

CHEMICAL COMPOSITION OF ROCK-FORMING MINERALS MAGMATIC AND SEDIMENTARY ROCKS

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Abstract

This article provides sufficient information about the chemical composition, luster, clarity, specific gravity, and magnetism of rock-forming minerals. In addition, from this article you can learn about the structure, composition and conditions of formation of igneous and sedimentary rocks.

Keywords: Minerals, Clark number, crust, crystal, silicates, sulfides, ferromagnet, magma, amorphous mass, paragenesis, microlite, mineral grains, sedimentogenesis.

Minerals are made up of chemical elements. The composition of the earth's crust consists of the sum of all known chemical elements. Only 4 chemical elements make up 98% of the earth's crust - lithosphere. According to academician A.S. Fersman's proposal, the average percentage of certain elements in the Earth's crust was called "Clark's number", or simply "Clarks". 34% of minerals are silicates, 25% are oxides and hydroxides, 21% are sulfates, and 20% are other minerals. In modern mineralogy, the systematics of minerals is based on the chemical composition, crystal structure and genesis of minerals. The chemical classification of crystals was arranged. All minerals are divided into several classes depending on their chemical composition and crystal structure. The mineral class is divided into several subclasses, and the subclasses are divided into groups.

Minerals are divided into the following types according to their structure and composition: pure native elements, sulfides; oxide and hydroxide minerals; halide, sulfate and phosphorus minerals; carbonates and silicate minerals; chain and ribbon silicates; textured silicates.

The number of minerals with magnetic properties is very small. Minerals with weak paramagnetic properties (for example, pyrrhotite) are easily attracted to a magnet. In particular, there are minerals that are only magnetic, that is, they are ferromagnetic and attract iron scraps, nails and other iron objects. Magnetite. some types of iron, ferroplatinum have such properties. There are also

diamagnetic minerals that avoid magnetism (pure bismuth). The magnetic property of the mineral is checked using a freely rotating magnetic arrow.

Minerals are mainly formed under certain thermodynamic conditions. According to current information, most of the existing minerals are formed in the interior of the Earth's crust by the gradual crystallization of boiling magma or by the interaction of its products (gas, steam, boiling water solutions, etc.) with the surrounding rocks. . These are called primary endogenous minerals. They become secondary minerals in the atmosphere, biosphere and hydrosphere. Such natural compounds formed on the surface under the influence of the earth are called exogenous minerals.

Minerals have thermal and electrical conductivity, pyroelectricity and piezoelectricity. Also, it has solubility, burning in a flame with a unique color, taste, smell, powder (talc, yarosite) spreads like oil and other properties.

Solid minerals occur in nature in the form of multifaceted crystals of a certain shape, or in the form of a naturally crystallized solid mass or an amorphous mass. Minerals form separate (smaller) piles (clumps) or large integrated masses.

A rock is a mineral aggregate composed of one or more minerals. At the same time, if mineral grains are studied by eye, in some cases they can be studied only under a microscope due to their small size. Then, the minerals that make up the rock, their quantity, and their interaction are studied.

When magma flows to the surface of the Earth, its temperature and pressure drop very quickly. A certain part of minerals is separated from the cooled magma - lava in the form of crystals (phenocryst or phenocryst). The main part of the solution hardens in the form of very small crystals - microlite or amorphous volcanic glass. Effusives are easily distinguished from intrusive rocks because of their very fine grain and often glassy appearance.

Determining the conditions of formation of intrusive rocks is quite complicated. The solution of this issue is based on the following geological data: the shape of intrusive rocks, their size, their relationship with the surrounding rocks, and their chemical and mineral composition. Recently, these data are supplemented with the results of experiments. Intrusive rocks are formed during the gradual cooling of magma and the preservation of volatile components in solution. Therefore, they are characterized by a balanced paragenesis of minerals.

The mineral composition of igneous rocks depends on the chemical composition of the magma and the environment in which it crystallized. Legal paragenesis of rock-forming minerals corresponds to rocks with a certain chemical composition. They form the basis of gender classification. It is possible to learn that the mineral

composition of rocks depends on their crystallization conditions by comparing intrusive and effusive rocks.

Minerals are classified into primary and secondary groups based on the conditions of their formation (genesis). Primary minerals are products of crystallization of magma. They, in turn, are divided into basic and accessory minerals. The main minerals are the minerals that make up the rock, based on which the rocks are named. For example, the main minerals of granite are feldspars, quartz and biotite.

The structure of igneous rocks is defined by the following four signs: 1) degree of crystallization of rocks; 2) the size of mineral grains; 3) forms of crystals and methods of joining. The structure is divided into types and types. Types of structures are determined depending on some features of the rock.

Sedimentary rocks include rocks formed by the decay of previously formed rocks under conditions of low temperature and low pressure on the surface of the earth. Also, pyroclastic rocks (volcanic ash, tuff, tuffite and tuffogenic rocks) formed from the solid products of the volcano form a separate group of sediments. Sedimentary rocks are formed from the exogenous accumulation of various fragments and minerals at the bottom of oceans, seas, lakes, rivers, swamps in the upper part of the lithosphere.

The general definition of sedimentary rocks is given by M.S. Shvetsov cites the following: "Sedimentary rocks are rocks formed by the life activity of organisms and deposited in the environment of any materials in air and water, and always formed under the conditions of pressure and temperature on the surface of the earth."

The composition of sedimentary rocks consists of mineral and rock fragments formed by the decay of igneous and metamorphic rocks, the remains of organic substances and sediments formed by the accumulation of chemically formed minerals.

Hard rocks are broken into small pieces during the physical weathering process. Chemical weathering creates chemical compounds. Partly they remain in their place, and a large part is carried away with the help of water, wind, ice (sedimentogenesis). As a result of the decrease in the force of their removal, i.e., the speed, the eroded rocks are caught. Thus, water-saturated sediment is formed. Sediment is transformed into sedimentary rock during diagenesis. Over time, the sediment is gradually dehydrated, the structure of the sediment changes, the fragments are cemented, the porosity decreases, new minerals are formed, and the rock recrystallizes.

Layering, which is the most important feature of most sedimentary rocks, is included in this texture. Layering sedimentary rocks are observed in marine and freshwater basins or layered rocks formed on land. Both the mineral composition and grain size of the layered rocks formed under such conditions change. A change in the mineral composition causes a change in the color of the rock.

Sedimentary rocks vary in color from white to black. The color of the rocks is an important sign in their identification. The color of rocks depends on: 1) the color of the mineral that formed the rock; 2) the color of rare mixtures and cement in the rock; 3) often depends on the color of the very thin veil surrounding the mineral grains that make up the rock.

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