

Successive Phase Transitions in Ferroelectric RbHSeO_4

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It has been recently found by the present authors that rubidium hydrogen selenate RbHSeO_4 undergoes a phase transition at 173°C (T_1) besides the 102°C transition (T_2) found by Czapla *et al.*¹⁾ and it is ferroelectric below 173°C . There are thus three phases altogether, and the phases are denoted as I, II, III in order of descending temperature. The results of dielectric and dilatometric measurements have been reported briefly.²⁾

Recently we also measured the specific heat and made observations of both dielectric hysteresis curves and twin structures. The specific heat measurement from -180°C to 200°C shows λ -type anomalies associated with the III-II and II-I phase transitions. Ferroelectric hysteresis loops observed with a hysteresis bridge are shown in Fig. 1. The double-like hysteresis loop observed in the phase II suggests that the crystal in the phase II may be ferroelectric rather than ferrielectric.

Two kinds of twin structures were observed at room temperature: one with the (001) twin planes which disappears above T_2 and the other with the (100) twin planes which can be observable even in the phase II. The twins with the (001) twin planes at room temperature can be easily detwined by application of the shear stress Y_z (or Z_x) or the electric d.c. field along the ferroelectric b axis E_b (see Fig. 2), while the twins with the (100) twin planes could not be detwined by the electric field.

It can be concluded from the present results that the domains with the (001) boundaries are ferroelectric ones accompanied by the triclinicity, while the domains with the (100)

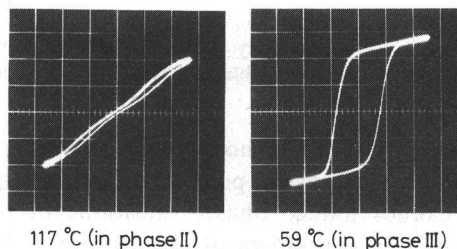


Fig. 1. Ferroelectric hysteresis loops observed in the phases II (left side) and III (right side).

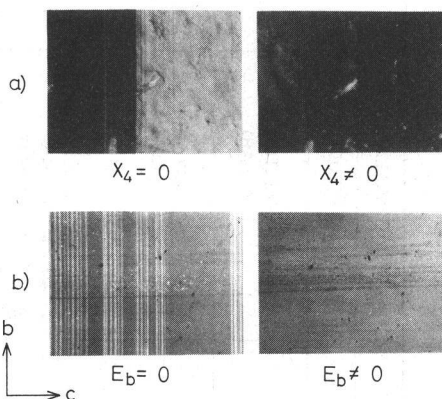


Fig. 2. Domains with the (001) boundaries along the a axis observed at room temperature.

boundaries are ferroelastic domains accompanied by the monoclinicity which exists even in the phase I. The detailed result will be reported elsewhere.

References

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- 2) S. Suzuki, T. Osaka and Y. Makita: *J. Phys. Soc. Jpn.* **47** (1979) 1741.