NOTES AND NEWS

STRUCTURAL TRANSITION IN AlF_3*

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Because of recent interest in structural transitions and electrical properties of WO_3 (1, 2, 3), it has appeared advisable to examine a number of other ionic structures of similar coordination. One purpose of such investigations is to examine the applicability of the criteria for existence of ferroelectric phases in such structures, as these have been presented by Matthias (4). This author has made brief mention of a transition above 400° C. in AlF_3 (5), but no other studies of the thermal or optical properties seem available. Electrical, thermal and optical properties of AlF_3 over a range of temperatures are reported here.

Single crystals were prepared by heating anhydrous AlF_3 in a covered platinum crucible at 1020° C. Crystals 2 to 3 mm. in size were formed by sublimation on the bottom of the crucible cover.

The crystals show domains at room temperature, as illustrated in Figs. 1 and 2. Figure 1 shows a crystal under crossed nicols, and Fig. 2 in unpolarized light. Upon heating, a few crystals developed domains in two directions. A sharp transition occurs at 460° C., at which temperature the domains disappear and the crystals become isotropic. The domains reappear sharply at 460° C., when the temperature drops.

FIG. 1. AlF_3 between crossed nicols.

FIG. 2. AlF_3 in unpolarized light.

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The crystals show no measurable piezoelectricity and no anomalies in dielectric constant with temperature variation from −190° C. to 480° C. The dielectric constant is about 6 at room temperature. A thermal analysis was made between 100° and 800° C., and this showed a sharp transition at 460° C. The analysis is illustrated in Fig. 3.

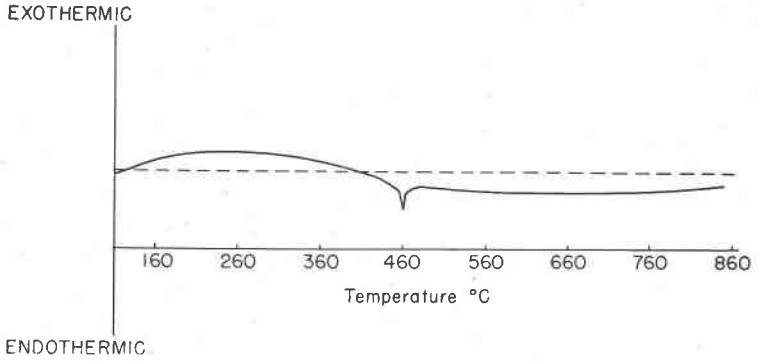

FIG. 3. Differential thermal analysis (AlF_3).

The crystal structure of AlF_3 below the transition point is not firmly established. A reexamination by x-ray diffraction of the structure above and below the transition temperature will be reported shortly.

The participation of Dr. W. Merz in the electrical measurements is gratefully acknowledged.

REFERENCES

(1) MATTHIAS, B. T., *Phys. Rev.*, **76,** 430 (1951).
(2) UEDA, R., AND ICHINOKAWA, T., *Phys. Rev.*, **82,** 563 (1951).
(3) JEFFREY, G. A., KEHL, W., AND WAHL, D., in press.
(4) MATHIAS, B. T., *Science*, **113,** 591 (1951).
(5) MATTHIAS, B. T., *Helv. Phys. Acta*, **23,** 167 (1950).

POWELLITE AND ASSOCIATED PSEUDOMORPHS AT THE ANDERSON MINE, MINERAL COUNTY, NEVADA

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During and after World War I, the Santa Fe District in Mineral County, Nevada, was an important copper producer and of the producing mines the Champion-Anderson group was one of the largest. The writer had an opportunity in recent years to examine the surface and underground workings of these mines rather extensively. Certain features of the mineralization observed may be of more than passing interest.