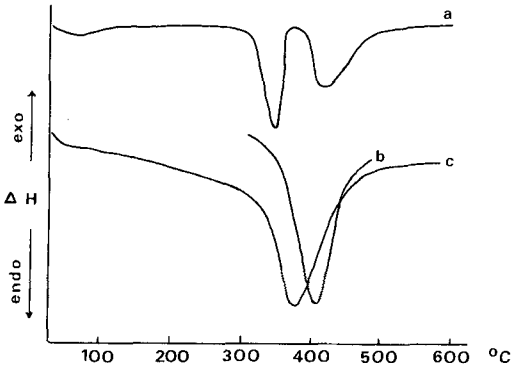

FIG. 3. DSC scan, in static air: (*a*) 'doranite' with 3% MgO; (*b*) calcian analcime from intergrowth; and (*c*) synthetic sodium analcime (*a* and *c* at 15 °C/min, *b* at 10 °C/min.) After Dyer *et al.* (1987).

albite + vapour field whereas, if CaO is fully substituted for Na_2O in the above system, Liou (1971) ascertained wairakite (+ fluid) formed a separate field from anorthite (+ quartz and fluid). From the co-existence of natural calcian analcime and bytownite it would appear that if Ca and Na are both present in substantial quantities with Al_2O_3–SiO_2–H_2O then, if equilibrium is achieved, Na–Ca analcime–plagioclase assemblages may well form over the whole analcime–'Ca analcime analogue' range with corresponding equilibrium Ab–An compositions.

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Unit cell dimensions of the hydrated aluminium phosphate–sulphate minerals sanjuanite, kribergite, and hotsonite

AT the time when the hydrated aluminium phosphate–sulphate hotsonite (Beukes *et al.*, 1984*a*) and its equally rare relative zaherite (Beukes *et al.*, 1984*b*; De Bruiyn *et al.*, 1985) were discovered near Pofadder, South Africa, very little was known about the unit cells of the other two hydrated aluminium phosphate–sulphate minerals sanjuanite and kribergite, originally described by De Abeledo *et al.* (1968) from Argentina and Sweden, respectively. Although the Powder Diffraction file (PDF) contains the X-ray diffraction patterns for sanjuanite and kribergite (PDF 20-47 and 20-48 respectively), they had not been indexed nor have their unit cell parameters been calculated thus far. The purpose of this paper is therefore to index the X-ray power patterns of the latter two minerals and compare their unit cell dimensions with that of hotsonite.

The indexing of these two minerals was conducted on the data as contained in the powder diffraction files (PDF 20-47 and 20-48) which are the results of De Abeledo *et al.* (1968). Indexing was achieved by the reciprocal lattice method of Ito (Azàroff and Buerger, 1958). The unit cell dimensions obtained by this procedure were further refined using the least squares method (Appleman *et al.*, 1972).

The unit cell dimensions and their reliability parameters (Fn and Mn), according to the methods of Smith and Snyder (1979) and De Wolff (1968) for the three minerals hotsonite, sanjuanite, and kribergite are presented in Table 1.

Table 1. The unit cell dimensions and reliability parameters of the three hydrated aluminium-phosphate-sulphate minerals

	Sanjuanite	Kribergite	Hotsonite
a (Å)	11.314	18.126	11.288
	(0.011)	(0.025)	(0.059)
b (Å)	9.018	13.519	11.658
	(0.009)	(0.225)	(0.060)
c (Å)	7.376	7.500	10.550
	(0.007)	(0.013)	(0.067)
alfa	930°4.17'	70°29.99'	112°32.22'
	(6.01')	(7.17')	(2.93')
beta	95°46.49'	117°52.20'	107°31.33'
	(4.17')	(7.11')	(2.84')
gamma	105°39.77'	136°34.60'	64°27.06'
	(4.42')	(6.67')	(2.90')
Volume (Å³)	718.39	1116.72	1135.33
	(0.808)	(11.592)	
Z	2	2	1
D(calc)	1.96	1.95	2.03
D(meas)	1.94	1.92	2.06
Fn	3.33	3.71	6.50
Mn	3.16	3.25	3.41

Standard errors of estimate in parenthesis.

Their cell volumes are in accordance with those calculated from the molecular mass, density and other parameters. According to PDF 20-48, kribergite contains $4H_2O$ molecules while Fleischer (1987) reports $2H_2O$ molecules per unit cell for this mineral. The former value is favoured as it causes the calculated density of kribergite to correspond more closely to the measured density.

The reliability parameters indicate that the respective cell characteristics are possibly correct. Accordingly three diffraction reflections in the case of sanjuanite, namely 6.92, 4.27 and 4.04 cannot be accounted for in the lattice presented by us. The presence of these reflections could be atttributed to an unknown contaminant.

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