Tables and figures

Table 1. Cyclosilicates from groups VIIIC01–VIIIC03 [91N1].

Silicate	Composition	Group
Wadeite	$K_2ZrSi_3O_9$	VIIIC01[1)]
Benitoite	$BaTiSi_3O_9$	VIIIC01
Pabsite	$Ba(Sn,Ti)Si_3O_9$	VIIIC01
Bazirite	$BaZrSi_3O_9$	VIIIC01
Walstromite	$BaCa_2Si_3O_9$	VIIIC02
Margarosanite	$Ca_2PbSi_3O_9$	VIIIC02
Roeblingite	$Ca_6MnPb_2(Si_3O_9)_2(SO_4)_2(OH)_2 \cdot 4H_2O$	VIIIC02
Scawtite	$Ca_7(Si_3O_9)_2(CO_3)\cdot 2H_2O$	VIIIC02
Eudialyte[2)]	$Na_{16}Ca_6Fe_3Zr_3(Si_3O_9)_2(Si_9O_{27})_2(OH,Cl)_4$	VIIIC03
Kentbrooksite	$(Na,R)_{15}(Ca,R)_6Mn_3Zr_3NbSi_{25}O_{74}F_2 \cdot 2H_2O$	
Catapleiite	$Na_2ZrSi_3O_9 \cdot 2H_2O$	VIIIC03
Calcium catapleiite	$CaZrSi_3O_9 \cdot H_2O$	VIIIC03
Gaidonnayite	$Na_2ZrSi_3O_9 \cdot 2H_2O$	VIIIC03
Georgechaoite	$KNaZrSi_3O_9 \cdot 2H_2O$	VIIIC03
Loudounite	$NaCa_9Zr_4Si_{16}O_{40}(OH)_{11} \cdot 8H_2O$	VIIIC03

1) The $K_2Si_4O_9$, $Na_2Si_4O_9$, $BaSi_4O_9$, $A_{2-x}A'_x(B_{1-z}B'_z)Si_yGe_{3-y}O_9$ (A, A′ = K, Rb, Cs, Tl; B, B′ = Ti, Sn, Ge), $K_6M_6Si_4O_{26}$, $A_3M_6Si_4O_{26}$ are also included;

2) Various eudialyte types were studied and their denominations were mentioned in text. We mention in table only kentbrooksite.

Table 2. Atomic positional parameters and temperature factors.

a) $K_2ZrSi_3O_9$, crystallizing in space group P3 [77B1].

Atom	x	y	z	$\beta_{ij} \cdot 10^4$					
				β_{11}	β_{22}	β_{33}	β_{12}	β_{23}	β_{13}
Zr1	0	0	0.0000(4)	56	56	14	36	0	0
Zr2	0	0	0.4990(4)	56	56	15	37	0	0
K1	2/3	1/3	0.560(4)	96	96	36	99	0	0
K2	2/3	1/3	0.946(4)	101	101	32	93	0	0
K3	1/3	2/3	0.059(4)	99	98	34	82	0	0
K4	1/3	2/3	0.447(4)	99	98	30	77	0	0
Si1	0.386(1)	0.259(1)	0.249(4)	14	16	15	10	2	8
Si2	0.614(1)	0.741(1)	0.749(4)	30	42	8	42	–3	–7
O1	0.488(2)	0.090(2)	0.261(4)	30	40	33	42	10	12
O2	0.514(2)	0.911(2)	0.762(5)	43	51	36	62	-18	–8
O3	0.246(2)	0.236(2)	0.120(5)	63	50	19	51	-21	–26
O4	0.268(2)	0.239(2)	0.387(5)	65	56	19	41	19	39
O5	0.756(2)	0.768(2)	0.620(5)	72	88	16	90	6	22
O6	0.734(2)	0.767(3)	0.887(5)	80	100	16	10	–13	–32

Table 2 (cont.)

b) $K_2Si_4O_9$, crystallizing in space group $P6_3/m$ [83S1].

Atom	*x*	*y*	*z*	B_{eq} [Å^2]
K	1/3	2/3	0.05778(5)	1.139(5)
$^{[6]}$Si	0	0	0	0.344(6)
$^{[4]}$Si	0.36532(7)	0.23343(7)	¼	0.323(4)
O1	0.49150(18)	0.07339(19)	¼	0.629(12)
O2	0.23203(13)	0.20907(13)	0.10611(8)	0.619(8)

c) Walstromite, $Ca_2BaSi_3O_9$, crystallizing in triclinic lattice, space group $P\bar{1}$ [68D1].

Atom	*x*	*y*	*z*
Ca1	0.272	0.507	0.763
Ca2	0.435	0.831	0.935
Ba	0.049	0.848	0.323
Si1	0.096	0.222	0.145
Si2	0.235	0.484	0.284
Si3	0.442	0.196	0.511
O1	0.236	0.251	–0.027
O2	–0.098	0.114	0.102
O3	0.042	0.366	0.212
O4	0.366	0.556	0.089
O5	0.125	0.580	0.389
O6	0.352	0.365	0.494
O7	0.613	0.238	0.368
O8	0.517	0.084	0.765
O9	0.238	0.130	0.389

d) Roeblingite, having monoclinic structure of space group C2/m [84M2].

