

## **Distribution of vanadium and nickel in heavy oil asphaltenes**

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### **Abstract**

Heavy oils are characterized by high concentration of vanadium and nickel, with their total content comparable with commercially mined ores. Vanadium and nickel are concentrated in the asphaltenes-resin portion; the maximum amount of these metals is found in asphaltenes. Petroleum feedstock with a high vanadium and nickel content is unsuitable for catalytic refining processes. Vanadium and nickel significantly affect the thermal cracking and hydrodemetallization. Primary removal of the metals can be performed by deasphalting, and the main part of vanadium and nickel remains in the residue. However, the amount and ratio of the metals in the resulting products is usually estimated empirically; thus, it is impossible to predict these quantities in a feedstock of another composition. Trends in the vanadium and nickel concentrations in heavy oils asphaltenes in which the total content of these metals vary from 0.0049 to 0.1795 wt. % have been studied. It has been shown that as the vanadium and nickel content in heavy oils increases, vanadium concentrates faster than nickel in asphaltenes. In heavy oils, asphaltenes contain approximately 40-90% of total vanadium and 25-75% of total nickel. The summed concentration of vanadium and nickel in heavy oil asphaltenes can reach 1 wt %. The data on the vanadium and nickel content in asphaltenes shows that this parameter should be taken into consideration as it can predict the distribution of these metals during heavy oils processing in various conditions.

### **Biography**

Makhmut Renatovich Yakubov has completed his PhD from A E Arbutov Institute of Organic and Physical Chemistry, Kazan Scientific Center, Russian Academy of Sciences. He is the Head of the Oil and Natural Bitumen Processing Laboratory. He has published more than 20 papers in reputed journals.

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