BULLETIN OF NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
ISSN 1991-3494
Volume 1, Number 371 (2018), 106 – 109

UDC 553.07

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CHARACTERISTICS OF ZEOLITES FROM CANKANAY, ALTYN-EMELSKOYE, KAINARSKAYA, TUZKOLSKOE, DAUBABINSKOYE DEPOSITS

Abstract. The article gives a description of the zeolites of the Chankanay, Altyn-Emel, Kaynar, Tuzkol and Daubabinskoye deposits. Zeolites (natrolite and thomsonite) along with analcime and calcite perform numerous tonsils in lavas, cement clastic material in tuffs, and also form secondary emissions of feldspar, leucite and volcanic glass. The content of zeolites is from 5 to 15%. Monomineral zeolite accumulations are found in some areas, along faults. Horizons of zeolite-containing rocks can be traced for 5 km at a power of up to 50 meters or more. The most promising in the search for zeolite are sites along tectonic disturbances, where zeolitization processes have intensively manifested. Mineral composition shows that zeolites of these deposits can be used as ameliorants, diet additives in the cement industry.

Key words: zeolite, deposits, minerals, spar, tectonics.

Zeolite is a generalized name for frame aluminosilicates produced in deposits and obtained synthetically. Their crystal structure is represented by tetrahedra of silicon and aluminum oxides, united in lacy frames with the same size cavities filled with cations of alkali and alkaline earth metals and water molecules. It is the porous structure and diverse composition of ions that determine its qualities, making the zeolite irreplaceable for use in the chemical, nuclear, food, agriculture, life and medicine. In the world there are about 1000 deposits where it is possible to extract natural zeolite (tuff) on a large scale [1].

The Chankanay deposit (467) is located in the Guards district of the Almaty region, 25km southeast of the railroad. Saryozek station and 5 km to the south-east from the Chankanay RTS, 1 km from the asphalt road. The area is economically developed. It was opened in 1990. Almanemel party. Studied by AV Morozov in 1994.

The deposit is confined to the Saryozek brachisinclinorium. The host rocks-tuffs, ignimbrites of the rhyolite-dacite composition of the Zalgizagashsky permian formation (Figures 135, 136). Mineralization is represented by a horizontally lying deposit of zeolites, not contoured in length and width. Its average power is 25 m. Depth of occurrence of the rabbit from 0 to 25 m.

Chemical composition of ores, %: SiO_2 – 50-62, TiO_2 – 0,3, Al_2O_3 – 12-16, Fe_2O_3 – 3,1-4,0, CaO – 1,4-1,9, MnO – 0,1, Na_2O – 0,1-1,4, K_2O – 5-5,5.

Mineral composition of zeolite ores: clinoptilolite, lomontite, analcime. Content of zeolites – 15-90%.

Zeolites can be used as a sorbent for purifying waters for domestic and drinking purposes and as a feed additive in animal husbandry and poultry farming.

The following conditions are taken into account when calculating the reserves: the on-board content of zeolites is – 20%, the minimum content of zeolite is 50%, the minimum thickness of the ore body is 2 m.

Inventories recorded in the balance sheet (kt) as of 01.01.96 are A + B + C1-3406, with a zeolite content of 60.4%, off-balance – 3604 at a zeolite content of 47.64%.

Open-cast mining with a maximum working depth of 20 m has been carried out since 1996 by Rystas JSC. The conditions of occurrence of zeolites, the shape of the body, high power, insignificant depth and

volume of overburden are very favorable. Prospects of the field are very significant due to transfer of reserves to higher categories, additional exploration of flanks and promising ore occurrences near the field [2].

The Altyn-Emel field (468) is located in the Panfilov district of the Almaty region, 55 km west-north-west of the railroad station Sary-Ozek. The Almaty-Sary-Ozek-Khorgos highway runs through the field. In 7km north-west of the settlement properties. Tests as strontium and cadmium sorbents were carried out at the Institute of Metallurgy and Enrichment of the National Academy of Sciences of the Republic of Kazakhstan. On the chemical faculty of KazNU on their basis a catalyst was obtained, intended for direct purification of gases and hydrogen sulphide.

Altynamel, in 20km south-east of the village of Baschi. The area is economically developed. In a 5 km power line with a capacity of 10 kW. It was discovered in 1986 by V.N. Portnyagin, V.I. Lysov. It was studied in 1990 by L.G. Pavlov.

It is confined to the Altyn-Emel anticline. It is located among the volcanogenic strata of the rocks of the Zheldykarinskaya suite of the upper Permian. The thickness falls monoclinically to the northwest at an angle of 200. The underlying rocks are andesite and dacite porphyrites, overlapping-tuffs and tuffites of various composition. The total thickness of the formation is 900 m, zeolite-bearing rocks are 150 m. Zeolitization affected tuffs of mixed composition (andesite-dacite). The richest areas with a high content of zeolites are confined to zones of disruption. The shape of the bodies is lenticular. Stretching them north-west 290-3300, length 1500 m, width 100-700 m, power 16-51m (average 43m). The depth of occurrence is 0-52 m.

