SHORT COMMUNICATIONS

X-ray powder data for holmquistite from Rhodesia.

THE following table was accidentally omitted from the paper by O. von Knorring and G. Hornung, Min. Mag., 1961, vol. 32, p. 733.

TABLE II. X-ray powder data for holmquistite from Benson mine, Southern Rhodesia. Fe-$K\alpha$ radiation, camera diameter 9 cm.

d, Å.	*I.*	*d*, Å.	*I.*	*d*, Å.	*I.*
8·1	vs	2·12	m	1·460	w
5·0	vw	2·11	w	1·435	w
4·80	vw	2·08	w	1·415	w
4·38	s	2·04	w	1·385	m
3·80	vw	2·02	w	1·345	w
3·58	m	1·945	w	1·329	w
3·27	w	1·920	w	1·303	m
3·19	w	1·840	w	1·275	w
3·15	w	1·800	w	1·265	w
2·98	vs	1·790	w	1·251	w
2·77	s	1·755	w	1·230	w
2·68	m	1·730	w	1·190	vw
2·62	m	1·700	w	1·170	w
2·52	s	1·675	w	1·157	w
2·45	w	1.620	vw	1·130	w
2·39	w	1·580	w	1.100	w
2·27	w	1·560	m	1·081	w
2·24	w	1·515	vw	1·062	w
2·22	w	1·495	w	1·052	w
2·19	w	1·479	m		

THE EDITOR

Structural relationships within pseudomorphs after olivine.

CURRENT investigations by optical and single-crystal X-ray diffraction have shown that iddingsite—the name applied to deep reddish-brown alteration products of olivine—is a polycrystalline aggregate that frequently contains more than one mineral species. The constituents vary considerably in different occurrences. For instance, Brown and Stephen[1] described iddingsite from New South Wales, Australia, containing goethite and a layer-lattice silicate, while Smith[2] described one from Markle basalt, Edinburgh, containing hematite, chlorite, and quartz.

Yet another mineral assemblage, saponite, goethite, and hematite, has been found in pseudomorphs after olivine in weathered Dunsapie basalt, Edinburgh.

The orientational relationship of these minerals has been studied and compared with the data obtained by previous investigators.[1, 2, 3] Since the Dunsapie basalt pseudomorphs contain no remnant olivine, the author has been able to relate the orientation of the alteration products only indirectly to the structure of the original olivine.

The goethite crystals are apparently all oriented with their three orthorhombic axes perpendicular to the three cleavage planes of the iddingsite. In the iddingsite containing goethite examined by Brown and Stephen,[1] the normals to these planes were shown to be parallel to the orthorhombic axes of olivine, and since the a_G axis (the subscripts G, F, H, L, and S in the text represent goethite, forsterite, hematite, layer lattice silicate, and saponite respectively) is normal to the principal cleavage plane of the Dunsapie iddingsite, the orientation of the goethite with respect to the original olivine is probably the same as that observed for 80% of the goethite in the New South Wales sample, with $[100]_G \| [100]_F$; $[010]_G \| [010]_F$; and $[001]_G \| [001]_F$. Brown and Stephen suggested that the three possible directions of orientation for goethite, based on sheets of oxygen atoms in hexagonal close-packing, are not exactly equivalent and that the cation configuration in the olivine influences the orientation to a considerable extent and accounts for the marked preference for one orientation.

The saponite crystals are aligned with respect to the goethite crystals so that $[100]_S \| [010]_G$; $[010]_S \| [001]_G$; and $(001)_S \perp [100]_G$—an arrangement comparable to the orientational relationship in the New South Wales sample where $a_L \| b_F \| b_G$ and $c_L \| a_F \| a_G$. However, oscillation photographs have shown that the saponite crystals give, in aggregate, a symmetry that is effectively hexagonal, and thus $[100]_S$ may also be parallel to the equivalent directions $[0\bar{1}\bar{6}]_G$ and $[0\bar{1}6]_G$ at 120° to each other.

The orientation of the hematite crystals with respect to goethite is similar to that obtained by Goldsztaub[3] and by Francombe and Rooksby[4] on dehydrating a single crystal of goethite: $[10\bar{1}0]_H \| [010]_G$ and $[0001]_H \| [100]_G$. The $[10\bar{1}0]_H$ axis in the Dunsapie sample may be parallel to any one of three equivalent directions. Similarly, Goldsztaub[3] found that, on dehydration, goethite does not give a single crystal of hematite but an assemblage of small crystals in two orientations rotated 180° from each other in the plane normal to their trigonal axes.

The hematite crystals in the Dunsapie pseudomorphs are oriented with respect to the saponite crystals so that $[100]_S \| [10\bar{1}0]_H$, and $(001)_S \perp [0001]_H$, which is as one would expect because of the similar orientational relationship between chlorite and hematite in the pseudomorphs after olivine in Markle basalt.[2]

Summarizing the above results, the three alteration products in the pseudomorphs after olivine in Dunsapie basalt may be arranged so that $[100]_S \| [010]_G$, $[0\bar{1}6]_G$, $[016]_G$, $[10\bar{1}0]_H$; and $(001)_S \perp [100]_G \| [0001]_H$. The structural unit dimensions corresponding to these directional relations are as follows: $2a_S \mathrel{\hat{=}} b_G \mathrel{\hat{=}} 2a_H$ and $c_S \mathrel{\hat{=}} 3a_G \mathrel{\hat{=}} c_H$.

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[1] G. Brown and I. Stephen, Amer. Min., 1959, vol. 44, p. 251.

[2] W. W. Smith, Min. Mag., 1959, vol. 32, p. 324.

[3] S. Goldsztaub, Compt. Rend. Acad. Sci. Paris, 1931, vol. 193, p. 533.

[4] M. H. Francombe and H. P. Rooksby, Clay Min. Bull., 1959, vol. 4, p. 1.

Some observations concerning viscosity and anionic groups in silicate melts.

THE study of the viscosity of silicate melts has steadily increased in importance in petrology and industry. The slope of the viscosity curve has industrial significance wherever process automation of melts is present. Most theoretical considerations of viscosity reveal a relationship of this quantity to the geometry and internal and external anionic forces of the unit of flow.

The purpose of this study was to discover whether any data existed that on re-analysis would yield supporting or conflicting data on the theory of anionic groups as described in a previous publication (de Wys, 1960). It was felt that if various anionic groups had an effect on viscosity characteristics this would most likely be obvious in the slope of the viscosity curves, which is an indication of the activation energy for viscous flow.

According to Eyring's 'hole' theory it would appear reasonable to assume that the fluidity of a liquid will be related to the number of holes. Since the number of holes in a solid is related to its temperature elevation, ΔT, above its most dense state it would appear reasonable, in view of modern solid–liquid transition theory, that the increase in the