

# A METHOD TO FORM SINGLE CRYSTALS OF $\text{ZnF}_2$

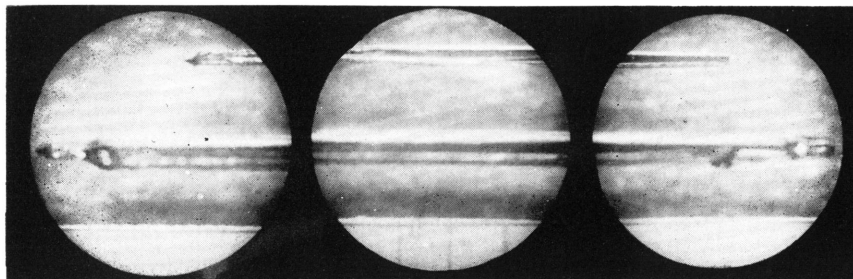
by Ikumaro KUBO and Sôiti IMAI

James H. Crawford, Jr. and Ferd E. Williams<sup>1)</sup> measured the temperature-dependence of electrical conductivity and thermal e.m.f. on fused samples of  $\text{ZnF}_2:\text{Mn}$  and  $\text{ZnF}_2$ , and of the Hall coefficient and rectifying power at 25°C on fused  $\text{ZnF}_2$ . In the course of a fundamental study of  $\text{ZnF}_2:\text{Mn}$ , Peter D. Johnson and F.E. Williams<sup>2)</sup> found possible to prepare clear transparent crystals, dimensions  $1 \times 1 \times 2\text{mm.}$ , of this phosphor. But we could not find a precise report concerning the conditions of  $\text{ZnF}_2$  crystal formation. We report the method used, as could get some single crystals.

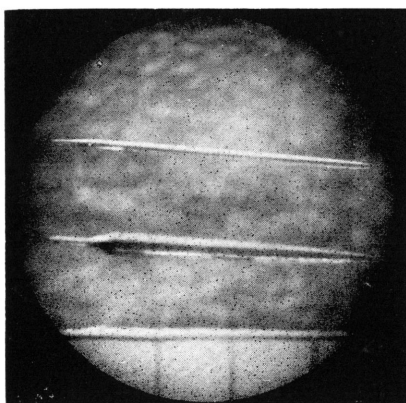
We also used a Pt crucible. Its size was 3.5cm. dia., and 4cm. high. The  $\text{ZnF}_2$  powder\* was put in it about 2cm. high and heated. In the course of heating, the gas supply to the Bunsen burner was almost constant. The temperature of the bottom of the Pt crucible was raised to about 1050°C. (The melting point of  $\text{ZnF}_2$  is 872°C.)<sup>3)</sup> The clear yellowish transparent needle-like crystals grew in radial direction on the walls of the inside of the crucible. The temperature of the outside of the wall was found to be 950°C by means of Pt-Pt:Rh thermocouples, and  $\sim 880^\circ\text{C}$  by the optical pyrometer. Without cooling, after heating of a few hours, we could find some crystals grown. Larger crystals were obtained by longer heating, and by one hour heating, we could find no crystal grown. The temperature gradient of the crucible was 3°C/mm.. The crystals were seemed to grow out of the  $\text{ZnF}_2$  vapour. Some examples of crystals had the dimensions as follows;  $1 \times 1 \times 15\text{mm.}$ ,  $0.5 \times 0.5 \times 20\text{mm.}$ . When the cover of the crucible was cooled by water or kept at high temperature, no crystal was got. Laue X-ray photograph was taken and it showed the character of the single crystal. Some typical crystals are shown in photographs.

In conclusion, the authors wish to express their thanks to Prof. T. Fujiwara and Prof. S. Doi for their valuable advices and constant encouragement, and also wish to thank Mr. Yoshinori Itinose for his assistance.

\* $\text{ZnF}_2$  powder was manufactured by Hayasi Jun'yaku Kôgyo Co. Ltd..



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× 10

#### REFERENCES

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