

Short Reports

**SEPARATION OF BITUMEN
FROM MINERAL PART
OF OILBITUMENE ROCKS
OF THE WESTERN KAZAKHSTAN**

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In presented work oilbitumene rocks (OBR) of the Western Kazakhstan, of fields Tyub-Karagan Munayly-Mola and Beke were used. For separation of oil-containing part of oilbitumene rocks from a mineral part by of water – alkaline extraction and extraction by organic solvent in Sokslet's device are used. As solvent alcohol- benzene mix was used. The extraction method by organic solvent determined composition of oilbitumene rocks. It is shown that oilbitumene rock of the Munayly-Mola field is more enriched with organic part in comparison with OBR of Tyub-Karagan field. The method of the sedimentation analysis determined the size of particles of mineral part of OBR. It is shown that the mineral part of oilbitumene rocks is polydisperse. The greatest share of particles of a mineral component for system of m of Munayly-Mola has the size of particles of 03–0,38 microns, for system Tyub-Karagan – 0,2–0,25 microns. Research by method of infra-red spectroscopy has been shown that oilbitumene rocks contain saturated and cycloparaffin hydrocarbons, and also existence of CH₂- and CH₃-of groups is revealed. The received results showed that oilbitumene rocks of the Western Kazakhstan can be used as a alternative power source to oil.

The international experience shows that oilbitumene rocks can be used for receiving a wide range of valuable products: “synthetic” oil, the liquefied gas, in the paint and varnish and electrotechnical industry, in road construction [1, 2]. Reserves of

oilbitumene rocks in the Western Kazakhstan make 950–1000 million t [3, 5].

OBR are characterized by variety and inconsistency of structure and properties of their initial raw materials. They represent the difficult microheterogeneous disperse system consisting from organic (bitumene) and mineral (sand, clay, firm inclusions with impregnations of metals and oxides, salts) parts. Oilbitumene rocks are multicomponent raw materials, generally this chemical and power.

Content of bitumen and mineral part in rock is unequal not only for various fields, but also for one field on its area and depth. As raw materials for practical use can serve both organic, and mineral components of OBR.

For research in this work oilbitumene rocks of the Western Kazakhstan of fields Tyub-Karagan, Munayly-Mola and Beck were used.

For separation of oilcontaining part of OBR from mineral ways of water and alkaline extraction [4] and extraction by solvent in Sokslet's device are used. As solvent alcoholbenzene mix was used. Results of extraction by solvent in Sokslet's device are given in the Table.

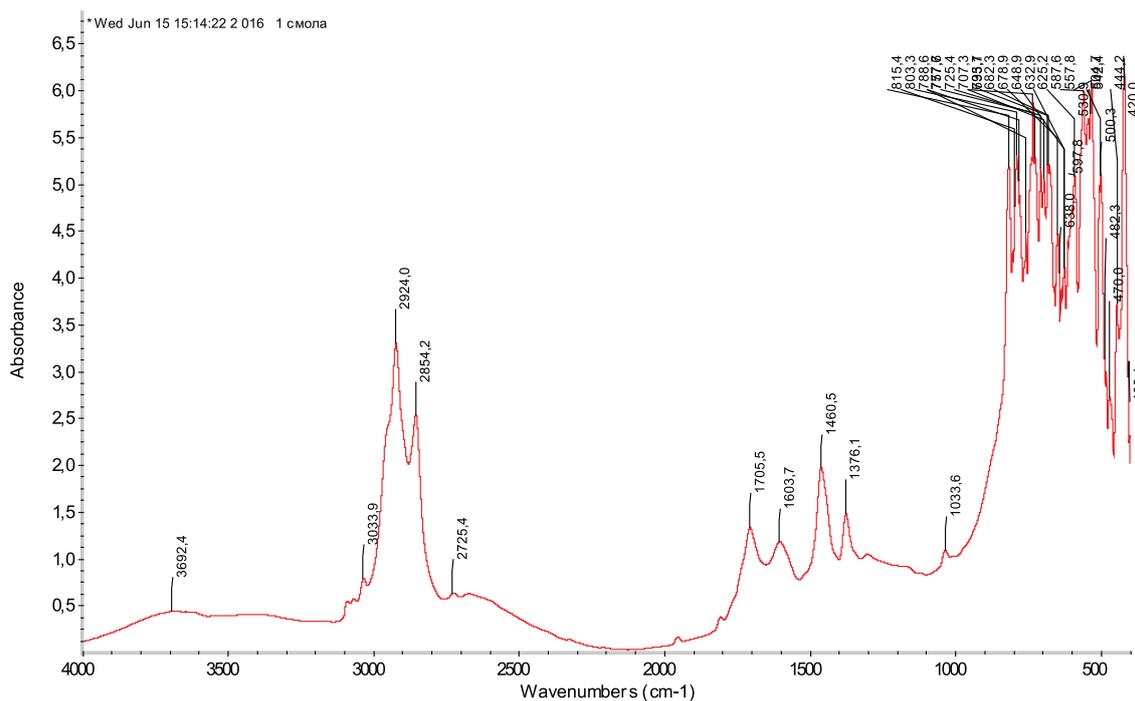
Apparently from the data provided in the table, oilbitumene rocks of Munayly-Mola is more enriched with organic part (16,71%), and the mineral part makes 83.29% whereas at breeds of Tyub-Karagan (14,6 and 85,4%) and Beck Karagan (10,2 and 89,8%) respectively.

