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Aqueous extraction of organic part of oil sands under influence of ultrasound

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The aim of this research is to study the kinetics of recovery of organic part from oil sands of Republic of Kazakhstan under the influence of ultrasound during the process of aqueous extraction. The study of influence of temperature, concentration of various alkaline additives, and average size of mineral particles and strength of ultrasound on the bitumen recovery rate was carried out. The extraction of organic part from oil sands of Beke and Munaily Mola deposits using ultrasound irradiation was carried out. The content of organic part in these oil sands is 12 wt.% and 11 wt.%, respectively. It was established that the main factors of influence of alkaline additives are: neutralization of organic acids followed by formation of natural surfactants in the form of soluble salts, increasing of pH of the medium and the change of electric charges on surface. It was found that the kinetics of the process greatly depends on the temperature of solution. Increasing the temperature of solution leads to increasing of the rate of extraction of organic part exponentially. It is preferable to use the working solution with a high concentration of alkaline reagents, since after the separation of organic part from mineral of oil sands, the solution can be returned to the process for reuse. The reuse of solution improves economical and ecological performances of the whole process. According to the results of laboratory tests, a pilot installation for ultrasonic aqueous extraction of organic part of oil sands was designed. This installation is closed counter flow system that allows reuse water and chemicals. Pilot tests of aqueous extraction of organic part on this installation confirmed the main conclusions of laboratory research.

Biography

F Sultanov is a PhD Doctoral student of Al-Farabi Kazakh National University and a Researcher at the Institute of Combustion Problems.

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