

carbonate hydroxide and its relationship to magnesium-aluminum double hydroxide, manasseite and hydrotalcite. *Amer. Mineral.*, **52**, 1036-1047.

FRONDEL, C. (1941) Constitution and polymorphism of the pyroaurite and sjögrenite groups. *Amer. Mineral.* **26**, 295-315.

THE AMERICAN MINERALOGIST, VOL. 53, MAY-JUNE, 1968

MAGNESIUM ALUMINUM CARBONATE HYDROXIDE TETRAHYDRATE:

A REPLY

G. J. ROSS AND H. KODAMA, *Soil Research Institute, Department of Agriculture, Ottawa, Ontario, Canada.*

In proposing the one-dimensional structural scheme for the synthetic hydroxycarbonate, $Mg_6Al_2CO_3(OH)_{16} \cdot 4H_2O$, (Ross and Kodama, 1967) we had already considered among others a structure similar to the one recently determined for sjögrenite by Allmann and Lohse (1966). However, we could not revise the structural scheme which had originally been outlined by Feitknecht (1942), since our X-ray intensity data appeared to be more consistent with the proposed structural scheme as shown by a comparison in the following table.

00l	I obs.	(Mg ₆)(OH) ₁₆ [Al ₂ CO ₃ (H ₂ O) ₄]	(Mg ₆ Al ₂)(OH) ₁₆ [CO ₃ (H ₂ O) ₄]
		I calc.	I calc.
1	100	100	100
2	60	53	24
3	40	23	4
4	6	2	1
5	—	0.03	0.3
6	6	7	3
7	—	1	0.9
8	5	3	1.3

The comparison shows that the observed intensities agree better with the calculated intensities of a structure in which the Al is present in the disordered interlayer (column 3) than with the calculated intensities of a structure in which no Al is present in this interlayer (column 4). The agreement between the observed intensities and the calculated intensities of the latter structure is only slightly improved if the powder pattern is indexed on a rhombohedral lattice (Table shown in previous discussion). In this case the enhancement of the intensity of the third order reflection may be explained by the contribution of the prismatic reflection.

Because of the microcrystallinity of our compound we could use only X-ray powder diffraction methods. We are aware of the limitations of

these methods as compared with single crystal determinations. In view of these considerations, we agree that the structure of manasseite, hydrotalcite and of our compound as well may be similar to the recently determined structure of pyroaurite and sjögrenite. With regard to this, Gastuche, *et al.* (1967) and Brown and Gastuche (1967) have proposed a structural scheme for their synthetic hydroxycarbonates which corresponds to the structures recently determined for pyroaurite and sjögrenite. However, our data do not justify the choice of this structure for our synthetic Mg-Al hydroxycarbonate and further data, especially single crystal data, would be necessary to determine the correctness of the structure of our compound.

REFERENCES

- ALLMAN, R. AND LOHSE, H. H. (1966) Die Kristallstruktur des Sjögrenits und eines Umwandlungsproduktes des Koenenits (=Chlor-Manasseits). *Neues Jahrb. Mineral. Monatsh.*, **1966**, 161-181.
- BROWN, G. AND GASTUCHE, M. C. (1967) Mixed magnesium-aluminum hydroxides. II. Structure and structural chemistry of synthetic hydroxycarbonates and related minerals and compounds. *Clay Minerals.*, **7**, 193-201.
- FEITKNECHT, W. (1942) Über die Bildung von Doppelhydroxyden zwischen zwei- und dreiwertigen Metallen. *Helv. Chim. Acta*, **25**, 555-569.
- GASTUCHE, M. C., BROWN, G. AND MORTLAND, M. M. (1967) Mixed Magnesium-Aluminum Hydroxides. I. Preparation and characterization of compounds formed in dialyzed systems. *Clay Minerals.*, **7**, 177-192.
- ROSS, G. J. AND KODAMA, H. (1967) Properties of a synthetic magnesium-aluminum carbonate hydroxide and its relationship to magnesium-aluminum double hydroxide, manasseite and hydrotalcite. *Amer. Mineral.*, **52**, 1036-1047.

THE AMERICAN MINERALOGIST, VOL. 53, MAY-JUNE, 1968

MORINITE-APATITE-WHITLOCKITE: A CORRECTION

D. JEROME FISHER, *University of Chicago, Chicago, Illinois.*

There is a correction which Professor Duncan McConnell of Ohio State University kindly points out should be made in my paper published under the above title in 1960. There on page 655 where the (101) line with $d=4.04$ (4.08 in Table 6) is considered as belonging to low cristobalite (also see p. 665; Figs. 2D, E; and Tables 1 (V) and 6), he states that this should be the corresponding (111) line of the $AlPO_4$ isotype of low cristobalite (see A.S.T.M. card 11-500). Similarly it follows that the $d=3.37$ and 4.28 lines (see the top of p. 659 and Fig. 2G) are the (102) and (100) lines of synthetic berlinite.

The same correction may also be needed in Fisher (1965).

REFERENCES

- FISHER, D. JEROME (1960). *Amer. Mineral.*, **45**, 645-667.
 ——— (1965) *Amer. Mineral.* **50**, 1658-1665.