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NATROPHILITE

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Precession and Weissenberg pictures taken of a sample of this rare orthorhombic mineral (Na Mn PO_4) from the Branchville, Connecticut pegmatite kindly supplied me by Professor Horace Winchell (Yale, Brush #2363) yielded a unit cell with $a=10.53$, $b=5.00$, $c=6.29$ Å. This setting is chosen to bring out the structural relations with the humites and olivines as well as the phosphate triphylite, Li (Fe^{2+}, Mn^{2+})PO_4, in the orientation of the monoclinic member chondrodite with $c<a$, and b, the 2-fold axis. The conditions limiting possible reflections were found to be Okl—k+l = 2n, and hOl—h = 2n. The space group is thus #33—$Pna2_1$ or #62—*Pnam*, presumably the latter. This is in agreement with Byström (1944). The *Pmna* in Danas' System (Palache *et al.*, 1951) is probably a misprint for *Pnma*. The writer confirms the powder data given by Lindberg (1950).

Samples of this powdered mineral resting on platinum foil were heated

TABLE 1. *X*-RAY POWDER DATA FOR HIGH NATROPHILITE

d(A.)	I/I_1	*d*(A.)	I/I_1	*d*(A.)	I/I_1
11.3	2	2.095	0+	1.338	– –
8.4	—	2.045	– –	1.318	– –
6.15	1+	1.995	0+	1.300	2
5.24	—	1.975	– –	1.279	2
4.47	3	1.895	3	1.264	– –
3.72	7	1.880	4	1.238	– –
3.35–3.51	four weak lines	1.755	– –	1.187	– –
3.10	—	1.720	3	1.180	– –
2.89	—	1.695	– –	1.169	1
2.72	10	1.672	1	1.159	1
2.60	8	1.658	1	1.148	– –
2.545	3	1.607	– –	1.137	2–
2.46	2	1.575	– –	1.124	2–
2.41	2	1.532	2	1.113	2–
2.345	0+	1.520	2	1.060	2–
2.26	1+	1.505	2	1.039	2–
2.21	0+	1.480	1	1.025	2–
2.16	0+	1.437	2	1.021	1
2.11	2	1.426	1		

Fe/Mn radiation, 114 mm diameter Straumanis-type camera, measured with a Nies scale. Intensities visually estimated (– – means <1; 0+ means much <1).

in air in an electric furnace for intervals of approximately 24 hours at temperatures varying from 460 to 985° C. After cooling, x-ray powder pictures were taken. It was found that the material inverted to a new form between 560 and 570°. At 925° the material seems to have melted and recrystallized; at least it is very strongly sintered. At 985° a light brown glass formed, but it recrystallized, giving a powder pattern not significantly different from those produced from any of the samples heated to 570°. Table 1 contains the powder data on this high-temperature form. The two forms of natrophilite yield powder data that appear to tie in with those for low (β) and high (α) forms of Ca Na PO_4 which have a transition point of 680° as determined by Bredig (1942), who lists other materials that are isotypous with each of these.

Both lithiophilite and triphylite were heated in similar fashion to about 900°. At 885° the South Dakota (Custer Mt. Lode) lithiophilite became thoroughly sintered, but the resulting material yielded powder diffraction data not significantly different from the same unheated material. At 880° the Rochester, New Hampshire triphylite was slightly sintered; at 925° it appeared to have been completely melted, but had recrystallized. The films of the triphylite heated to 600° or above showed minor differences from the unheated material; these were chiefly the production of doublets for the 5.2, 3.95, and 2.79 lines.

References

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THE FORMATION OF VERMICULAR PELLETS IN NEW ZEALAND GLAUCONITES

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Introduction

Since the paper by Galligher (1936) on the transformation of biotite to glauconite in Monterey Bay, California, this method of formation has been given credence, though seldom enthusiastically as a method of forming large greensand deposits.