

m01.p03**Direct Observation of Elementary Processes of Crystal Growth**

N.N. Piskunova

*Institute of Geology of Komi Science Center, Ural Branch of RAS, Syktyvkar, Russia. E-mail: piskunova@geo.komisc.ru***Keywords: AFM, crystal growth from solution, surface morphology**

It is determined that at atomic-force microscopy (AFM) investigations of water-soluble salt crystal growth the scanning unit does not considerably affect boundary layer and gives a reliable and objective data for statistical set and analysis of kinetic and morphological data [1]. The elementary processes, accompanying morphological surface evolution, are described phenomenologically and interpreted theoretically. First at nanolevel the processes of formation of inclusion and competition of growth centers in the directed solution flow are determined. Thus, e.g., at one of the experiments we observe a face of NaCl crystal with diffusive starvation in the form of small cavities. The cavity under observation was circular and had diameter up to about 1450 nm. Its obliteration occurred due to the motion of thin steps with a height 0.73-2.12 nm. At that fast growing upper layers with a rate 1.9-2.4 nm/s overtook lower layers with a smaller rate (0.2-0.9 nm/s), and within 12 minutes an inclusion was formed in the crystal.

Based on AFM statistics the methods of measuring normal growth rate in any part of a face and its fluctuations are developed. The conducted calculations allow to determine the degree of deviation of the processes from the permanent growth condition which is the most important parameter for defectless crystal synthesis for industry.

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m01.p04**Crystal growth and replacement processes in the Ba-Sr-SO₄-CO₃-H₂O system**Nuria Sánchez-Pastor, Carlos M. Pina,
Lourdes Fernández-Díaz*Dpto. Cristalografía y Mineralogía. Universidad Complutense de Madrid. 28040. Madrid. Spain. E-mail: nsanchez@geo.ucm.es***Keywords: crystal growth, solid solutions, mineral replacement**

On the Earth crust, barite-celestite solid solution essentially forms as a result of the reaction between fluids derived from the alteration of silicates, carbonates and sulphates. This solid solution shows a marked compositional bimodality, i.e. only barites with low Sr content and celestites with little amounts of Ba are common [1, 2]. Furthermore, Sr-Ba carbonates (witherrite-stroantianite solid solution) frequently result from the replacement of barite-celestite crystals. This origin, according to different authors, explains the compositional bimodality of Ba-Sr carbonates, which will be a characteristic inherited from previous barite-celestite crystals [3].

Here we present an experimental work in which a diffusing-reacting system (silica gel method [4]) has been used to study the sequential crystallization of the Ba_xSr_{1-x}SO₄ and Ba_xSr_{1-x}CO₃ solid solutions in the Ba-Sr-SO₄-CO₃-H₂O system. Both the relationships between the morphology and the Ba/Sr ratio of crystals and the possible replacement reactions between Ba-Sr sulphates and carbonates have been explored.

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