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Deasphalting of Crude Oil by Extraction Method

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Abstract : The asphaltenes are heavy fraction of crude oil. Asphaltenes on oilfield is known for its ability to plug wells, surface equipment and pores of the geologic formations. The present research is devoted to the deasphalting of crude oil as the initial stage refining oil. Solvent deasphalting was conducted by extraction with organic solvents (cyclohexane, carbon tetrachloride, chloroform). Analysis of availability of metals was conducted by ICP-MS and spectral feature at deasphalting was achieved by FTIR. High contents of asphaltenes in crude oil reduce the efficiency of refining processes. Moreover, high distribution heteroatoms (e.g., S, N) were also suggested in asphaltenes cause some problems: environmental pollution, corrosion and poisoning of the catalyst. The main objective of this work is to study the effect of deasphalting process crude oil to improve its properties and improving the efficiency of recycling processes. Experiments of solvent extraction are using organic solvents held in the crude oil JSC "Pavlodar Oil Chemistry Refinery. Experimental results show that deasphalting process also leads to decrease Ni, V in the composition of the oil. One solution to the problem of cleaning oils from metals, hydrogen sulfide and mercaptan is absorption with chemical reagents directly in oil residue and production due to the fact that asphalt and resinous substance degrade operational properties of oils and reduce the effectiveness of selective refining of oils. Deasphalting of crude oil is necessary to separate the light fraction from heavy metallic asphaltenes part of crude oil. For this oil is pretreated deasphalting, because asphaltenes tend to form coke or consume large quantities of hydrogen. Removing asphaltenes leads to partly demetallization, i.e. for removal of asphaltenes V/Ni and organic compounds with heteroatoms. Intramolecular complexes are relatively well researched on the example of porphyinous complex (VO2) and nickel (Ni). As a result of studies of V/Ni by ICP MS method were determined the effect of different solvents-deasphalting – on the process of extracting metals on deasphalting stage and select the best organic solvent. Thus, as the best DAO proved cyclohexane (C6H12), which as a result of ICP MS retrieves V-51.2%, Ni-66.4%? Also in this paper presents the results of a study of physical and chemical properties and spectral characteristics of oil on FTIR with a view to establishing its hydrocarbon composition. Obtained by using IR-spectroscopy method information about the specifics of the whole oil give provisional physical, chemical characteristics. They can be useful in the consideration of issues of origin and geochemical conditions of accumulation of oil, as well as some technological challenges. Systematic analysis carried out in this study; improve our understanding of the stability mechanism of asphaltenes. The role of deasphalted crude oil fractions on the stability asphaltene is described.

Keywords : asphaltenes, deasphalting, extraction, vanadium, nickel, metalloporphyrins, ICP-MS, IR spectroscopy
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