Project name, IRN	***AP08955761*** **-** Technology of natural diatomite raw material enrichment by electrohydraulic method
Completion date	08.10.2020-30.09.2021
Project supervisor	Sagimbayeva Shynar Zhanuzakovna - c.ph.-m.s., associated professor
Report	The relevance of the project is due to the need to develop innovative methods for enriching natural diatomite raw materials by separating it from the clay component by electrohydraulic method. Electrohydraulic explosion of a mixture of diatomite and clay in an aqueous solution will lead to a fine dispersion state. Over time, the separation of components occurs depending on the densities of diatomite and clay. For example, the density of diatomite is in the range of 380-1000 kg/m^3, and clay is 1400-1700 kg / m^3. Therefore, the clay, as a heavier material, will settle in the lower layer, and the diatomite will concentrate on top of the clay component. A preliminary study of the elemental composition of the two obtained fractions shows a significant increase in the percentage of silicon in the upper diatomite fraction, which requires a systematic study of the effectiveness of diatomite enrichment.
Purpose	The project's aim is to purify natural diatomite using electrohydraulic method, the essence of which is that electric discharge creates ultra-high hydraulic pressure shattering diatomite suspension into small fractions. Fine fractions are separated by mass: diatomite layer remains in the upper part, while clay components are lowered to the bottom.
Expected results	- Energy and time parameters of electrohydraulic influence on diatomite will be worked out in order to determine optimal modes of its separation from clay. - Experiments will be carried out in different modes of high-voltage electric pulse action in an aqueous solution of diatomite raw materials using a small-sized electric discharge unit operating on the basis of the Yutkin electrohydraulic method; - Chemical analysis will be performed after cleaning the diatomite by electrohydraulic method of each fraction separately; - A laboratory model of a powerful frequency electrohydraulic device with a wide range of practical applications for diatomite enrichment will be created. The advantages of the proposed device for diatomite enrichment are its low weight (600-800 kg for 4-channel device), 3 times less than the analogues weights which allows to install it on the car with loading capacity of 2 tones; lower cost and automatic protection system. It is safe for people working nearby and allows to considerably accelerate the work. Method is environmentally friendly, there is no harmful influence of chemicals, shock waves and acoustic waves in air, no flying splinters, etc
Research group	Supervisor – Main researcher: Sagimbaeva Shynar, c.ph.-m.s., associated professor, H index=4 (Author ID in Scopus – 6602130267; ORCID - 0000-0002-1234-3030). https://www.scopus.com/authid/detail.uri?authorId=6602130267 Shunkeyev Kuanyshbek, d.ph.-m.s., professor, H index=8

	(Author ID in Scopus – 57211063006; Researcher ID - O-8849-2017; ORCID - 0000-0002-3860-397X). https://www.scopus.com/authid/detail.uri?authorId=57211063006 Tarkovsky Vikenty Vikentyevich, c.ph.-m.s., associated professor, H index=4 (Author ID в Scopus – 23006668400) https://www.scopus.com/authid/detail.uri?authorId=23006668400 Tastanova Lyazzat Knashevna, c.ch.s., H index=1 (Author ID в Scopus – 57202578243). https://www.scopus.com/authid/detail.uri?authorId=57202578243 Myasnikova Lyudmila, c.ph.-m.s., associated professor, H index=4 (Author ID в Scopus – 16481268100; Researcher ID - O-9697-2017; ORCID - 0000-0003-3326-7206). https://www.scopus.com/authid/detail.uri?authorId=16481268100
Publications in scientific publications	1. Вестник Гродненского государственного университета имени Янки Купалы. Серия 6. Техника. – 2020. – Т.10. №2. – С. 20-31. http://www.vesnik@grsu.by 2. Patent RK № 6260 na poleznuyu model'. Elektrogidravlicheskiy sposob obogash-cheniya diatomita / Sagimbayeva SH.ZH., Shunkeyev K.SH., Tarkovskiy V.V., Tastanova L.KZ., Myasnikova L.N. zayavitel' i patentoobladatel' NAO «Aktyubinskiy regional'nyy univer-sitet imeni K.Zhubanova», Reg. nomer zayavki - 2021/0122.2; zayavl. 10.02.2021; opubl. 23.07.21. - 5 s. 3. Patent RK № 6137 na poleznuyu model'. Maska-skrab s diatomitom i aloe / Sagimba-yeva SH.ZH., Shunkeyev K.SH., Zhanturina N.N., Myasnikova L.N., Aymaganbetova Z.K., Istlyaup A.S. zayavitel' i patentoobladatel' Sagimbayeva SH.ZH., Reg. nomer zayavki - 2021/0071.2; zayavl. 26.01.2021; opubl. 11.06.21. - 5 s. 4. Sagimbayeva Sh.Zh., Shunkeyev K.Sh., Tarkovsky V.V., Tastanova L.K., Myasnikova L.N., Beketova G.K. Electroplasma enrichment of natural diatomite // Metalurgija. – 2022. – Vol.61(1). – P. 281-284. 5. Sagimbayeva SH.ZH., Shunkeyev K.SH., Tarkovskiy V.V., German A.Ye., Sergeyev D.M., Tastanova L.K., Ubayev ZH. K. Elektrogidravlicheskiy metod obogashcheniya prirodnogo diatomita kazakhstanskogo mestorozhdeniya // Vestnik KazNITU. –2021. – №4. – S. 138-150.