

Lecture #11 Oxysilicon acid.

Silicon-oxygen radicals - chains, mites, grids and rings are strong enough, but not as tough and easily deformed, adapting to the various structural conditions, the location of major cations. [1]

Highly polymerized silicon-oxygen radicals - the main structural unit nizkoosnovnyh Hydrosilicates calcium type of mO Zermorita San) [5n2Oz1] (OH) e - 8N2O (Riverside, plombierit), xonotlite Sav bop] (OH) 2 (Hillebrand, Foch-HIT) and girolita CA4 [51bO15] (OH) 2 - 4H2O (Oken, a certain coward Kotte), which are the main carriers of the ultimate strength of the stone. [2]

These silicon-oxygen radicals having valence oxygen atoms in silicates act as a negatively charged ions. [3]

Minerals with chain and ribbon silicon-oxygen radicals constitute a large group. These include, in particular, minerals pyroxene group of the general formula $R_2 SiO_3$, where R_2 - doubly charged cation (or cations) metals. Refer to amphibole minerals such as hornblende, tremolite, and so forth. [4]

Vickery [23-25], silicon-oxygen radicals found in the crystals of the above compounds, chelate complexes stabilized also in the initial solutions. [5]

As a result, a compound of silicon-oxygen radicals and metal ions obtained by a certain group of chemical compounds called silicates. [6]

Insular silicon-oxygen radicals. Insular silicon-oxygen radicals.

The island type structure includes silicon-oxygen radicals, consisting of one, two or more, but a finite number of tetrahedra. [7]

Given the postulate of maintaining fixed by the crystal chemistry of elementary silicon-oxygen radicals [1], the results of the study are used to determine the crystallization structure of a multi-component glass-forming melt and glass. [8]

All variety of silicates, depending on the structure of silicon-oxygen radicals is divided into five groups. [9]

Some types of silicon-oxygen radicals finite size (black circles - silicon, white - oxygen. Some types of silicon-oxygen radicals finite size (black circles - silicon, white - oxygen.

Valence non-socialized oxygen atoms neutralized by metal cations, which bind the silicon-oxygen radicals together. The charge of each individual radical determined by the number it contains oxygen atoms linked only to one silicon atom. The shape and size of silicon silicates motifs in this group may be different. [10]

In some silicates aluminum atom contained in the form of trivalent cations, which together with the above silicon-oxygen radicals structures and with some other anions form certain chemical compounds - aluminum silicates. [eleven]

From what has been said in paragraphs 4 and 5 that such a replacement is made easier with the complexity of the silicon-oxygen radical. [12]

Another type of silicon motifs finite size occurs if several tetrahedra are joined in a ring to form a silicon-oxygen ring radicals. Thus, if each tetrahedron collectivized two oxygen anion may be formed with single three - or four - and six-membered rings having respectively 3, 4 and 6 of silicon-oxygen tetrahedra, each having two oxygen atoms in common with neighboring tetrahedrons. [1]

In light of these purely structural results had to seem at first, paradoxical conclusion that no silica is not silicon-oxygen radicals are construction silicate, but the cations are usually laid just rods oxygen octahedra (around each cation), and to this basic architectural structure They adapt themselves only silicon-oxygen radicals. Silica, as inactive in the chemical analysis was as an inert in the crystal structures. Silicon-oxygen radicals - chains, tape, wire mesh, and even rings - strong enough, but not as tough and easily deformed, adapted to the different conditions, leading to concentration of cations, often simply forced the geometry of their arrangement. [2]

From these data it can be seen that the interaction SigOis anion (OH) 2 c NH2 - rpyannaMH ligands is carried out as an indirect - through the water molecules as well as direct hydrogen bonds between the nitrogen atoms of ethylenediamine complex and the silicon-oxygen atoms of the radical. [3]

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oxygen octahedra (around each cation), and to this basic architectural structure They adapt themselves only silicon-oxygen radicals. Silica, as inactive in the chemical analysis was as an inert in the crystal structures. Silicon-oxygen radicals - chains, tape, wire mesh, and even rings - strong enough, but not as tough and easily deformed, adapted to the different conditions, leading to concentration of cations, often simply forced the geometry of their arrangement. [4]

If two chains are located in one plane parallel to each other so that one of them - mirroring the second and both are interconnected by third sharing of oxygen atoms of repeating tetrahedrons whose vertices when approaching the chains are in contact with each other (by one), then obtained silicon-oxygen radical new structure, called a ribbon. The period of such a structure consists of four silicon atoms and oxygen atoms of eleven, five of them of oxygen - common silicon-oxygen tetrahedra of one period and the six - valence. [5]

Combining diortogruppy Si₂O₇ with a big octahedron. | Various forms of the composition of the chains. Combining diortogruppy Si₂O₇ with a big octahedron. | Various forms of the composition of the chains.