Research of organic part investigated by NBP was conducted by method of infrared spectroscopy. In Figure the IR spectrum, the natural bitumene emitted from OBR of Munayly-Mola is presented.

For all samples of bitumene in the field of 400–2200 cm⁻¹ of a strip of absorption strips are observed at 425 and 426,9; 471,2 and 485,3; 537,5 and 559,5; 618,9 and 646,8; 705 and 726,8; 882; 911,8 and 925,7; 986,1; 1032,3 and 1042,2; 1070,1; 113,5 and 1125,6; 1218,8; 1236; 1282,6; 1375 and 1376,3; 1453,9 and 1457,7; 1486,4; 1557,9; 1581,7; 1598,3; 1641,6; 1699,3; 1721,5; 1958,1; 2108,2 and 2149,6 cm⁻¹.

The composition of oilbitumene rocks determined by an extraction method

| OBR | Mass of OBR, g | Maintenance of organic part | | Maintenance of mineral part | |
|-----------------|----------------|-----------------------------|-------|-----------------------------|-------|
| | | g | % | g | % |
| 1. Tyub-Karagan | 50 | 7,30 | 14,60 | 42,70 | 85,40 |
| 2. Munayly-Mola | 50 | 8,35 | 16,71 | 41,65 | 83,29 |
| 3. Beck | 175 | 17,86 | 10,2 | 157,14 | 89,8 |



IK – a range of the bitumen emitted from NBP of m of Munayly-Mola

Very intensive items at 1375–1376,3 and 1453,9–1457,7; 1486,4 cm^{-1} in oil fractions belong to valent and deformation fluctuations of SN_2 - and CH_3 -groups in paraffin and cycloparaffin hydrocarbons. In ranges of all components the absorption strip at 726,8 cm^{-1} which corresponds to deformation fluctuations of CH_2 -groups in free paraffin chains is accurately visible.

The disperse structure of mineral part of oil-bitumene rocks of systems was studied by method of the sedimentation analysis. Its principle is based on determination of speed of subsidence of particles of a disperse phase on a cup of the torsion scales and the subsequent establishment of nature of distribution of particles by the sizes and degree of dispersion [6]. In work differential curve distributions of particles by the sizes of three systems of oil-bitumene rocks were constructed.

It is shown that the size of particles of sand for system Tyub-Karagan makes 0,2–0,25 mkm , for

particles of Munayly-Mola – 0,3–0,38 mkm and for a sisema Beck – 0,2–0,27 mkm .

References

1. Bohm M., Goold S., Laux S., Neu B., Sharma A., Aasen K. Application of oxy-fuel CO_2 capture for in-situ bitumen extraction from Canada's oil sands // Proceedings of XXI World Energy Congress. – Montreal, Canada, 2010. – P. 12–1b.
2. Zhang Xiaoming, Pan Yi. Development and application of oil sand // Int. Journal of Scientific & Engineering Research. – 2012. – Vol. 3. – Issue 4. – P. 360–363.
3. Lipatova V.V., Svetlakovae A., Trokhimenko M.S. Mes-toskoplenniyе of solid bitumens and high-viscosity neftу Caspian Depression in southeast part // Oil and gas geology and geophysics. – 1980. – № 4. – P. 7–10.
4. Meshcheryakov St., Toyganbayev E.A., Ospanova Zh.A., Pankratova N.A. A.S. USSR 648597, opubl. 25.02.79, bulletin № 7. An additive in process of water extraction of bitumen of bituminous rocks.
5. Nadirov N.K., Braun A.E., Trokhimenko M.S., etc. Neft-e-bituminozny breeds of Kazakhstan: problems and prospects. – Almaty. 2001. – 5 tomov. – 376 p.
6. Frolov Yu.G. Course of colloidal chemistry. Superficial phenomena and disperse systems. M.: Himiya, 1982. – 400 p.