Atom	*x*	*y*	*z*	$\beta_{ij} \cdot 10^3$					
				β_{11}	β_{22}	β_{33}	β_{12}	β_{13}	β_{23}
Pb	0.1010(1)	0.0000	0.1450(1)	13.4(3)	11.5(3)	14.5(3)	0	3.0(2)	0
Mn	0.0000	0.5000	0.5000	10(2)	10(2)	16(2)	0	3(1)	0
Ca1	0.0549(3)	0.5000	0.2371(3)	12(1)	11(1)	15(1)	0	4(1)	0
Ca2	0.3042(2)	0.2306(3)	0.3307(2)	9(1)	9(1)	15(9)	2(1)		2(1)
Si1	0.2632(4)	0.5000	0.4846(4)	8(2)	7(2)	13(2)	0	3(1)	0
O1	0.2217(10)	0.5000	0.3592(10)	9(4)	18(6)	14(5)	0	5(4)	0
O2[a)]	0.3224(10)	0.0000	0.4472(11)	6(5)	29(7)	22(6)	0	12(4)	0
O3	0.1552(7)	0.1580(10)	0.4802(7)	12(3)	5(3)	17(3)	–4(3)	3(3)	10(3)
Si2	0.0612(2)	0.1732(4)	0.3690(3)	8(1)	5(1)	15(1)	2(1)	4(1)	1(1)
O4	0.1173(7)	0.1938(12)	0.2742(7)	14(4)	17(4)	13(3)	–3(3)	8(3)	–7(3)
O5	0.4870(7)	0.1768(11)	0.3708(7)	12(3)	3(3)	23(4)	–4(3)	3(3)	–4(3)
O6	-0.0011(10)	0.0000	0.3571(12)	10(5)	2(4)	31(6)	0	11(4)	0
S	0.2626(4)	0.5000	0.1123(3)	15(2)	11(2)	14(2)	0	7(1)	0
O7	0.2851(13)	0.5000	0.0088(12)	29(7)	25(7)	20(6)	0	15(5)	0
O8	0.1475(3)	0.5000	0.1018(14)	22(7)	38(8)	26(7)	0	5(6)	0
O9	0.3101(9)	0.3581(13)	0.1728(9)	34(5)	16(4)	25(4)	10(4)	17(4)	8(4)
OW1	0.2754(10)	0.0000	0.2143(11)	9(5)	17(6)	16(5)	0	4(4)	0
OW2	0.4460(9)	0.1742(15)	0.0967(9)	19(4)	26(5)	30(5)	2(4)	1(4)	–2(4)

[a)] Non-positive definite thermal parameter.

Table 2 (cont.)

e) Scawtite, $Ca_7(Si_6O_{18})(CO_3) \cdot 2H_2O$, having monoclinic structure, space group I2/m [73P1].

Atom	*x*	*y*	*z*	B_{eq} [Å^2]
Ca1	0.2120(1)	0.1402(1)	0.1996(2)	1.00(2)
Ca2	1/2	0.2495(1)	0	0.66(3)
Ca3	1/2	1/2	0	1.39(5)
Si1	0.7729(1)	0.3957(1)	0.2059(2)	0.45(3)
Si2	0	0.3233(1)	0	0.46(4)
O1	0.9028(4)	0.3933(3)	0.0901(6)	1.13(8)
O2	0.0879(4)	0.2683(3)	0.1837(6)	0.89(8)
O3	0.6447(4)	0.3756(3)	0.0322(6)	0.84(7)
O4	0.6980(4)	01619(2)	0.0918(6)	0.74(7)
O5	0.7409(6)	0	0.2268(8)	0.83(10)
O6 [H_2O]	0.3452(7)	0	0.2033(9)	1.66(13)
C	0	0	0	1.46(24)
O7[a)]	0.0152(12)	0.0699(9)	0.1024(20)	4.04(33)
O8[a)]	0.0665(13)	0	0.1777(18)	1.47(25)

[a)] O7 and O8 were assigned to an occupancy of 0.5.

f) Eudialyte[17)] (footnote see Table 3), having trigonal structure, space group R3m [99R2].

1) Framework of Ti-rich eudialyte.

