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LUMINESCENT AROMATIC HYDROCARBONS OF ZAGLY PETROLEUM OF THE APSHERON PENINSULA OF AZERBAIJAN

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Oil and petroleum products are a rich source of hydrocarbons, the study of the hydrocarbon composition of new deposits allows the discovery of new hydrocarbons, which can provide a number of industries (petrochemical and oil refining, pharmaceuticals, etc.) with corresponding cheap hydrocarbons. For example, the production of quality oil products by the oil industry is highly dependent on the quality of the raw materials supplied to the oil refining industry; aromatic-based heavy oil fractions are used to produce petroleum phosphors, etc. In this regard, at the Institute of Petrochemical Processes of the National Academy of Sciences of Azerbaijan, the composition of natural oil is currently being comprehensively studied using modern highly sensitive instruments (UV, IR, NMR, chromato-mass spectroscopy, luminescence, etc.) hydrocarbon compounds are determined, their physico-chemical and spectral-luminescent properties are studied and proposed for application in the corresponding industries.

In this work, the physicochemical and spectral-luminescent properties of Zagly natural oil are studied. Oil consists of paraffin-naphtha, aromatic hydrocarbons, and also contains resins and asphaltenes. Physical and chemical indicators are given in the table:

Substance name	Reflection coefficient, n_d^{20}	Density ρ_4^{20}, кг/м^3	Yield of components relative to oil, %
Paraffin-naphtha	1,4685	859,7	40,5
1st group aromatics	1,5074	892,1	15,3
1st group aromatics	1,5480	932,1	4,5
1st group aromatics	1,5790	972,2	7,8
1st group aromatics	1,6011	1043,6	18,7
Resin	-	1065,2	11,6
Asphalten	-	-	1,6

Since the petroleum substance is a dispersed system of complex composition, in order to improve the accuracy of spectral studies, Zagli's well oil was separated by liquid adsorption chromatography (GOST 11244-76) method into separate components and the structural-group composition of aromatic hydrocarbons was studied: mono (benzene-11.7; 23.1; 24.3; 7.1%), bi- (naphthalene-12.8; 17.1; 18.3; 30.1%) and tricyclic (anthracene-1.1; 1.1; 1.3; 2.7% and phenanthrene-10.9; 14.1; 15.4; 24.6%) hydrocarbons. It has been established that as the concentration of solutions increases, the UV spectra shift to the long-wavelength region of the spectrum, and even in group IV, the "red" edge of the spectrum reaches > 500 nm.

Using the methods of luminescent excitation and luminescence, it was found that, despite the presence of mono-, bi- and tricyclic aromatic hydrocarbons in components I-IV gr. AH of this oil, them the ratio varies by components and if in I-III gr. AH the main luminescent glow in the components is provided by tricyclic aromatic hydrocarbons (TAH) and their substituted compounds, then in component IV gr. AH, photoluminescence is provided by both polycyclic bicyclic aromatic hydrocarbons (BAH) and TAH. Based on the results obtained, it can be concluded that, despite the absorption of light quanta in oil components by individual hydrocarbons (benzene, naphthalene, phenanthrene, anthracene and their substituted ones), there is energy transfer between hydrocarbons and it occurs from a low molecular weight to a higher molecular weight hydrocarbon ($h\nu_{benzene} \rightarrow h\nu_{naphtha} \rightarrow h\nu_{phenanthrene} \rightarrow h\nu_{anthracene}$) and finally, an intense luminescent glow is observed, corresponding to a higher molecular weight hydrocarbon: TAH (I - III group AH), BAH and TAH (I-IV group AH).

Component IV gr. AH oil Zagly can be offered in the production of phosphors for the detection of microdefects in the field of fluorescent color flaw detection [1, 2].

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