Mineral composition: Heylandite, Stilbite, Skulecite, Lomontite.

Chemical composition: %: SiO_2 – 47.94; TiO_2 – 0.84; Al_2O_3 – 17.59; Fe_2O_3 – 7.93; FeO – 0.62; Fe_2O_3 + FeO – 8.55; CaO – 7.31; MgO – 4.28; MnO – 0.12; Na_2O – 2.67; K_2O – 0.47; Na_2O + K_2O – 3.14; P_2O_5 – 0.14; SO_3 – 0,1.

Physico-mechanical properties of zeolites: density – 2.54-2.89 (2,76) g/cm^3, bulk weight – 2.37-2.63 (2.42) g/cm^3, total porosity – 8.21-18.59 (13.97) % , bulk density – 1.33-1.46 g/cm^3.

The crush strength index is 0.51 - 1.03 kg/cm^2, the abrasion strength index is 99.0-99.9%, the water resistance is 98.05 - 99.7%, the benzene pore volume is 63 g/cm^3. Adsorption properties – 3.6 and 7.3% at p/ps = 0.4-1.0%, cationic properties from 24 to 64 meq / 100 grams (average 35), non-thermoresistant, highly acid resistant. Reserves of zeolites, approved by the balance on 01.01. 96. g., Account for the category C1 - 41 million tenge.

Forecast reserves with a zeolite content from 46.8 to 53.1% (average 50.1%) are 41163 thousand tonnes. The tests carried out allow the use of zeolite ores in the production of building materials (active mineral additives), as a feed additive for agricultural animals and birds, and for environmental protection (water treatment). The reserve deposit, explored, recommended for further technological study.

The described manifestations are located on a very promising area (425 sq. km.), Where the estimated reserves for P3 are estimated – over 5 billion tons of zeolite [3].

In addition to the above, there are manifestations of unclear perspectives, which require redemption: Dardandallah, Oikaragan, Kokto-Beb, Shakpakty, Saryozek, Maytyubinskoye, Shiylisu, Arkharli, Malaysar, and many unnamed manifestations. Most of them gravitate to the Chankanai field, significantly increasing its prospective reserves.

Sedimentary type.

The manifestation of the Kainar (474) is located in the Syrdarya region of the Kyzylorda region, 20 km east of the railroad. Zhana-Korgan station, in the central part of the Prikaratau region, in the interfluve of the Akuyk-Besharyk and is confined to the Zhana-Korgan elevation, complicated by the Shukyroy graben-syncline, Zhidelinsky and Zhana-Korgan anticlines.

Deep geological mapping of scale 1: 50000 was carried out within the area, thematic and prospecting works on granular phosphorites.

Phosphate deposits of the Middle Eocene occur on the noncarbonate bentonite clays of the Lower Eocene and are subdivided into the upper siliceous and lower carbonate packs. The rocks are porous, the composition is siliceous-argillaceous, and the silica is represented by globular and worm-like intergrowths of opal. Clay substance - montmorillonite composition. The silica content is 69.14 to 73.76%, the

carbonate content is 4.08-6.8%. Carbonate pack capacity of 8-20 m is composed of marls clay and phosphate-containing carbonate clays, limestones and phosphorites. Carbonate rocks 56-59% [4-5].

The clinoptilolite, quartz, cristobalite, calcite and montmorillonite were determined in the upper, siliceous part of the section in well.24a by X-ray analysis. Moreover, the amount of clinoptilolite decreases as it approaches the phosphatonic thicker.

In the interval of 12-22 m clinoptilolite more than 50%, 22-31 m – up to 20%. On an area of 300 sq. Km, 2700 million tons of clinoptilolite ore can be expected in category P3.

Manifestation Tuzkolskoye (475) is located in the Syrdarya region of the Kzyl-Orda region, 80 km north of the city of Kzyl-Orda, on the Tuzkol uplift, which extends along the main Karatau fault and has an isometric shape.

The arch of the uplift is composed of deposits of the Upper Cretaceous, the northeastern and eastern slopes are lacustrine sedimentary deposits of the Paleocene, Lower, Middle and Upper Eocene, overlapped by Neogene-Quaternary formations. The geological structure is complicated by a series of faults. The depth of occurrence of the mid-Eocene soles exceeds 100 m. Middle Eocene deposits are phosphate-bearing, occur on dark gray (to black) clays of the Lower Eocene. Regularities in the distribution of carbonate and siliceous rocks along the section are not observed. Plastics are not sustained on laterals.

Taking into account the lithological-facies, structural and stratigraphic features on the recommendation of S. Ya. Bayakhunova, phosphatostenium, higher and lower deposits for the presence of sedimentary-diagenetic zeolites.

