

A NOTE ON THE THERMAL DECOMPOSITION OF POTASSIUM CHLORATE.

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Certain experiments on the decomposition of potassium chlorate suggested that microscopic observation of the crystals would be of interest, in view of the results obtained with potassium hydrogen oxalate hemihydrate.¹

Potassium chlorate twice recrystallised from distilled water, was prepared in the form of thin plates of 1 to 2 mm. length. Suitable crystals of shape as shown in Fig. 1, as free as possible from etched markings, were carefully dried at room temperature. Single crystals were heated at $223 \pm 2^\circ$ C. on the microscope stage and observed by

¹ Hume and Colvin, *Proc. Roy. Soc.*, **A**, **125**, 635, 1929.

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transmitted light at intervals of half an hour. For a period of six hours no change was evident. On further heating two rows of dark spots in positions *ab* and *ef* in close proximity and parallel to the edges AB and EF, appeared. These developed until they presented the appearance of continuous broad lines, which progressively increased in breadth. A little later lines of dots parallel to the edges BC, CD and DE, and also lines *a'b'* and *e'f'* parallel to and inside the first lines developed. This proceeded until the whole crystal was covered with regularly arranged lines and dots.

The successive stages are shown in the photographs taken, (1) before heating and (2) after heating for seven hours and (3) after heating for twelve hours respectively. It was found impossible to pro-

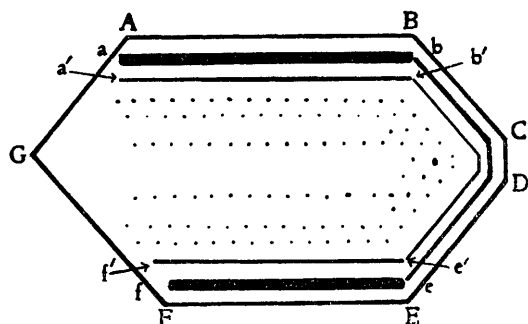


FIG. 1.

long the observations beyond this period, on account of fracture of the crystals. Kohlschütter and Lüthi² have observed similar regularly arranged decomposition markings in the incipient dehydration of crystals of hydrated salts.

When the crystals presented the appearance shown in the last photograph, the pres-

ence of potassium chloride was established. Similar tests failed to show the presence of chloride in the original crystals.

From these observations it is to be concluded that at 223° the decomposition of potassium chlorate is interfacial and proceeds from nuclei on the surface. In view of this it was thought that the catalytic action of manganese dioxide might be due to increase in the rate of nucleation. Crystals of potassium chlorate in light contact with particles of manganese dioxide and rubbed with manganese dioxide failed to show any increase in the rate of decomposition.

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² Kohlschütter and Lüthi, *Helv. Chim. Act.*, **13**, 978, 1930.