

Brief information about the project

Name of the project	AP15473256 «Investigation of the activity of promoted composites based on mesoporous aluminosilicates in the diesel fractions' dewaxing process».
Relevance	<p>Today, due to the decrease in the reserves of medium and light oils, the amount of which, according to forecasts, will be insufficient to meet the required demand by 2035, the scientific community is faced with the issue of high-quality processing of heavy crude oil and its derivatives. This is especially true for Kazakhstan due to the predominance of reserves of highly paraffinic oils.</p> <p>One of the valuable fractions of paraffinic oils is the diesel fraction, which can be used as commercial fuel. However, the high content of normal alkanes (~10-40%) in the composition of the diesel fraction leads to a deterioration in the performance characteristics of the fuel and, as a result, the inability to use the diesel fraction without additional processing in the cold season at lower temperatures, which is critical for many regions of Kazakhstan with cold winters. In this regard, the process of hydroisodewaxing of the diesel fraction is increasingly used, because of which n-alkanes in the presence of catalysts are converted into branched alkanes and, as a consequence, the performance characteristics of diesel fraction are improved. Bifunctional catalysts based on zeolites and mesoporous materials promoted with transition metals have become widely used in this process.</p> <p>In connection with the foregoing, this work is devoted to the study of the activity of promoted catalysts based on mesoporous aluminosilicates and natural bentonite in the process of hydroisodewaxing of diesel fractions. The implementation of the study consists in the synthesis of bifunctional catalysts, the study of their physicochemical characteristics and testing their activity in the process of dewaxing diesel fractions, as well as the study of the hydrocarbon composition and performance characteristics of diesel fractions before and after the process.</p>
Purpose	Study of the catalytic activity of bifunctional composites based on mesostructured aluminosilicates in the dewaxing process of Kazakhstani oil's diesel fractions.
Objectives	<ul style="list-style-type: none"> • Study of morphology and textural characteristics of synthesized aluminosilicates and composites based on them. • Study of acid characteristics of synthesized composites based on mesoporous aluminosilicates. • Study of the physical and operational characteristics and composition of diesel fractions before and after the process. • Investigation of the effect of temperature and feed space velocity on the yield and selectivity of isoparaffins in the diesel fractions' dewaxing process in the presence of bifunctional composites based on mesoporous aluminosilicates. • Study of the state of promoting additives on the surface of composites based on mesoporous aluminosilicates. • Study of the influence of promoting additives on the activity of bifunctional composites based on mesoporous aluminosilicates in the diesel fractions' dewaxing process.

	<ul style="list-style-type: none"> • Study of physical and chemical characteristics of spent (after experience) composites based on mesoporous aluminosilicates.
Expected and achieved results	<ul style="list-style-type: none"> • Aluminosilicates and composites based on them will be synthesized and their morphological, textural and acid characteristics will be studied. • The state of promoting additives on the surface of composites based on mesoporous aluminosilicates will be studied. • The physical and operational characteristics and composition of diesel fractions before and after the process will be studied. • The effect of temperature and feed space velocity on the yield and selectivity of isoparaffins in the diesel fractions' dewaxing process in the presence of bifunctional composites based on mesoporous aluminosilicates will be studied. • The effect of promoting additives on the activity of bifunctional composites based on mesoporous aluminosilicates in the process of dewaxing diesel fractions will be studied.
Research team members with their identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and links to relevant profiles	<p>Abdildina Kamilla, PhD - Researcher ID: B-9560-2017 https://www.webofscience.com/wos/author/record/971589 ORCID: 0000-0002-0474-5240 https://orcid.org/0000-0002-0474-5240 Scopus Author ID: 57220029184 https://www.scopus.com/authid/detail.uri?authorId=57220029184</p> <p>Vassilina Gulzira, Cand. of Chem.Sc., Researcher ID: A-5232-2015 https://www.webofscience.com/wos/author/record/1012011 ORCID: 0000-0002-5407-6751 https://orcid.org/0000-0002-5407-6751 Scopus Author ID: 55604181500 https://www.scopus.com/authid/detail.uri?authorId=55604181500</p>
List of publications with links to them	<ul style="list-style-type: none"> • Gulzira Vassilina, Kamilla Umbetkaliyeva (Abdildina), Nuray Oktar, Birce Pekmezci Karaman, Tursunay Vassilina. Characterization and catalytic activity of Ni/mesoporous aluminosilicate HMS and Mo/mesoporous aluminosilicate HMS in the conversion of n-hexadecane // Materials Today: Proceedings (Scopus). – 2020. – Vol. 31, Part 3. – P. 580-583. https://doi.org/10.1016/j.matpr.2020.06.562 • Vassilina G.K., Abdildina (Umbetkaliyeva) K.M., Abdrassilova A.K., Vassilina T.K., Zakirov Zh.Y. The mesoporous aluminosilicate application as support for bifunctional catalysts for n-hexadecane hydroconversion // Open Chemistry. – 2022. – V. 20. P.225-236. https://doi.org/10.1515/chem-2022-0134 • Kamilla Abdildina , Gulzira Vassilina, Albina Abdrassilova, Ivan A. Klassen и др. The Role of Catalyst Promotive Additives and Temperature in the Hydroisodewaxing Process // J. Molecules. – 2023. – Vol. 28(22), – P. 7598. (процентиль: 78, Q2) https://doi.org/10.3390/molecules28227598
Patents	-





