07.1-10 GROWTH HABIT AND DEFECTS OF SYNTHETIC FLUOR-PHLOGOPITE. By Hua Su-kun and Zhong Wei-zhuo, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, China.

In correlation with the crystal structure, the growth habit and the defects of the fluor-phlogopite are depicted. The defects are mainly considered as plane defects developing along the magnesium atomic rows of the lattice. The following questions are discussed:

1. The anisotropy of growth habit: the growth rate along the a-axis direction is the fastest, b-axis the second and c-axis the slowest. These differences are interpreted from the disparity in specific surface energy of each group of crystal planes.
2. Seed orientations: the quality of growth along the b-axis is better than that along the a-axis. Both growth rates and the temperature stability required are different. It is easier to control the quality of growth along the b-axis than that along the a-axis, with less probability of the occurrence of defects. During growth along the direction of the a-axis defects develop along crystal planes {1$\bar{1}$0} and {110} (Fig. 1 and 2). For growth along direction of the b-axis, defects develop along {110} and {$\bar{1}$10} (Fig. 3).
3. The shape of the solid-liquid interface and crystal defects: the reasons for the reduction of defects in the crystal growth of a flat interface have also been analysed in terms of the crystal habit. It is suggested that the defects associated with convex or concave interfaces result from the anisotropy of the growth rate, and the shape of interface may be considered as the envelope of surfaces of each group of the growing crystal faces.

Fig. 1: Growth defects in the direction of a-axis.

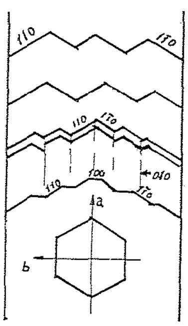

Fig. 2: The relation between defects and crystal faces along the growth direction of the a-axis.

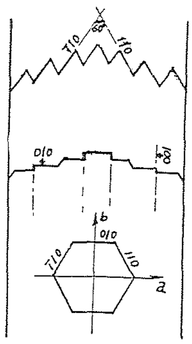

Fig. 3: The relation between defects and crystal faces along the growth direction of the b-axis.

07.1-11 COMPUTER CONTROL OF CRYSTAL GROWTH FROM SOLUTION. By J. Danielsen, Department of Chemistry, Aarhus University, DK-8000 Aarhus C, Denmark.

The purpose of the project is to optimize growth of crystals from solution. A microprocessor, Motorola 6800, is used for controlling temperature and concentration of the solution. A TV camera is used to observe the crystal suspended in the solution. Microprocessor and camera are connected to the departmental computer, which analyzes the picture and decides how the growth conditions should be changed. The apparatus is used in two modes. In the first, pictures of the crystal are taken at regular time intervals. The length and convexity of the crystal boundary and the area of the crystal are measured and used as a basis for change of growth conditions. In the second mode, a beam of light is passed along a crystal which is nearly in equilibrium with the surrounding solution. The light will be refracted because of the concentration gradient near the crystal surface. By a suitable arrangement of lenses and diaphragms, the effect can be detected as an illumination of the crystal boundary projected on a screen. The method is described by J. Mýl, J. Kvapil (Coll. Czech. Comm. (1960) 25, 194). In the present work the effect is recorded by the TV camera. In this way the crystal is systematically brought into states of growth, equilibrium or dissolution, depending on the purpose of the experiment.

07.1-12 METRIC, AFFINE AND COMBINATORIAL ASPECTS OF CRYSTAL GROWTH. By L.L.Aksenova, R.V.Galiulin, M.I.Leonyuk, Institute of Crystallography, USSR Academy of Sciences, Moscow State University; Moscow, USSR.

According to the present-day concept the distances between the surface atoms (or more complex particles) to be bound during the growth of crystals and the angles between them are strictly fixed. Such a metric approach to crystal growth limits, to a great extent, the possibilities of fitting of atoms in the metrically rigid "nests" on the seeding surface. It is known (V.I.Mikheev, Homologia Krystallov, 1961), that polyhedral forms of a growing crystal do not obey the metrical transformation, but strictly obey a more general, affine, transformation. The most general type of transformation is that of combinatorial-topological transformation in which the object is deformed randomly but without discontinuities or artificial connection. According to F.Laves (Z.Kryst. 78, 1931) there are only 11 various combinatorially regular planar nets and each of them can be transformed into a metrically regular planar net by a combinatorical-topologic transformation. Thus, if the atoms have formed a combinatorical regular net, there is a possibility of the set's transformation into a metrically regular net, bond lengths and bond angles only being varied. It is most likely that such a situation also holds true for three-dimensional atomic frameworks. In this case the adsorption layer of the seeding can be combinatorically regular but in the process of growth it becomes metrically regular.