6 K. Kamber, D. Keefer and C. Wert: Acta Met. **9** (1961) 403.

DISCUSSION

Bullough, R.: I should like to comment on the use of Harper's result to estimate the dislocation density. This result of Harper's is merely empirical and always underestimates the dislocation density. The Harper's result has been shown to be incorrect by F. S. Ham and recent papar in Proc. Roy. Soc. (1962) on the theory of strain aging.

Sugeno, T.: Thanks for your kind comment. As I have not yet read Ham's paper, I can not assert that I am completely correct. However, the fact that the linear relationship holds between log Q_1/Q_0 and $t^{2/3}$ may show the approximate correctness at the intermediate segregation stage. In my case, the principal conclusion of our papar may not be influenced by some numerical changes of dislocation densities.

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Effect of High-Frequency Vibrations on the Dislocation Structure and on Internal Friction of Alkali-Halide Crystals

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Crystals of NaCl and LiF with an initial dislocation density of 10^4 cm^{-2} were subjected (in a resonance vibrator) to the action of a longitudinal stationary wave. The frequency was 110 kc/s, and the strain amplitude gradually increased up to $3 \cdot 10^{-4}$.

As the amplitude increased, new dislocations were generated and there appeared first single and the broad diffuse slip-bands.

The ratio of the stress amplitudes causing changes in the dislocation structure is the same as the yield points ratio of the crystals.

Simultaneous measurements of internal friction at the same frequency but with an amplitude of 10^{-7} have made it possible to establish that internal friction increases as

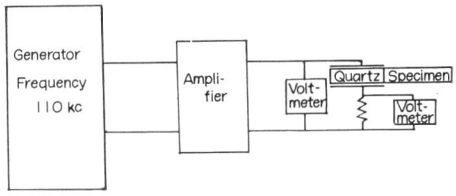


Fig. 1 Scheme of vibration apparatus (scheme of internal friction measurement ----- amplifier omitted)

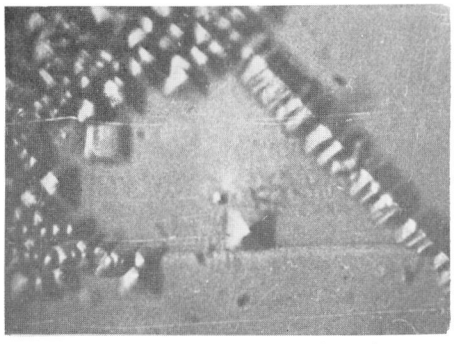
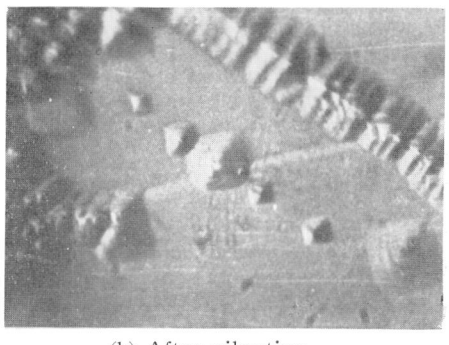


Fig. 2 LiF: (a) Before vibration



(b) After vibration

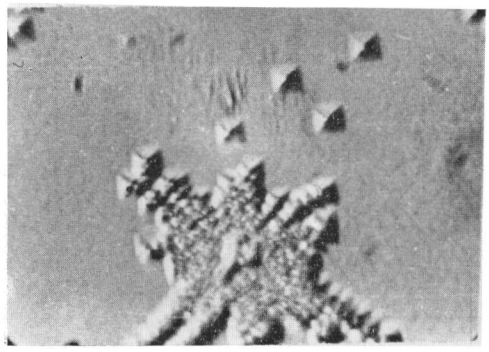
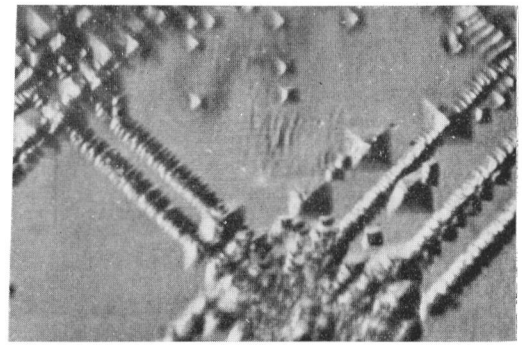
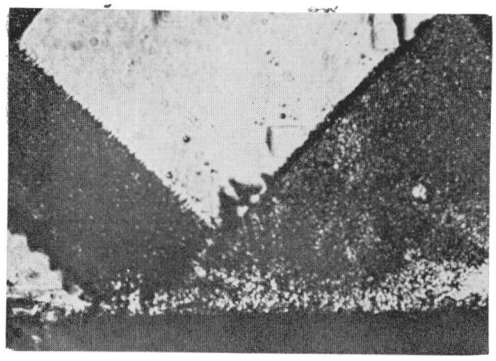


Fig. 3 LiF: (a) Before vibration



(b) After vibration



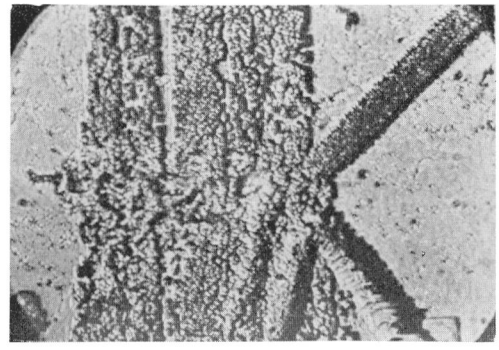


Fig. 4 LiF. Diffuse slip bands on two perpendicular slip planes of crystal

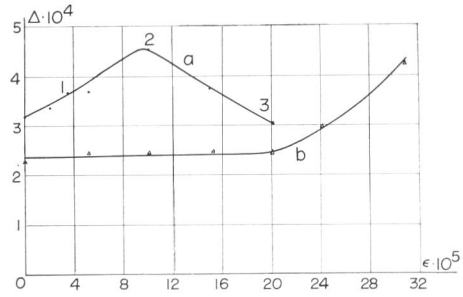


Fig. 5 LiF: Internal friction Δ as function of stress amplitudes ε.
(a) "Soft crystal", the value of Δ in points of curve indicated as 1, 2, 3 corresponds to pictures of structure of Fig. 2, 3, 4 respectively.
(b) "Hard crystal", maximum of Δ is not still reached at indicated stress amplitudes, and also the state corresponding to the picture as on Fig. 4 is not reached.

new dislocations arise, reaches its maximum when single slip-bands develop and then decrease as broad slip-bands appear.

The very same results were obtained on NaCl crystal.

DISCUSSION

Bragg, R. H.: Can you tell us your strains introduced prior to internal friction measurements are in the elastic or plastic range?

Shvidkovsky, E. G.: After vibrations irreversible change in crystal occurs, such as slip-bands, *i.e.* internal friction measurements are in plastic range in this case.

Igata, N.: Do not your experimental results include any after effect?

Shvidkovsky, E. G.: Measurements of internal friction were done after sufficiently long time which was determined by special investigations, and thus the after effect is absent.