A METHOD TO FORM SINGLE CRYSTALS OF ZnF₂

by Ikumaro KUBO and Sōiti IMAI

James H. Crawford, Jr. and Ferd E. Williams¹) measured the temperature-dependence of electrical conductivity and thermal e.m.f. on fused samples of ZnF₂: Mn and ZnF₂, and of the Hall coefficient and rectifying power at 25°C on fused ZnF₂. In the course of a fundamental study of ZnF₂: Mn, Peter D. Johnson and F.E. Williams²) found possible to prepare clear transparent crystals, dimensions 1×1×2mm., of this phosphor. But we could not find a precise report concerning the conditions of ZnF₂ 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 ZnF₂ powder* was put into 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 ZnF₂ is 872°C.)³) 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 ~880°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 ZnF₂ vapour. Some examples of crystals had the dimensions as follows; 1×1×15mm., 0.5×0.5×20mm.. 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.

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*) ZnF₂ powder was manufactured by Hayasi Jun'yaku Kōgyo Co. Ltd..
REFERENCES
