

CRYSTALLOGENESIS OF MINERALS DURING THE FORMATION OF TECHNICAL STONES

BAKHTIN, A.I., MOROZOV, V.P., KOROLEV, E.A., KRINARI, G.A. Geological Faculty of the Kazan State University, Kazan, Russia.

The mechanisms of transformation of minerals during the formation of technical stones have been studied by different techniques of X-ray analysis, conductometry, visual observation etc. The technical stones were obtained by the reaction between a calcined product of limestone, dolomite and gypsum, and water or aqueous solutions of salts. They were: lime CaO , periclase MgO , bassanite $\text{CaSO}_4 \cdot 0,5\text{H}_2\text{O}$, gamma- CaSO_4 and anhydrite CaSO_4 . The processes of transformation of initial minerals into products of reactions have led to a lithifications of their water test. The lithification results from the dissolution of initial minerals and crystallization of new minerals. Due to the formation of new minerals, in a pore space of technical stones the crystallizational contacts are created. A special feature of such reactions is the spatial unconformity between the fronts of dissolution and crystallization. Beside this well-known process, others mechanisms of mineral crystal-genesis at lithification have been found experimentally. They are:- dissolution with a simultaneous crystallization (both fronts are conformable spatially),- solid transformation of one mineral into another, migration of components taking place in a dissolved state,- recrystallization leading to an increase in size of metastable mineral grains. The last three mechanisms are very poorly known, but have widespread occurrence. The two first lead to a decrease in strength of stones while the third one leads to a strength increase. The obtained data well explain a change in time in physical and mechanical properties of technical stones. They can be used for the creation of composite materials of desirable properties