

## X-RAY DATA FOR KINGITE

Calculated		Measured <sup>a</sup>	
hkl	d(Å)	I	d(Å)
122	2.529	3	2.529
32 $\bar{1}$	2.480	7	2.476
041	2.450	5	2.446
		1	2.404
11 $\bar{3}$	2.353	1	2.365
		5	2.336
231	2.315	7	2.300
		2	2.292
		2	2.274
		3	2.269
		1	2.255
		3	2.248
331	2.232	7	2.233
		4	2.216
		4	2.208
		3	2.196
		1	2.189
		1	2.182
331	2.163	2	2.159
		2	2.148
		3	2.127
322	2.116	14	2.112
		3	2.054
		1	2.041
421	2.035	6	2.026
		2	2.005
33 $\bar{2}$	1.988	8	1.990
050	1.973	13	1.974
15 $\bar{1}$	1.918	3	1.922
23 $\bar{3}$	1.912	1	1.914
042	1.898	5	1.900
2 $\bar{3}$ 3	1.882	1	1.882
412	1.875	1	1.875
340	1.856	3	1.858
051	1.831	13	1.835
510	1.814	1	1.814
114	1.806	3	1.805
25 $\bar{1}$	1.787	2	1.788
		4	1.722

<sup>a</sup> K $\alpha$  radiation,  $\lambda = 1.7889 \text{ \AA}$ .

both crystal systems. The calculation assuming monoclinic symmetry did not converge. The cell parameters obtained from the final least squares adjustment, assuming triclinic symmetry, are as follows:

$a = 9.15 \pm 0.01 \text{ \AA}$ ,  $b = 10.00 \pm 0.01 \text{ \AA}$ ,  $c = 7.24 \pm 0.02 \text{ \AA}$ ,  $\alpha = 98.6 \pm 0.1^\circ$ ,  $\beta = 93.6 \pm 0.1^\circ$ ,  $\gamma = 93.2 \pm 0.1^\circ$ ,  $V = 652 \pm 2 \text{ \AA}^3$ ,  $Z = 2$  (using above described chemical formula),  $\rho_{\text{calc}} = 2.465$ ,  $\rho_{\text{meas}} = 2.2-2.3$ . (by Norrish *et al.*)

Meta-kingite, which is obtained by dehydrating kingite at 160°C and gives the same X-ray pattern as that reported by Norris *et al.*, gives insufficient diffraction spots in the electron diffraction pattern to allow a similar calculation of unit-cell parameters.

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## REFERENCE

- NORRISH, K., L. E. R. ROGERS AND R. E. SHAPTER (1957) Kingite, a new hydrated aluminum phosphate mineral from Robertstown, South Australia. *Mineral. Mag.* 31, 351-357.

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## THE SYNTHESIS OF CHLORITOID AT LOW PRESSURES

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## ABSTRACT

At oxygen fugacities along the Ni-NiO buffer, triclinic chloritoid has been synthesized from oxide mixes at water pressures between 8.7 kbar and 1 kbar and at temperatures between 650°C and 525°C respectively. The data indicates that the 7 Å chlorite assemblage, previously considered to be the low pressure metastable equivalent of chloritoid, is unstable with respect to chloritoid.

The mineral chloritoid,  $\text{FeAl}_2\text{SiO}_5(\text{OH})_2$ , has been the subject of several experimental studies in recent years. (Halferdahl, 1961, Ganguly and Newton, 1968). Although it has been described from various apparently low-pressure geological environments, including contact metamorphic aureoles, chloritoid has never been successfully synthesized below pressures of the order of 10 kbar. The lowest pressure of synthesis reported is at 9.2 kbar and 650°C by Halferdahl (1961).

In previous low pressure studies on chloritoid by Halferdahl and on iron cordierite (composition: chloritoid +  $\text{SiO}_2$ , Fig. 1) by Schreyer