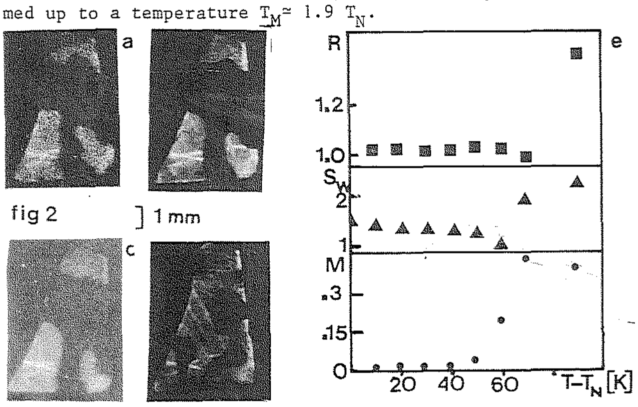
$T \lesssim T_N$ + 50K, and increases with a further increase of the temperature (Fig.2e). The memory of the initial domain structure is thus lost only when the sample is warmed up to a temperature $T_M \simeq 1.9\ T_N$.



When the sample is repeatedly warmed up to $T \simeq T_M$, and cooled under a magnetic field parallel to $\vec{c}$ and $\gtrsim$ 25 Oe, the domain structure remaining in virtually zero field is again reproducible [Alperin, Brown, Nathans and Pickart, Phys.Rev.Lett.8, 237 (1962)], the domain type being changed in a given region of the sample when the field is reversed [Baruchel and Schlenker, Nukleonika 25, 911 (1980)] . This effect which depends on the state of stress of the sample, seems to be related to the piezo-magnetic properties of MnF_2 [Borovik, Romanov, Soviet Physics JETP 11, 786 (1960)]

Domains are not affected by dislocations or subgrain boundaries, but are very sensitive to planar defects lying in (011) type planes, which seem to be twin lamellas similar to those observed by Van Landuyt, Gevers and Amelinckx [Phys.Stat.Sol. 7,307 (1964)]in TiO_2. This interaction is magnetic field dependent.

11.1–16 THE STUDY OF α-β PHASE TRANSITION OF QUARTZ BY MEANS OF IN-SITU X-RAY TOPOGRAPHY AND FINE BEAM LAUE PHOTOGRAPHY.

By K. Gouhara and N. Kato, Faculty of Engineering, Nagoya University, Chikusa-ku, Nagoya, Japan.

An incommensurate phase (IP) between high and low temperature phases of quartz has been discovered (Gouhara, Li and Kato; J. Phys. Soc. Japan (1983) 52, 3697, ibid. 3821). The experiments of heat capacity and neutron diffraction conform to our results (Dolino & Bachheimer; Solid State Short Comm.(1983) 45, 259 and private comm.). The brief resumé and the recent observations on a new domain structure of IP will be presented. Henceforth, T_C and T_Q will be used for denoting the transition temperatures of α→IP and IP→β, respectively.
Specimens were circular plates (7 mmϕ, 1 mm in thickness) of X and Y cut prepared from synthetic quartz. With high intensity X-ray source of Ag and Cu [RU 1500; H. Uematsu et al; Acta Cryst.(1978) A34, Suppl. S330], three diffraction methods were employed. (a) Ordinary and Laue topography due to the Bragg reflections (BR): They were recorded on TV screen, VIDEO tape, as well as on nuclear emulsion plates. (b) A fine beam Laue photography for observing the satellite reflections (SR). The angular resolution was of 3 min. (c) The topography due to SR. The temperature could be controlled with accuracy of 0.1 degree.
When a temperature gradient was deliberately given in the specimen, as increasing and decreasing temperature, a dark contrast of IP crossed over the specimen, reversibly (Fig.1). Always, a strain contrast was associated. The analysis shows that the transitions at T_C and T_Q are of first and nearly second order, respectively. Fixing tiny apertures on α, IP and β regions [the method (b)], we could observe SR in vicinity of more than 20 Laue spots, but only in IP phase. The modulation vectors $\tilde{q}_i$ lay in c-plane and were approximately parallel to $\tilde{b}_i$ (primitive reciprocal lattice vectors). Also, the modulation waves were transversal in c-plane.
When the temperature gradient was reduced to less than 0.1° over the specimen, the contrast of IP in the ordinary topograph was much decreased. The strain contrast disappeared. In a suitable condition, the Laue topograph due to SR could be obtained simultaneously but separately from that due to BR [The method (c)]. Under the conditions, the Laue photographs were also recorded sequentially. A super heating of α phase (∿1.5°) was recognized when the temperature was increased. From the analysis of SR spots observed in decreasing temperature, were obtained the temperature dependences of the modulation wavelength (n = b/q) and the deviation angle (ϕ) of $\tilde{q}_i$ from $\tilde{b}_i$ (Fig.2). The intensity of SR also rapidly increases near T_C. The contrast of topograph of BR was generally homogeneous except very near T_C but that of SR (X-cut plate) was stratified along c-axis. It was concluded that IP phase has a new domain structure as shown in Fig.3, each domain being characterized by ±ϕ .

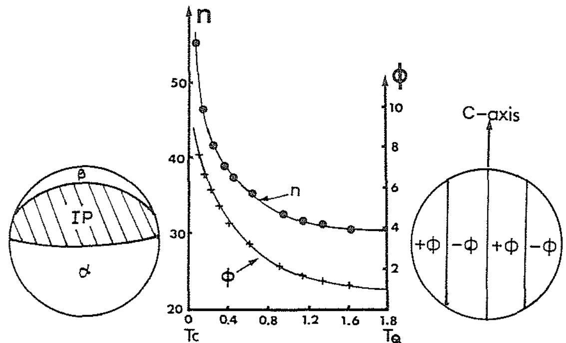


Fig.1. Fig.2. Fig.3.

11.1–17 ON THE CONTRAST OF DISLOCATION DIRECT IMAGE IN X-RAY SECTION TOPOGRAPHY.

By G.Kowalski, Institute of Experimental Physics, University of Warsaw, Warsaw, Poland.

To get an insight into the process of the dislocation image formation in X-ray section topography, the beam trajectories /Fig.1/, both for the so called normal and newly created wavefields are numerically constructed /Kowalski, submitted to phys.stat.sol./.It was found that direct image of dislocation /Authier,Adv.X-Ray Anal./1967/,10,9/ may be interpreted by interbranch scattering occuring near direct beam /Kowalski,ibid./.The influence of the position of dislocation with respect to the direct beam on image formation is also studied.The presented model of direct image was applied to interprete the experimentally obtained 30° dislocation image /Fig.2/.Long black image of dislocation observed on topograph /Fig.2/ results from interaction between strain field along whole dislocation line and wavefields travelling near S_0 edge of Borrmann fan,giving rise to interbranch scattering. The possibility that the same kind of process of image formation will occur along dislocation line but inside the Borrmann fan is also discussed.

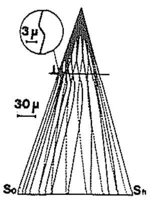


Fig.1

Fig.2