

Figure 1 shows dependence graphs of the refractive index on the aromatics and paraffins content in the feedstock and hydrocracking products. With an increase in the aromatics content, the refractive index value increases; for paraffins, an inverse relationship is observed. These graphs confirm the above statement about the different effect of different hydrocarbons groups on the refractive index. Numbers in Figure 1 and in Table 1 are sam-

ple numbers: 1 – R-2004; 2 – R-2002; 3 – Summer diesel fuel; 4 – R-2003; 5 – 2nd stage feed; 6 – the 2nd line feed; 7 – 1st line feed.

The table also presents the RI evaluation results for 7 samples of hydrocracking feedstock and products. The data obtained is used to determine the structural group composition of feedstock and products compounds and to enhance mathematical models of the process.

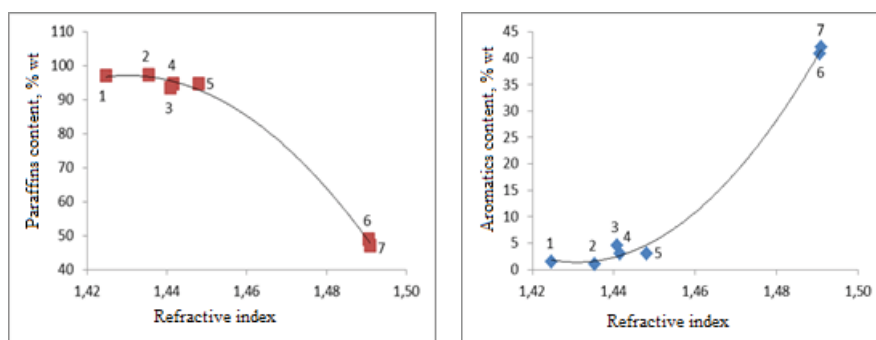


Fig. 1. Dependence graphs of the refractive index on the hydrocracking feedstock and products paraffins and aromatics content

Table 1. RI evaluation results for hydrocracking feedstock and products

Temperature	№1	№2	№3	№4	№5	№6	№7
50 °C	1.4246	1.4354	1.4408	1.4416	1.448	1.4906	1.491
20 °C	1.4366	1.4474	1.4528	1.4536	1.46	1.5026	1.503

References

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INVESTIGATION OF ACID-BASE PROPERTIES OF NATURAL MATERIALS

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In connection with the desire to reduce the cost of sorption processes, it seems very promising to use natural mineral. Natural sorbents are in high demand today, because they have a low cost and significant sorption capacity [1], [2], therefore, their use in the process of purification makes it possible to exclude the stage of adsorbent regeneration [2]. A review of publications and scientific papers showed that the study and use of materials with high sorption

properties is an urgent task. To date, the sorption mechanism has not been studied in detail enough and requires further study and research [1]. With the progressive development of the chemical industry, the requirements for the properties and quality of sorbents are increasing. As a result, the search for new effective sorbents with high adsorption properties that directly depend on the content of elements and specific surface area is urgent [3].

The aim of the work was to investigate the acid-base properties of natural materials. Natural materials such as Tripoli from the Zikeevsk field, Tonsil OPTIMUM 210 FF, Taiko Classic 1G and Bentonite from the Zyryansk field were used in this work. Mineral materials were investigated using IR spectroscopy method.

The determination of the functional groups was carried out by taking the IR spectra of the samples under study in a certain frequency range. The spectra were recorded on an IR spectrometer «Agilent 660» (Russia). A weighed portion of the sorbent (0.007 g) was ground to a finely dispersed state in an agate mortar. Then the sample was mixed with KBr (0.170 g), followed by pressing this mixture in a mold to obtain a translucent tablet. When registering the spectra, the background KBr spectrum was first recorded, then the IR spectrum of the analyzed sample was recorded.

References

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The IR spectra of Tonsil OPTIMUM 210 FF and bentonite show that the structures have a similar profile. They contain pronounced absorption bands at 3600–3200 cm^{-1} , which are characteristic of stretching vibrations of hydroxyl groups (–OH), and the band at 3400 cm^{-1} is due to stretching vibrations of bridging groups of silicon hydroxide (SiOH) and interlayer water. In addition, the group with a wavenumber of 1620 cm^{-1} correlates with flexural vibrations and in the range 1400–400 cm^{-1} we observe characteristic bands for the functional groups Si–O and Si–O–R (R is an ion such as Al^{3+} or Fe^{3+} , which have different widths and heights due to the structure of the mineral).

Based on the data obtained, it can be concluded that Tonsil OPTIMUM 210 FF sorbent contains the main centers (–OH and –MeO–) on the surface with a predominance of –OH. On the surface of amorphous silica, there are several main centers of various types with predominance of –H.