POLYMORPHISM IN MINERALOGY

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Pyrite, gypsum, barite, celestine, calcite and other mineral types are very impressive in their multiformity. Obviously, the mineral morphology depends on the growing media, but the details of the growing processes are still unknown. Complex system approach can be used to create the new mineral forming theory. Crystal forming, stats and decay are different processes according this theory and these processes run by their own elements. Therefore, the mineral atomic structure or the mineral dissolving to the ions has no influence at the crystal growth processes. The observations on te minerals in nature show that the crystallization processes run via molecule and supramolecule particles.

The atomic and ionic point of view of crystallization cannot resolve some non-agreements. Salts pretend to be ionic crystals because they dissolve to ion solutions. On the other hand, salt crystallization is impossible in dilute ion solutions. The physical sense of the solution, saturation and supersaturation does not elucidate. Obviously, salt growth in dilute solutions is impossible because salts do not grow by ions. The saturation point marks the beginning of the NaCl molecule appearance in the solution. The supersaturation means the enlargement of particles of growth (clusters). That is why salt growing in the supersaturated solutions yields muddy crystals.

The particles of crystal growth (clusters) can be defined by the system analysis and design procedures on the base of the crystal chemistry and crystal morphology theories. The result of the definition is the table of atomic coordinates in the cluster structure. The clusters of the minerals differ by the forms and sizes, but they have got the same chemical composition. Pyrite clusters have the $n(FeS_2)$ composition, with n value from 1 to 10 and more. The variety of the mineral morphologies depends on the cluster multiformity.

Clusters of mineral growth are the main objects of the theory. They are the good indicators of the crystal growing media. The pyrite morphologies differ in the various occurrences, but a single morphological type prevails in the specific ore deposit. This effect takes place because of the cluster's exact dependence on the mineral growth condition. The cluster structure, form and size are the strict parameters of the growing media.

Cluster is the starting point for the more detailed investigations. Firstly, the large cluster consists of the smaller particles and the nucleation processes may be studied. The kinetics of the nucleation processes is the field of the geochemistry interest. On the other hand, the crystal surface processes may be defined more exactly on the cluster structure base. According this theory, the mineral surface is not an atomic plane, but the cluster-size relief one. Therefore, the undulating atomic structure of the mineral surface may be determined by this methodology.

Complex system approach leads to the molecular conceptions in mineralogy. These ideas do not depreciate the significance of the atomic structure conception. Each of these theories prevail in the different processes and states, but some of the mineral forming phenomena, and polymorphism phenomenon especially, may not be resolved on the base of the molecular conception.