11.1–7 *IN SITU* TOPOGRAPHY OF SANIDINE FELDSPARS DURING ANNEALING, USING WHITE BEAM SYNCHROTRON RADIATION.

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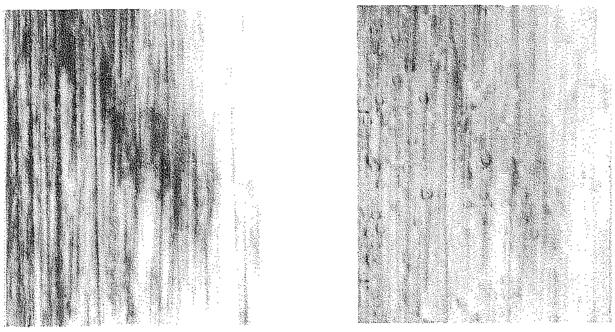
Sanidine from Volkesfeld/Eifel exhibits an unusual annealing behaviour: the optic axial angle changes after prolonged heat treatment at temperatures as low as 750°C, the speed of change increases at higher temperatures. The changes of the optic angles may be explained by an Al/Si order-disorder transformation. Lang topographs also show a change in the defect structure of these crystals: the dislocation network of the untreated samples disappears after annealing and considerable precipitation occurs in its place.

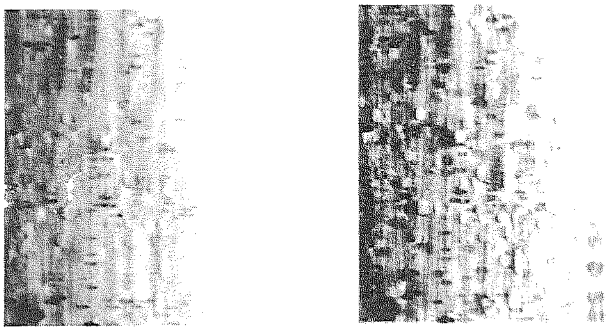
The annealing processes have now been studied in a series of *in situ* topographs at HASYLAB in Hamburg, using white synchrotron radiation from the storage ring DORIS. A high temperature furnace developed at the RWTH Aachen (Hastenrath, Krüger and Kubalek, Rev. Sci. Instrum. (1977) 48, 605) has been used successfully for these experiments. The precipitates occur as isolated contrast or in bundles like a string of pearls. Their 'doughnut' shaped images are 50–350 μ in diameter and they have a single contrast-free plane perpendicular to the scattering vector $\vec{g}(040)$. The speed of the formation of precipitates depends (just as the change of the optic axial angle) on the annealing temperature.



T = 400 , t = 10   T = 985 , t = 37

(040) *in situ* transmission topographs of sanidine during annealing. T in °C, t in minutes.

$\vec{g}(040)$ 1 mm ⟷



T = 1020 , t = 66   T = 1015 , t = 130

11.1–8 GROWTH DEFECTS IN GALLIUM SINGLE CRYSTALS.

By M. Surowiec, Institute of Physics and Chemistry of Metals, Silesian University, Katowice, Poland.

Using oriented seeds, plate-like gallium single crystals of dimensions 30x5x0,2 mm^3 were prepared by Bridgman method. The Lang X-ray topography method was applied for growth defects characterization. Different content of defects inside the same sample was observed. Areas completely free of defects (A) as well as the parts with high dislocation density (B), were found (Fig. 1). Band contrast (D) appears near the edges of the sample. It corresponds probably to striations caused by nonuniform distribution of impurities during crystallization. Analysis of X-ray topographs enables to separate five typical configurations of dislocations in the gallium single crystals: 1) short dislocation lines (E) randomly distributed in the volume of the specimen; 2) long dislocation lines (F) running along the specimen perpendicularly to the interface; these dislocations may play significant role during the growth; 3) helical dislocations (G) with helix axis parallel to the interface; these dislocations result from screw dislocations after the climb due to the absorption of vacancies; 4) local tangles of dislocations (B) which were introduced in regions with higher impurity content; 5) jungle of dislocations (C) always observed on the end part of the specimen where impurites are pushed by interface. The investigation proved that impurites play important role in the process of generation of dislocations in gallium single crystals.

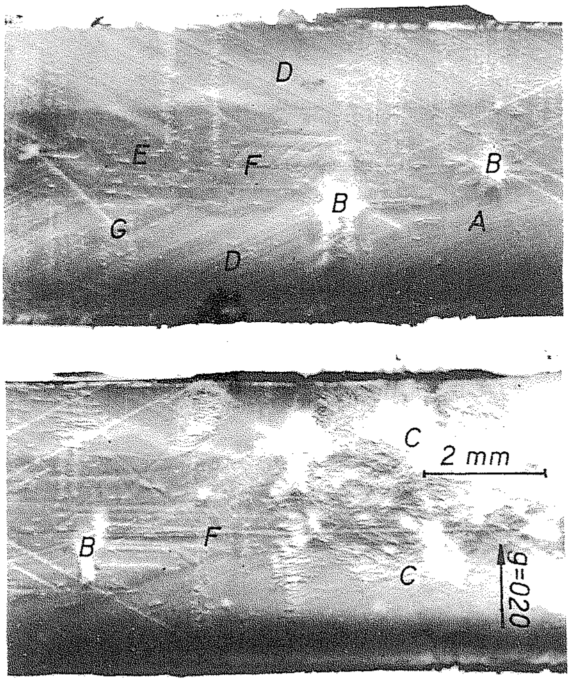


Fig. 1. Fragments of X-ray topographs of gallium single crystal.