**Research of the processes proceeding in the mineral dumps**

**of gold-platinum placers**

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**Keywords.** Chemical differentiation and integration, anthropogenic oregenesis, gold-platinum mineral phase.

**Abstract.** Chemical differentiation and integration processes of gold from the anthropogenic dumps of gold-platinum placers on the example of Isovskiy mine in the Middle Urals were considered. Sediments, formed as a result of anthropogenic lithification, were studied. There is a transformation of primary composition and formation of aggregates, cemented by secondary microcrystalline oxyhydroxide-ferrous material and a variety of new ore minerals. The new gold-platinum mineral phases, formed at anthropogenic oregenesis of gold and platinoids, were shown. X-ray diffraction, electron-microscopy and X-ray microprobe studies were carried out. Anthropogenic phase’s formation mechanisms, which can be used for gold concentration process control, were tracked.

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**Zinc-polymer coatings obtained by electrodeposition at the cathode while the amine polyelectrolyte and electrolytic reduction of zinc**

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**Keywords**: polyelectrolytes, electrolytic deposition of metals, cathodic electrodeposition, zinc-plating.

**Abstract**. First new zinc-polymer coatings were obtained by a combination of cathodic electrodeposition of amine polyelectrolyte and electrolytic recovery of zinc. The optimum composition of the mixed electrolyte consisting of amine industrial epoxy polyelectrolyte and zinc acetate was designated. The optimal conditions for obtaining of the zinc-polymer coatings of mixed electrolyte was designated: voltage range of 150-170 V, the coating time of 120 seconds. The dependence of the electrochemical equivalent deposition of additive of the zinc electrolyte in the electrodeposition bath. The electrochemical equivalent deposition decreases by increasing the content of zinc electrolyte in the composition. It has been proved that zinc metal actually deposited on the surfaces in an amount of not less than 2.6 mass%.

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**Hydrodynamic mode operation turbulent
for washing of gas condensate with water**

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**Keywords**: gas condensate, emulsion, pressure drop, turbulent apparatus.

**Abstract**. Results of numerical calculation and experimental study of regularities of dispergating of a two-phase stream and pressure difference in the tubular turbulent device in relation to process of a water washing of gas condensate from salts are presented. Formulas for calculation of the amount of disperse inclusions and pressure difference on the ends of the device are received. Comparison of experimental data to settlement sizes confirms possibility of use of the received formulas for performance of engineering calculations. In relation to process of a water washing of gas condensate in shop of preparation of gas and gas condensate on a field Borankol (Sea Oil Company Kazmunayteniz, Kazakhstan) is offered the geometry of the tubular turbulent device diffuser-confuser type providing a pressure drop of 0.223 bar, the formation of emulsions with droplets of the dispersed phase with a diameter of 0.8 mm, the performance of the process of about 100 m3/hr.

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**Investigation of hydraulic resistance of the layer bulk packing in the form of rings Moebius**

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**Keywords**: bulk ring nozzle, hydraulic resistance, specific surface area, porosity, the equivalent diameter of the channel.

**Abstract**. Logarithmic graph presents the results of a study of the hydrodynamics of the layer of bulk dry and irrigated nozzles in the form of r Mobius rings of the size 55х10х0,05, made of paper sheet, the surface of which is covered with a layer of polymeric adhesive. The geometrical characteristics of the tested nozzles aregiven. The comparative analysis of the performance of the nozzle with the most common industrial nozzle - metal Rashig rings and Mobius rings of the size 50х15х0,8 are made of metal and Mylar grid. This analysis showed that the hydraulic resistance of the tested nozzles is lower than the other elements of the nozzles shown in this paper attachments.

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**Production of nitrogen-enriched stream by membrane gas separation**

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**Keywords:** membrane, gas separation, air separation, nitrogen, membrane plant

**Abstract.** In the last years membrane processes obtaining the nitrogen-enriched stream are gaining a larger acceptance in industry and in the market and compete with traditional technologies such as pressure swing absorption (PSA) and cryogenic distillation. The nature and characteristics of existing membranes as well as the construction of gas separation devices are discussed. The article describes the process schemes for manufacturing of membrane nitrogen units that may be applied. The main aim of the study presented was the analysis of engineering solutions in the field of membrane air separation, which are currently in use. The results of the feasibility analysis of the effectiveness of using membrane nitrogen units for varios concentrations of nitrogen-enriched air stream is presented and discussed. The data of specific operating and capital costs for different values ​​of the concentration and productivity of nitrogen-enriched stream are calculated and analyzed.

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**Energy-saving schemes for extractive distillation of benzene-cyclohexane-toluene mixture with N-methylpyrrolidone as entrainer.  Part 1. Schemes of two-outlet columns**

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**Keywords:** benzene, extractive distillation, energy saving.

**Abstract.** Extractive distillation is one of the methods for benzene recovery from reforming and vapor cracking fractions. The separation considered of benzene, cyclohexane and toluene mixture as some equivalent of crude benzene fraction by extractive distillation with N-methylpyrrolidone as the entrainer. There are three different conventional schemes of this mixture separation by extractive distillation. Each scheme consists of three two-outlet columns. The aim of the research is to identify the optimal scheme by the criterion of minimum total energy consumption in column’s boilers. The study defined the optimal operating parameters for each scheme such as the total number of trays for each column, the entrainer temperature and flow rate, the entrainer and the feed trays locations. We have determined that the lowest energy consumption (7256.2 kW) has the scheme where entrainer using in the first column and recovering in the last column.

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