11. REAL AND IDEAL CRYSTALS

11.1-9 DOMAIN STRUCTURE IN ROCKSLE SALT REVEALED BY X-RAY PLANE-WAVE TOPOGRAPHY. By K. Ishida, K. Umezawa, M. Kawata, T. Ogawa and S. Takagi, Faculty of Science and Technology, Science University of Tokyo, Noda-shi, 278, Japan.

Domain structures in (001) plate of Rochelle salt has been studied by the plane-wave X-ray topography (K. Ishida, K. Umezawa, M. Kawata and S. Takagi, J. J.A.P. 1983, 22, 225-27)

In ferroelectric phase a very small split of the diffraction direction has been observed in the rocking curve showing slight inclination of the c-axis due to existence of the domain structure. The split, $\Delta$, shows temperature dependence represented by $\Delta = kT/t^2.75$ below $T_c$, the upper transition temperature, where $k=50(\text{sec}^2\text{K})$ for 090 reflection with $0.10\mu m$.

Abrupt change in the contrast in projection topographs upon the phase transition has been observed, though the image which directly indicate the domain structure has not yet been observed. Section topographs give contrast of b- and c-domains, b-domain consisting of twin lamellar parallel to (001) and c-domain to (010). Section topographs of b-domain taken at the two peaks of 090 reflection show dark and bright bands which are reversed at each peak, those of c-domain fine stripes originated from domain walls. These patterns disappeared in the paraelectric phase and another contrast appeared which were caused by distortions in the crystal surface. Projection topographs of the ferroelectric phase give a maze-like pattern in regions of b-domain parallel to (001) and c-domain parallel to (010). Some of these patterns are shown in the figure.

The upper transition temperature, $T_c$, is defined as the temperature at which the domain pattern is revealed by the ordinary Lang method. The upper transition temperature has been studied by the plane-wave X-ray topography (K. Ishida, K. Umezawa, M. Kawata and S. Takagi, Acta Cryst. 1981, 35, 526; 527). We have taken section topographs with (+, +, +) setting (Ishida, Kobayashi & Kato, Phil. Mag. A, 1984 b; LI).

The first crystal is a symmetric reflector, the second, an asymmetric reflector and the third, the specimen which is a wedge shaped St crystal. The width of the slit is about 20 $\mu m$. By the arrangement of the crystals and the slit, the divergent of the incident beam is estimated as 0.7 sec for 220 with Mo Ka1. When an incident beam satisfies the exact Bragg condition, i.e. $W=0$, the section pattern taken by the transmitted wave is made up of hyperbolic contours and of a straight line which forms one side of the triangular pattern, while the other side which corresponds to the energy flow parallel to the reflected beam is not observed. The pattern taken by the reflected wave is made of hyperbolic contours and the hot margin is not observed. When $W$ is not 0, the pattern is composed of hyperbolic contours and two straight lines on both sides of the triangle, i.e., hot margin. These experimental results are interpreted by the plane wave theory and well agree with the computer simulation based on the dynamical theory (Takagi, Acta Cryst. 1962 15, 1311; J. Phys. Soc. Japan, 1969 26, 1237).

11.1-10 X-RAY TOPOGRAPHIC INVESTIGATION OF THE DEFECT STRUCTURE AND DECOMPOSITION OF CALCIUM COPPER ACETATE HEXAHYDRATE. By D. Götz and H. Klapper, Institut für Kristallographie der RTH Aachen, 5100 Aachen, FRG.

Calcium copper acetate hexahydrate, (CH3COO)2Ca·6H2O, crystallizes in the tetragonal space group I 4/m, $a=1.1152$ nm, $c=6.240$ nm (Langshoire, Chem. Commun. 1967 3, 896; Klop, Duitsenbergspeck, Acta Cryst. 1968 C29, 13427). The structure consists of chains of alternating Ca and Cu coordination polyhedra along [001] which are linked by water molecules at the end. To this end, a plane parallel to (110) and a less perfect one parallel to (100). Lines of blue crystals up to 20x20x22 mm size were grown from an aqueous solution. X-ray topographs of (100), (110) and (001) plates show high crystal perfection with only few dislocations. The Burgers vectors are $b=\langle 100 \rangle, \langle 110 \rangle$ and $\langle 010 \rangle$. Large blue crystals up to 20x20x22 mm size were grown from a solution of Cu(NO3)2·3H2O and (CH3COO)2Ca·6H2O. The observed magnetic structure coincides with the observation by Kitei and Fujiishi by polarized light (Phys. Rev. 1952 90, 193) has been observed by the ordinary Lang method.

11.1-12 MAGNETIC DOMAIN STRUCTURE IN (111) ORIENTED Fe-35% Si BY XSE TOPOGRAPHY. By H. Graeff and H. Mietzsch*, Hamburger Synchrotronstrahlungs labor HASYLAB an Deutsches Elektronensynchrotron DESY, Hamburg, Germany.

Synchrotron radiation (DORIS, Hamburg) is used in reflection and transmission topography to study the magnetic domain pattern in a (111) oriented grain of Fe-35% Si. Some kind of domain structure, more or less stable in time, is observed in the state without any external field applied. Direction of the visible lines is often a continuation of stripe domain pattern observed in neighbouring grains of different orientation. In two cases the most distinct image of the lines and bands lying in (111) directions is analyzed. The lines most stable in time shown in the figure begin at the boundary of the grain. Prolongation of the direction of these lines in the neighbouring (001) oriented grain is [100] direction which is also the direction of close spaced stripe domains. The strain field due to a surface defect is visible near the grain boundary. Stress concentration and magnetic charges which can occur at grain boundaries may facilitate the nucleation of the domains in the neighbouring (111) oriented grain. A set of the topographs needed as well as section images were taken to determine the observed magnetic structure. Analysis of the x-ray diffraction contrast changes shows that the lines are traces of the 90° magnetic domain walls crossing the specimen perpendicular to the surface.

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