In clay-zeolite rocks (well # 32/38), lying above the productive horizon, 65-70% of the zeolite is determined from the sections. In the sections taken between the layers of granular phosphorites, the content of the zeolite along the thin sections in the borehole. 34/38 at a depth of 12 m - 30%, 36 m - 15-20%, 48 m - 10-12%. In the base of the productive bundle along the well. 14/12 in the interval 97.5-98.4 m on the grinding of the zeolite 70%, at a depth of 111 m - up to 80%. In a similar horizon along the well. 18/0 determined up to 90% of zeolites at a power of up to 20 m. Radiographic analysis determined clinoptilolite-geylandid.

On an area of 750 km^2 along P3, it is possible to expect 13,500 million tons of ore. A comprehensive assessment of the area for the extraction of zeolite, granular phosphorites, glauconite and bituminous shales, containing rhenium, tungsten, molybdenum, germanium.

The Daubabinskoye deposit (469) is located in the Sairam district of the South Kazakhstan region on the right bank of the Daubab River, 15 km to the southeast of the village. Sas - Tube and 50 km northeast of Shymkent.

The rocks of the Daubabinsky permian formation form the core of the Daubabin brachisinline and are characterized by a high content of zeolites (Kompaneytsev, 1962). A complex of non-metallic minerals is associated with the volcanoes of the Daubabinsky Formation. Here, a large deposit of volcanic rocks, suitable as active additives to cement and for the production of mineral wool, has been explored. The area of development of the Daubaban volcanics is promising for the discovery of deposits of zeolites, vermiculites and Iceland spar (Fig. 139). The increased content of potassium, magnesium and a number of trace elements in volcanics allows us to recommend them as fertilizers [6, 7].

Zeolites (natrolite and thomsonite) along with analcime and calcite perform numerous tonsils in lavas, cement clastic material in tuffs, and also form secondary emissions of feldspar, leucite and volcanic glass. The content of zeolites is from 5 to 15%. Monomineral zeolite accumulations are found in some areas, along faults. Horizons of zeolite-bearing rocks can be traced for 5 km at a power of up to 50 meters and more.

Estimated reserves of zeolites (Kompaneets, 1962) – hundreds of thousands of tons, and active mineral additives – 221132 thousand tenge. The most promising in the search for zeolite are sites along tectonic disturbances, where zeolitization processes.

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ЧАНКАНАЙ, АЛТЫН-ЭМЕЛЬ, ҚАЙНАР, ТҰЗКӨЛ, ДАУБАБИНСК ЦЕОЛИТТІ КЕН ОРЫНДАРЫНЫҢ СИПАТТАМАСЫ

Аннотация. Мақалада Чанканай, Алтын-Эмел, Қайнар, Тұзкөл және Даубабинск кен орындарының цеолиттері сипатталған. Цеолиттер (натролит және томсонит) анальцим мен кальцитпен бірге лавалардағы көптеген бөртпелерді, түтіктердегі цемент-қылшықты материалдарды орындайды, сондай-ақ қайталама дала шпатының тұнба, лейкит және вулканды шыны түзейді. Цеолиттердің құрамы 5-тен 15%-ға дейін. Мономинералды цеолит жинақтары кейбір жерлерде, ақаулықтар бойында кездеседі. Цеолит құрамындағы жыныстардың горизонты 50 метрге дейін немесе одан да көп қуатпен 5 шақырымға дейін байқалады. Цеолит қорларын іздестіруде ең перспективалы болып табылатыны – цеолитизация процестері қарқынды түрде көрініс тапқан тектоникалық бұзылыстары бар жерлер. Минералды құрамы көрсеткендей, осы кендердің цеолиттері цемент өндірісінде мелиоранттар, диеталық қоспалар ретінде қолданыла алады.

Түйін сөздер: цеолит, кендер, минералдар, шпат, тектоника.

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ХАРАКТЕРИСТИКА ЦЕОЛИТОВ МЕСТОРОЖДЕНИЙ ЧАНКАНАЙ, АЛТЫН-ЭМЕЛЬСКОЕ, КАЙНАРСКОЕ, ТУЗКОЛЬСКОЕ, ДАУБАБИНСКОЕ

Аннотация. В статье приведена характеристика цеолитов местрождений Чанканай, Алтын-Эмельское, Кайнарское, Тузкольское, Даубабинское. Цеолиты (натролит и томсонит) вместе с анальцимом и кальцитом выполняют многочисленные миндалины в лавах, цементируют обломочный материал в туфах, а также образуют вторичные выделения по полевым шпатам, лейциту и вулканическому стеклу. Содержание цеолитов от 5 до 15%. На отдельных участках, вдоль разломов, встречаются мономинеральные цеолитовые скопления. Горизонты цеолитсодержащих пород прослеживаются на 5 км при мощности до 50 метров и более. Наиболее перспективными на поиски цеолита являются участки вдоль тектонических нарушений, где интенсивно проявились процессы цеолитизации. Минеральный состав показывает, что цеолиты данных месторождений могут быть использованы в качестве мелиорантов, диетдобавок в цементной промышленности.

Ключевые слова: цеолит, месторождения, минералы, шпаты, тектоника.

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