07.1-10   GROWTH HABIT AND DEFECTS OF SYNTHE-
TIC FLUOR-PHLOGOPITE. By Hua Su-kun and Zhong
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In correlation with the crystal structure, the
growth habit and the defects of the fluor-
phlogopite are depicted. The defects are main-
ly 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 dis-
parity 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 pro-
bability of the occurrence of defects. During
growth along the direction of the a-axis de-
fects develop along crystal planes {1$\bar{1}$0} and
{110} (Fig. 1 and 2). For growth along direc-
tion of the b-axis, defects develop along {110}
and {$\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 in-
terface have also been analysed in terms of the
crystal habit. It is suggested that the de-
fects associated with convex or concave inter-
faces result from the anisotropy of the growth
rate, and the shape of interface may be con-
sidered as the envelope of surfaces of each
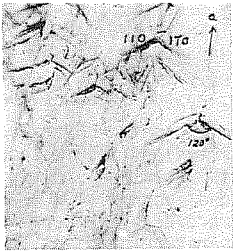group of the growing crystal faces.

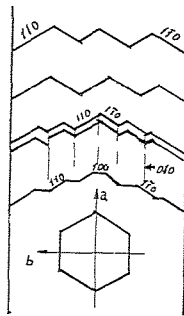Fig. 1: Growth defects in the direction of a-axis.

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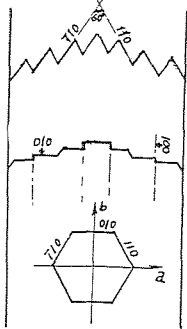

Fig. 3: The relation between defects and crystal faces along the growth direction of the b-axis.

07.1-11   COMPUTER CONTROL OF CRYSTAL GROWTH FROM
SOLUTION. By J. Danielsen, Department of Chemistry,
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The purpose of the project is to optimize growth of
crystals from solution. A microprocessor, Motorola
6800, is used for controlling temperature and concen-
tration of the solution. A TV camera is used to
observe the crystal suspended in the solution. Micro-
processor 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 near-
ly 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 Crys-
tallography, USSR Academy of Sciences, Moscow
State University; Moscow, USSR.

According to the present-day concept the dis-
tances between the surface atoms (or more co-
mplex particles) to be bound during the gro-
wth 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 gene-
ral, affine, transformation. The most general
type of transformation is that of combinato-
rial-topological transformation in which
the object is deformed randomly but without
discontinuities or artificial connection. Ac-
cording to F.Laves (Z.Kryst. 78, 1931) there
are only 11 various combinatorially regular
planar nets and each of them can be transfor-
med into a metrically regular planar net by
a combinatorical-topologic transformation.
Thus, if the atoms have formed a combinatori-
cal 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-dimensio-
nal atomic frameworks. In this case the ad-
sorption layer of the seeding can be combina-
torically regular but in the process of gro-
wth it becomes metrically regular.