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# POSSIBILITY OF PROCESSING OIL SHALE OF THE AKTAU DEPOSIT

*Almatov I.M.*

*Doctor of Philosophy in Engineering Sciences, Senior Research Fellow*

*University of Geological Sciences State Institution "Institute of Mineral Resources"*

*Abstract.* Oil shales are used as fuel, their products are used as fuel, raw materials for the chemical industry and the building materials industry; solid wastes of mining, enrichment and processing - raw materials for the building materials industry. The most advanced technology is "Galoter" and "Petroter", since these processes have a minimal impact on the environment and a maximum yield of target products of 90-93%. The main part of oil shales consists of complex hydromica. Integrated processing of oil shale from the Aktau deposit will provide the republic with oil products, non-ferrous, rare and rare earth elements.

*Purpose of research.* Study of the potential processing of oil shale from the Aktau deposit.

*Key words:* oil shale, waste, technology, vanadium, molybdenum.

Oil shales, sedimentary minerals, consisting of organic matter 10-50% by weight and the mineral component of clay, siliceous and other useful minerals. Oil shales are used as fuel, their products are used as fuel, raw materials for the chemical industry and the building materials industry; solid wastes of extraction, enrichment and processing are raw materials for the building materials industry [1-6].

In technologies, two sources of oil shale heating are used: solid heat carrier (shale ash, ceramic balls) - Halothere, Enefit and Alberta Tasiuk processes, gas heat carrier (with internal heating - Union, Paraho, Kiviter, Superior, Union, Petrosix and Fushun processes) . Existing pyrolysis methods have a number of

disadvantages: low specific productivity of the reactor, increased consumption [7–9]. Based on the comparative characteristics of oil shale processing, it has been established that the most advanced technology is "Galoter" and "Petroter", since these processes have a minimal impact on the environment and a maximum yield of target products of 90-93%.

The predicted resources of oil shale in the Central Asian region up to a depth of 600 m from the day surface are determined at 93 billion tons. (Including 47 billion tons in Uzbekistan) [10-15]. Only in the Kyzylkum basin there are deposits with predicted reserves of oil shale in the amount of 24.6 billion tons. At the deposits of Baysun, Sangruntau, Aktau, Uchkyr-Kulbeshkak, Urtabulak, the reserves of oil shale are more than 1.0 billion tons.

The oil shale of the Aktau deposit consists mainly of hydromica-carbonate-quartz or clay-carbonate-quartz shale (hydromicas are often referred to as clay minerals) mineral composition with the presence of organic substances in them.

The content of organic carbon, which is the main constituent of organic matter - kerogen - 11.2% ~15%. In combustible shales, the main part is occupied by hydromicas (in the form of clay substances), calcareous minerals (dolomite, ankerite, and others), brittle micas, and chlorites. Rock-forming rocks include quartz, feldspars (acidic plagioclase and potassium feldspar). Oil shales have inclusions of minerals of contact-metasomatic origin - in the form of wollastonite, celsian and carbonates of various compositions. The rock has thin interspersed inclusions of ore minerals - pyrite, pyrrhotite, chalcopyrite, sphalerite and their alteration products. Pyrite is widely developed among ore minerals. Ore minerals form a finely disseminated texture.

The shale rock contains single and rare signs of accessory minerals. Accessory minerals are represented by rutile, apatite, monazite, baddeleyite, and corundum.

Waste of the original oil shale after firing - ash does not differ in material composition. In the burnt waste, primary minerals containing water are dehydrated. These waste products also lack organic matter. Changes also take place with ore

minerals and their substitution products (iron hydroxides pass into hematite, oxide form), etc.

Table 1

Results of mineralogical analysis of ash from oil shale of the Aktau deposit

| **No p/n** | **Name of minerals** | | **Content, %** |
|---|---|---|---|
| I | Sulfides and products of their modification: | Pyrite | ~3,8 |
| | | Pyrrhotite | |
| II | Sulphates: | Gypsum + anhydrite | ~5,2 |
| III | Rock-forming and other minerals (silicates.): | Quartz | 17,5 |
| | | Plagioclases (albite + oligoclase) | 7,5 |
| | | Hydromicas of complex composition (hydromuscovite + glauconite, etc.) | 21,0 |
| | | Chlorites + and other brittle micas (margarite) | 7,0 |
| | | Minerals gr. wollastonite | 6,1 |
| IV | Carbonates: | Calcite | 5,0 |
| | | Dolomite | - |
| V | Accessory minerals | Rutile and its varieties | 1,0 |
| | | Apatite | ~1,4 |
| VI | Organic, carbonaceous substances | Organic, carbonaceous substances | ~12,0-15,0 |



As can be seen from the data in Table 1, sulfides and products of their change is 3.8%; sulfates 5.2%; rock-forming and other minerals, carbonates 5.0%; accessory minerals from 1.0 to 1.4%; organic, carbonaceous substances from 12 to 15%. The main part of oil shales consists of complex hydromica.

