

## MINERALOGICAL SOCIETY (London)

The anniversary meeting of the Society was held on Thursday, November 6th, 1952, at 5 p.m., in the apartments of the Geology Society of London, Burlington House, Piccadilly, W.1. (by kind permission).

The following papers were read:—

### (1) IMPERFECTIONS IN THE CRYSTAL STRUCTURE OF KALIOPHILITE

By Dr. A. M. B. Douglas.

Kaliophilite with anomalous optical properties has been recorded by Professor C. E. Tilley. Single-crystal *x*-ray investigations show that the basic crystal structure is identical with that of normal kaliophilite, but anomalous effects are observed which can be explained as due to imperfections in the structure. These could also account for the anomalous optical properties, and the imperfect structure is closely related to the orthorhombic form of  $\text{KAlSiO}_4$ .

### (2) MORPHOLOGY OF BARYTE

By Mr. A. F. Seager.

A morphological analysis of barytes has been made in the manner of Donnay and Harker, using a modification of their method of estimating the relative importance of forms. An attempt has been made to predict the space group. A comparison of the observed and theoretical morphological aspects is given.

### (3) GYROLITE

By Dr. A. L. Mackay and Dr. H. F. W. Taylor.

*X*-ray single crystal investigations on gyrolite ( $2\text{CaO} \cdot 3\text{SiO}_2 \cdot 2\text{H}_2\text{O}$ ) show that it is hexagonal, with  $a = 9.72 \pm 0.01 \text{ \AA}$ ,  $c = 132.8 \pm 0.3 \text{ \AA}$ , space group  $C6_1(C6_6)$ ,  $N = 48$ . The dehydration curve shows that three-quarters of the water is lost much more easily than the remainder, and it is therefore possible that the formula of gyrolite should be written  $\text{Ca}_4(\text{Si}_6\text{O}_{15})(\text{OH})_2 \cdot 3\text{H}_2\text{O}$ . The unit cell probably contains six chemically discrete layers, stacked parallel to the *c*-axis, and of thickness 22.13  $\text{ \AA}$ . The structure of these layers is still uncertain, the *a*-axis being apparently too long to permit of a structure containing  $(\text{Si}_2\text{O}_5)_n$  sheets of the mica type. The dehydration of single crystals of gyrolite has been studied by *x*-ray methods. Loss of the first three-quarters of the water, at  $450^\circ$ , produces only minor changes in the structure, but loss of the remainder brings about conversion to  $\alpha$ -wollastonite, even at temperatures considerably below that ( $1125^\circ$ ) at which it becomes the stable form. The changes from gyrolite to  $\alpha$ -wollastonite, and also from the latter to the  $\beta$ -form on annealing at  $1050^\circ$ , take place in a completely ordered way, and it seems probable that a close structural resemblance between gyrolite and  $\alpha$ -wollastonite must exist.

### (4) AN UNUSUAL SYNTHESIS OF ACANTHITE CRYSTALS

By Dr. F. A. Bannister.

Description of an accidental growth of large transparent blades of acanthite by the diffusion of sulphur contained in plasticine to the silver electrodes of apparatus. The apparatus had been kept in closed metal vessels under normal conditions of temperature and pressure for ten years.

### (5) A RE-EXAMINATION OF CHURCHITE

By Dr. G. F. Claringbull and Dr. M. H. Hey.

A new analysis of churchite shows that it is a hydrous yttrium phosphate with only minor proportions of cerium. It has been commonly regarded as essentially a cerium phosphate, but this is not supported by Church's original analysis (1865) which leaves the exact nature of the rare earths present in doubt. Weinschenkite first described in 1923 is identical with churchite. The name churchite has priority.

## (6) FERROUS CHAMOSITE AND FERRIC CHAMOSITE

By Dr. G. W. Brindley and Mr. R. F. Youell.

A substantially pure ferrous chamosite has been obtained, which, on heating in air at 400° C., is converted to a wholly ferric form. The oxidation is accompanied by a partial dehydration of the structure which is analysed chemically and by *x*-rays. The external hydroxide sheet of the kaolin-type layer structure of chamosite is converted to a sheet of oxygen atoms. The internal hydroxide radicals remain in the lattice up to about 450°–500° C. The reduction of ferric to ferrous chamosite has been effected by heating at 460° C. in an appropriate H<sub>2</sub>/H<sub>2</sub>O mixture in absence of air. The oxidation process is accompanied by characteristic colour changes from green to brown. At higher temperatures up to 1100° C., ferrous aluminates, spinel, hematite and cristobalite are recorded depending on the conditions of heating.

The following papers were taken as read:—

## (1) THE SPACE-GROUP AND CELL-DIMENSIONS OF RANKINITE

By Mrs. K. M. Moody. (Communicated by Dr. W. H. Taylor.)

Oscillation, Weissenberg, and Laue *x*-ray photographs gave for rankinite from Scawt Hill, Co. Antrim:  $a = 10.55$ ,  $b = 8.88$ ,  $c = 7.85$  Å,  $\beta = 120.1^\circ \pm 0.5^\circ$ ; sp. gr. 2.96, 4[Ca<sub>2</sub>Si<sub>2</sub>O<sub>7</sub>].

## (2) AN OCCURRENCE OF HARMOTOME IN N.W. ROSS-SHIRE

By Dr. C. D. Waterston. (Communicated by Dr. W. Campbell Smith.)

Harmotome crystals (average 3 mm. long) coat the vein-stuff in cracks and cavities of a fault breccia on the coast road between Lochinver and Ullapool,  $\frac{1}{4}$  mile S.W. of the southern margin of Loch an Arbhair. The habit and properties of the crystals are described.

## (3) THE FERRIFEROUS ORTHOCLASES OF MADAGASCAR

By Dr. D. S. Coombs.

New chemical and optical data are presented for seven crystals of yellow ferri-ferrous orthoclase from Madagascar. These are considered in conjunction with data taken from the literature, in an investigation of the seemingly anomalous determination of the optic axial plane parallel to (010), made by Kôzu in 1916 on a crystal from this locality. It is found that the entry of iron into the orthoclase structure tends to lower the optic axial angle at a rate of about 5° for 1% iron-orthoclase (0.25% Fe<sub>2</sub>O<sub>3</sub> approximately). For iron contents beyond about 7.5% iron-orthoclase the optic axial plane is normally parallel to (010). A significant proportion of crystals have optic axial angles which are larger (in the plane perpendicular to (010)) than would be expected for this simple relationship, possibly indicating transitions to adularious forms. One crystal has been found with a small 2V parallel to (010) instead of perpendicular to (010) as expected from the suggested relationship.

## (4) AN X-RAY METHOD FOR STUDYING ORIENTATION OF MICACEOUS MINERALS IN SHALES, CLAYS AND SIMILAR MATERIALS

By Dr. G. W. Brindley.

The method is based on the measurement of the *x*-ray intensities of basal, 001, reflections round a Debye-Scherrer ring using a flat specimen set at an angle to the incident *x*-ray beam equal to the Bragg angle for each reflection considered. The main consideration is the correction for absorption in the specimen, which is discussed fully. The method is illustrated by *x*-ray diagrams of shales and artificially orientated clay specimens.

(Titles and abstracts kindly submitted by G. F. Claringbull, General Secretary.)