and Esther Conwell. Thanks are due Dr. D. Tuomi for orienting the samples, and other members of the solid state groups of Lincoln Laboratory for their assistance.

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Kinetic Properties of the Domains in Rochelle Salt*

Toshio Mitsui and Jiro Furuichi
Faculty of Science, Hokkaido University, Sapporo, Japan
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As has been previously reported by the present writers,[1] the relation between the propagation velocity v of the domain wall in Rochelle salt and the electric field E is in general given by

$$\gamma v = 2P_s(E - E_0),$$

where P_s is the saturation polarization and both γ and E_0 are constants. Further investigations have proved that γ is structure-sensitive as well as E_0 and that the temperature dependency of the relation is as shown in Fig. 1. The fact that the curves are almost parallel to each other suggests that γ is roughly proportional to P_s, i.e.,

$$\gamma = \alpha P_s,$$

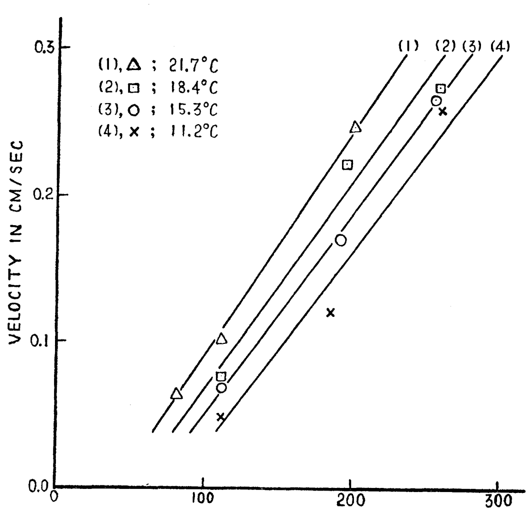

FIG. 1. Propagation velocity of the domain wall as a function of the electric field and the temperature.

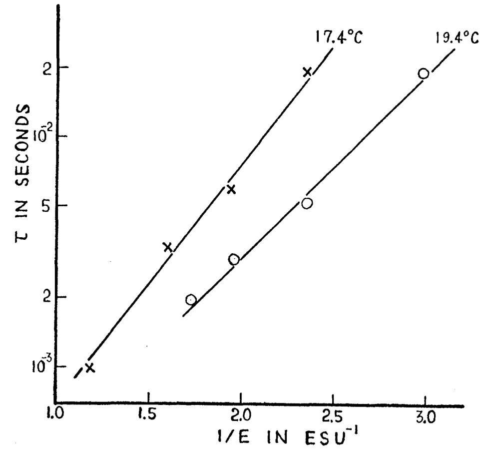

FIG. 2. Relation between the relaxation time for nucleation of the domain, τ, and the electric field, E. The ordinate, is scale logarithmic.

where α is a structure-sensitive constant. This relation implies that γ is proportional to the structure change of the crystal due to the passage of the wall, since the spontaneous deformation y_{zs} is proportional to P_s.

As has been reported by M. Marutake[2] and T. Nakamura,[3] many new domains appear when an electric field is applied along the a axis. The writers' observations have revealed that the new domains come into view at the same places in the crystal when application and withdrawal of the field are repeated, a fact suggesting that the nucleation of the domain takes place at some crystal imperfections. The relaxation time of the appearance of the new domains was measured by means of a rotating sector and a square-wave voltage as in the case of the study of the propagation velocity of the wall.[1] It has been found that the relaxation time τ can be expressed well by the equation

$$\tau = \tau_0 \exp(C/E),$$

where both τ_0 and C are constants, analogously to the results obtained by Merz[4] for $BaTiO_3$ (see Fig. 2). The measured values of C have the same order of magnitude with each other and in general decrease with increasing temperature above 15°C.

A detailed discussion of these results will appear in the *Journal of the Physical Society of Japan*. The writers wish to thank Dr. P. W. Anderson for his valuable discussions and for information on the research at the Bell Telephone Laboratories.

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