THERMODYNAMIC BASES OF THE PROCESS OF EXTRACTION OF HYDROCARBONS FROM OIL SLUDGE USING SCF PROPANE-BUTANE MIXTURE

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To date, enterprises of the Russian oil and gas complex have accumulated a huge amount of oil sludge. According to the most conservative estimates, the annual increase in their quantity is about 3 million tons. In recent years, various technological solutions aimed at recycling oil production wastes and oil treatment have been introduced by oil producing enterprises. However, a sufficiently effective and unified way of processing oil sludge for the purpose of neutralizing and utilizing them is still not available.

As part of the study of oil sludge utilization, raw materials are used, characterized by the content of mechanical impurities and water in the amount of 12.05% and 20% by weight. respectively. As an extractant, a mixture consisting of 75 wt. % propane and 25 wt. % butane. Extraction processes are carried out in the temperature range of 85-160 Â° C and a pressure interval of 5-50 MPa. Dedicated oil is characterized by the absence of mechanical impurities, asphaltenes and water. The first (5-6.5 MPa) and the second (11-12 MPa) crossover points of the isotherms of solubility of the petroleum products studied in the propane-butane solvent were determined. Knowledge of crossover points is an important condition for the implementation of extraction and impregnation processes.

To scale the results obtained, it is necessary to model the process, and for modeling it is necessary to investigate the thermodynamic properties of the systems participating in the process. For this purpose, the solubility of pure components of oil sludge, such as naphthalene, anthracene, etc., in the subcritical fluid (SbCF) and SCF propane-butane was studied.

Taking into account the studies of thermodynamic properties and laboratory studies, the modeling of processes was carried out.

Based on the simulation results, a pilot plant has been created that allows the extraction and impregnation processes to be carried out.

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1. Khairutdinov V. F., Akhmetzyanov T. R., Gabitov F. R., Zaripov Z. I., Farakhov M. I., Mukhutdinov A. V., Gumerova F. M., and Yarullin R. S. Extraction of oil-products from oil sludge with the use of liquid and supercritical fluid extraction processes with propane-butane extractant. Petroleum

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