



GEOLOGY, MINERALOGY AND SOIL SCIENCE

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GEODE: THE NATURAL WONDER

People of the Stone Age have already used at least 20 different minerals. Nowadays in the modern industry thousands of minerals are used. More than 4000 and about the same number of their varieties are known. Every year geologists explore about 50 new minerals. However, there are only 200 types which people use in everyday life, its application is really diverse and there are even some minerals we eat [2].

Non-specialist would probably say that minerals are just stones. Nevertheless, minerals are components of rocks, ores formed on the Earth because of certain physical, chemical conditions; geological processes have also influenced this process [4]. That is why minerals have different colour, form, chemical composition, density, the ability to conduct electric current. From a scientific point of view, the main essence of the mineral is the presence of a crystalline structure [2].

In the world of minerals, as in other natural kingdoms, one very often seems completely different than it really is. So minerals with different impurities dominate. Some minerals are masking to seem valuable, others are hiding from discoverers.

It is hard to remember where minerals aren't used. Some of them are valuable minerals by themselves and are used in their natural look: quartz, sulfur, rock salt, talc. Meanwhile a significant part of minerals contains really valuable components which can be obtained by processing using high temperatures, chemical reactions

and other technologies that are imitating natural geological processes [2].

In the nature minerals exist in the form of single mineral individuals but more often one can meet the single crystals which have grown together and formed mineral aggregates. When minerals in the rock are filled, secretions are formed. Small secretions which are up to 10 mm are called tonsils. But large secretions, often with a spot, the walls which are covered with druse crystals are called geodes [4].

Secretion often reminds a pie with valuable stuffing. The crust is made by silicon, the filling is made by agate about “the most delicious” is inside [3]. There can be transparent rock crystal or an amazing purple amethyst – everything depends on the “recipe” of geode because different sorts of these “pies” are baked in the hottest natural ovens – volcanoes.

Geodes are formed in the cavities of the earth’s crust. Minerals are created there layer by layer, from walls to the centre. The first condition is that shell, where the body of aggregate grows, has to be closed. They are often formed in the walls of gas in the magma that flows outside during the volcanic eruption. Magma dissolves water vapour, chlorine, carbon, dioxide, oxides of silicon, iron and more. If the magma is thick enough and the bubble with solution doesn’t explode, conditions for gradual cooling and crystallization of minerals are created. Magma is cooling and the colloidal solution hardens layer by layer. Firstly, minerals with higher temperature are deposited on the cavity walls. Then in the form of a white “crust” a chalcedony is deposited and then agate crystallizes that is a translucent variety of quartz. If the temperature has changed several times, chalcedony and agate form several layers [1]. The colour of agate depends on impurities and can be yellow, red, blue, with different shades. After that frozen magma cracks under the influence of the sun and cold, washed away by rains. Over time the upper layer of rocks collapses and dense secretions are scattered – that’s how geodes come out of the magma and come out in front of people.

Latin America is rich in geodes, you can find them also on the banks of mountain rivers in Vladikavkaz. In Ukraine there aren’t active volcanoes so you can find geodes near mountain rivers too, and also in large cave complexes in the Carpathians and Crimea.

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