In light of these results purely structural Belov (1953) did previously thought paradoxical conclusion that the construction silicate are not kremnezhm and anionic cream non-oxygen radicals, but on the contrary, the cations are usually laid in bars of oxygen octahedra (around each cation), and to these basic architectural structures only adapt silicon-oxygen radicals. Chains, tapes, nets and even rings are strong enough, but not as tough and easily deformed, adapting to the various structural conditions, the location of major cations. [6]

The trivalent aluminum atom replacing silicon-oxygen tetrahedra tetravalent silicon atom releases one extra valence. Because of this negative charge is increased by the silicon-oxygen radical sufficient units of silicon atoms in the radical is replaced by aluminum atoms. [7]

Types kremnekielorodnyh chains. Types kremnekielorodnyh chains.

Isomorphic substitution of silicon by aluminum in silicates with the radicals of finite size, is not typical. It is usual for silicates with silicon-oxygen radicals a more complex structure. [8]

Described structural decoding, which we consider basic experimental material on the second chapter of the crystal chemistry of silicates, are two groups of silicates: cement Ca-hydro-silicates and silicates fashion elements, mainly Zr, Ti, Nb, Ta, rare earth elements, and under these headings They have appeared in the form of two major problems. It was found that as the

main stems of crystal structures, and silicon-oxygen radicals (as determined by the primary name - katiopnymn - rods) - all these newly deciphered the structure subject to the same laws, and the two issues, if not merged poliostryu in one, very closer . By themselves, these trendy cations, in particular Zr, but in particular Ti, Nb, Ta, not so large as to claim for itself the crystal chemistry of silicates with large cations, but they subordinate themselves, their silicate crystal chemistry of cations Ca and Na, when they enter in one and the same mineral. But if lime motive in both structures identical to, the cations in kuspidiye presented speakers from one Ca-octahedra, while Loven in a very similar columns alternated Zr-octahedra with Na-octa-edramn, and (crystallographically distinct) other - Ti, Fe-octahedra with the same Na-octahedra. [9]

Since the discovery of the molecular sieve and to date continue practical and theoretical study of the dependence of the adsorption and, later, the catalytic properties of zeolites, the molar ratio Su09 A. Synthetics CBKr-zeolites act as architects of silico openwork lattice consisting mostly of silicon-oxygen radical of silicon tetrahedra. [10]

An analysis of three-dimensional features found Paterson reiterated earlier position of atoms Ni and allowed us to determine the coordinates of the atoms Si, knowing that it could be assumed location of the O atoms included in the silicon-oxygen radical. Then made a series of three-dimensional electron density syntheses possible to find consistent oxygen atoms of water molecules, atoms N and C ligands ethylenediamine complex. [eleven]

This also contributes to, and calcium fluoride. Lowering the viscosity of slags under the influence of additives CaF₂ because the identity of oxygen in shape and the radius of anion F⁻, replacing the final unsaturated divalent oxygen atom in the silicon complex, as if cut blocks of the silicon radical decrease its length. Considering the above, flux AN-8 can be used when ycnexoivi electroslag welding, as well as electroslag remelting, which is done in practice. [12]

The synthesized fibrous phase was assigned to the new structural type of tape silicates. The possibility of the existence of multi-row kremniykislorodnyh tapes structures Ba-Cu-silicates was first predicted by Belov in 1947 and experimentally confirmed by him in 1971. In the resulting fibrous phase as well as in the pyroxenes, amphiboles and layered silicates , silicon-oxygen radicals are polar. [13]

Reference:

<http://www.ngpedia.ru/id356040p2.html>