It should be noted that the complex processing of oil shale from the Aktau deposit will provide the republic with oil products, non-ferrous, rare and rare earth elements.

## Bibliography

1. Nazarenko M.Yu., Kondrasheva N.K., Saltykova S.N., Efficiency of using combustible shale and shale-ash waste for water purification from organic pollutants. Bulletin of the Tomsk Polytechnic University. Engineering of georesources. - 2016. - V. 327. No. 9. - P. 95–103.

2. Simonov V.F., Selivanov A.A., Mrakin A.N., Morev A.A., Determination of the kinetic constants of the release of gas products during the thermal destruction of sulfide oil shale. Vestnik SGTU. - 2015. - V. 81. No. 4. - P. 219–224.

3. Meybaum H., Oil shale volume chain from mining to and products. Estonian oil shale industry. Estonia. Earbook 2018. - P.8-14.

4. Aboutfile:///D:/GEIPER/Newsletter/08-13/www.lexinnova.com

5. Jianghua CHEN, Shale Gas Exploration and Development Progress in China and the Way Forward // IOP Conf. Series: Earth and Environmental Science 113. - 2018. P.1-7.

6. Ruven Fleming, The new German ‘fracking’ package // Journal of Energy & Natural Resources Law. - 2017. - Vol 35. No. 3. - P. 293–316.

7. Bit Tooth Energy, The Future of Oil Shale, Techcorr. - 2010. - www.techcorr.com. P.41-44.

8 U.S. Energy Information Administration: Shale in the United States. Internet resource: www.eia.gov. P.18-21.

9. Elliott Gue., Oil Shale, Shale Oil, and 6 Ways to Play the Difference, Seeking Alpha. - 2010. P.51-53.

10. Isokov M.U., Yusupkhodzhaev A.M., Alimov R.S., Somova U.A., Prospects for the development of oil shale in the Republic of Uzbekistan // Proceedings of the scientific and practical conference “Design and scientific support of innovative technologies in mining and processing oil and gas". - 2015. - P. 180-186.

11. Isokov M.U., Turesebekov A.Kh., Borminsky S.I., Vasilevsky B.B., Sharipov Kh.T., Deryugin E.K. Geochemistry and mineralogy of oil shale of Uzbekistan//Ed. B.A. Isakhodzhaev; State Committee for Geology of the Republic of Uzbekistan, State Enterprise "NIIMR", Institute of Geology and Geophysics of the Academy of Sciences of the Republic of Uzbekistan, Ministry of Higher Education and Science of the Republic of Uzbekistan, Tashkent KhTI. -T.: SE "NIIMR". - 2013. P. 78.

12. Isokov M.U., Borminsky S.I., Khozhiev A., On modern technologies for the complex processing of oil shale of the Republic of Uzbekistan // Uzgeoinnovation. – 2012. P. 164-165.

13. Conceptual design of the Sangruntau oil shale processing complex based on UTT-3000 units (based on the Haloter UTT-3000 process) // 17th Intern. conf. "Oil and Gas of Uzbekistan". "Internatijnal Hotel Tashkent", Uzbekistan - Atomenergo-proekt, St. Petersburg. OOO TTU-Ltd. May 15-16, 2013. P.116-124.

14. Golmshtok E.I., Salikhov R.M., Kozhitsev D.V., Petrov M.S., Blokhin A.I., Blokhin S.A., Method and plant for oil shale enrichment // Patent RU 2393199. - Application: 2008131752/15, 08/01/2008.

15. Isokov M.U., Borminsky S.I., Shin V.M., Rustamov A.I. The main directions of geological exploration, laboratory-analytical and technological research on oil shale in the Republic of Uzbekistan // Sat. abstract Republican sci.-tech. conf. "Priority directions of geological study of subsoil, hydrogeological and engineering-geological studies in the Republic of Uzbekistan". — Tashkent. - 2011. - P. 170–176.