A NOTE ON THE FORMATION OF ETCH PITS ON DEFORMED
AgCl CRYSTALS

The formation of etch pits on dislocations in AgCl crystals was studied using crystals prepared by the adapted Hedges-Mitchell method [1]. Single crystal samples of equal dimensions were cut from the AgCl plates and were annealed for four hours at a temperature of 390°C and for another four hours cooled to room temperature. The samples were deformed by tension or compression. The dislocations were rendered visible by etching with a 20% solution of $\text{Na}_2\text{S}_2\text{O}_3$ after [2]. The surface of the crystals approached — with larger or small deviations — the (001) plane. The maximum deviation found was 28°, the minimum 2°.

It could be deduced from the results that dislocations caused by plastic deformation can be etched by means of the above-mentioned etchant only on planes inclined from the (001) plane by less than 10°. Dislocations produced at crystal growth were etched up to an inclination of 25°. In samples with an inclination larger than 25° no etch pits were formed.

Figure 1a¹⁾ represents the etch pits of a crystal with its surface inclined by 2° from the (001) plane. The sample was deformed by the impact of a ball 1.5 mm in diameter; the pressure developed was 0.3 kg/mm². Rows of dislocations were formed at a distance of 0.5 mm from the edge of the indentation created by deformation.

The shape of the etch pits also depends on the orientation of the crystal surface. This can be seen by comparing the preceding figure with Fig. 1b; here the etch pits are on a surface inclined by 20° from (001).

Analogical results were obtained by studying AgCl crystals doped with 0.01 mol.% CdCl_2 . Here an interesting and typical effect was observed: the impurity became denser in bands of smaller or larger width with a relatively constant distance (Fig. 1c).

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¹⁾ For all Figs. see Appendix II (p. 702b).

References

- [1] Hedges J. M., Mitchell J. W.: *Phil. Mag.* 44 (1953), 357.
- [2] Jones D. A., Mitchell J. W.: *Phil. Mag.* 2 (1957), 1047.

Fig. 1a. Rows of dislocations produced in AgCl crystal after deformation. Magnification $175\times$.

Fig. 1b. Etched surface of AgCl sample after 0.35% deformation by elongation. Magnification $175\times$.

Fig. 1c. Unetched surface of AgCl crystal doped with 0.01 mol.% CdCl_2 . Magnification $175\times$.