline, as a sorbent taken synthetic zeolite NaX and its adsorption capacity is determined in the liquid phase by cryoscopy method. Dynamic capacity of zeolite NaX for benzene is 2,0% to slip, full 9,16%.

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MATHEMATICAL SIMULATION

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Application of mathematical statistics for study the process of obtaining liquid products from the catalytic cracking gases

Keywords: catalytic cracking gases, olefins, paraffins, alkylation, regression equation, yield of liquid products.

Abstract. The aim of this work is to develop a mathematical model in the form of a regression equation of the process for producing liquid products from the mixture of catalytic cracking gases and decision optimization problems based on model, as well as study the reaction in a wide range of changes in the input variables. For determining the coefficients of the equations was used the program S-plus 2000 Professional, developed by Mathwork company for automated mathematical processing of statistical analysis of the data for calculating the linear regression coefficients and coefficients of pair correlation for the indicated samples. The results of the study conversion process of paraffin and olefin C₃-C₄ hydrocarbons, contained in the catalytic cracking gases into the reaction liquid products on the industrial zeolite catalyst Omnikat-210P modified with Ni, Co, Cr are presented. $\gamma\text{Al}_2\text{O}_3$ was used as a binder. The studies on the influence of the temperature (260-420°C) and the volumetric feed rate of the feedstock (35-255 h⁻¹) on the yield of liquid reaction products were performed in an isothermal reactor with a fixed catalyst bed. The maximum yield of the liquid products for the feedstock - 86% wt and the yield of the liquid products for the sum of the olefins in the feedstock - 188.8% wt is achieved at the temperature 260°C and feed space velocity 180 h⁻¹. The regression equations adequately describe the response surface, therefore, this model can serve as a model of the statistical regularities of the process variations.

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Optimization of reactants mixing in ethylbenzene production with the use of hydrodynamic model

Keywords: alkylation, ethylbenzene, hydrodynamic modeling, mixing.

Abstract. In this paper the feasibility of mixing device reconstruction in benzene with ethylene alkylation in the presence of liquid-phase catalyst using Comsol Multiphysics software was evaluated. The hydrodynamic model of mixing chamber was developed and the different options of reactants input were considered. The best reagents input option with a uniform concentration profile of reagents distribution was defined. The intensification of mixing will allow conducting the alkylation process more effectively with reducing the catalyst complex consumption.

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ECOLOGY and INDUSTRIAL SAFETY

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Assessment of polycyclic aromatic hydrocarbons pollution extent of Côte d'Ivoire coastal waters

Keywords: Côte d'Ivoire coastal waters, pollution of water area with polycyclic aromatic hydrocarbons, liquid chromatography.

Abstract. Problems of Côte d'Ivoire coastal waters pollution are considered. For inhabitants of the coastal zone of Côte d'Ivoire seafood plays an important role in food allowance, being more than 65% in it. In this regard, use of some types of pesticides getting with meteoric waters to coastal water areas, as also hydrocarbons mining near the coast of Côte d'Ivoire can cause serious damage to coastal areas population health. In this article two regions of the country are given as an example: Zhakvil and Dabou, having suffered from above listed harmful ecological factors, reasons for mass fish death are also being discussed.

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CONFERENCES. SEMINARS. EXHIBITIONS

IX international industrial and economic Forum "the Strategy of enterprises" (November 24-25, 2016, Moscow)

MATERIALS of the PETROCHEMICAL and REFINERS ASSOCIATION

Extracts of the protocol #131 of ANN board meeting of 30.06.2016 / Subject - the use of Western standards for the design and construction of objects of oil refining and petrochemistry