Atom	*x*	*y*	*z*	B_{eq} [Å^2]	Site occupation
M1	0.1637(1)	0.3274(1)	0.0833(1)	1.21(2)	2.33 Zr + 0.67 Ti
M2	–0.0034(2)	0.4983(1)	0.2496(1)	1.27(3)	1.7 Ti + 1.3 Zr
M3	0.0743(1)	0.6668(2)	0.1662(1)	1.26(3)	4.77 Ca + 1.23 Mn
M4	–0.0007(2)	0.2606(1)	–0.0007(1)	1.24(2)	3.73 Ca + 1.87 Na + 0.4 Ce
Si1	0.3209(2)	0.0514(2)	0.1183(1)	1.65(5)	
Si2	0.2464(3)	0.1232(2)	0.2955(1)	1.24(6)	
Si3	0.0627(3)	0.3446(3)	0.2843(1)	1.37(5)	
Si4	0.5981(2)	0.4019(2)	0.2924(1)	1.71(7)	
Si5	0.0717(2)	0.1434(3)	0.0405(1)	1.49(7)	
Si6	0.4054(2)	0.5946(2)	0.2068(1)	1.44(7)	
Si7	0.5398(1)	0.4602(1)	0.1269(1)	1.35(6)	
Si8	0.2632(2)	0.5264(3)	0.1249(1)	1.54(8)	
Si9	0.0029(2)	0.6064(2)	0.0487(1)	0.97(4)	
Si10	0.1246(2)	0.2492(3)	0.2042(1)	1.50(7)	
Si11	0.4172(4)	0.2086(3)	0.0374(1)	1.37(7)	
Si12	0.3399(3)	0.0651(3)	0.2146(1)	1.33(5)	
O1	0.3558(8)	0.1779(5)	0.1105(1)	0.9(3)	
O2	0.3110(8)	0.1555(6)	0.3188(1)	2.2(2)	
O3	0.5136(3)	0.0272(5)	0.1521(1)	0.8(3)	
O4	0.3794(9)	0.2783(6)	0.0542(1)	2.1(2)	
O5	0.0714(5)	0.3715(5)	0.3092(1)	1.0(2)	
O6	0.0261(6)	0.2478(6)	0.1033(1)	1.6(2)	
O7	0.3024(11)	0.1512(9)	0.2246(2)	2.5(3)	
O8	0.1007(6)	0.3969(7)	0.0641(1)	2.5(2)	
O9	0.0614(5)	0.1228(7)	0.2047(3)	5.3(5)	
O10	0.5709(8)	0.1418(10)	0.2678(4)	4.6(4)	
O11	0.2357(6)	0.4714(9)	0.1016(2)	2.5(4)	

Table 2 (cont.)

Atom	*x*	*y*	*z*	B_{eq} [Å^2]	Site occupation
O12	0.2962(7)	0.2533(6)	0.1436(1)	1.3(2)	
O13	0.5500(4)	0.4500(4)	0.3103(1)	1.5(3)	
O14	0.2717(5)	0.5434(7)	0.2059(2)	2.1(3)	
O15	0.0328(9)	0.6219(7)	0.0225(1)	2.6(2)	
O16	0.3756(11)	0.3026(9)	0.1894(1)	3.2(2)	
O17	0.1238(8)	0.0619(5)	0.0391(2)	2.4(4)	
O18	0.5444(1)	0.2722(8)	0.2952(2)	2.1(4)	
O19	0.0570(4)	0.2981(4)	0.2196(1)	1.0(1)	
O20	0.5112(3)	0.0224(5)	0.0565(1)	1.1(3)	
O21	0.3970(6)	0.6030(6)	0.1262(2)	2.6(4)	
O22	0.0939(3)	0.1878(5)	0.0642(1)	1.1(3)	
O23	0.0706(6)	0.6357(7)	0.2686(1)	1.6(2)	
O24	0.1640(6)	0.3280(9)	0.2746(2)	3.0(3)	
O25	0.4370(9)	0.3596(9)	0.2315(1)	2.9(3)	
O26	0.5490(13)	0.2745(9)	0.0320(2)	5.8(4)	
O27	0.1135(6)	0.2270(8)	0.0204(2)	2.8(4)	
O28	0.2247(6)	0.4494(8)	0.1452(2)	2.4(3)	
O29	0.1100(13)	0.5550(9)	0.1871(1)	3.2(5)	
O30	0.2720(9)	0.2235(7)	0.2797(1)	2.6(2)	
O31	0.6069(5)	0.2137(7)	0.1251(2)	2.5(5)	
O32	0.4384(9)	0.3856(9)	0.1121(1)	3.4(3)	
O33	0.1146(14)	0.0573(9)	0.2975(3)	6.0(6)	
O34	0.1476(5)	0.2952(8)	0.1818(2)	1.8(4)	
O35	0.4351(6)	0.5649(6)	0.2316(2)	3.5(5)	
O36	0.3618(9)	0.1809(7)	0.0144(1)	1.6(4)	

2) extra framework positions

Atom	*x*	*y*	*z*	B_{eq} [Å^2]	Site occupation
T1a	2/3	1/3	0.0195(8)	1.7(9)	0.2 Si
T1b	2/3	1/3	0.0438(1)	0.8(7)	0.8 Si
T2a	2/3	1/3	0.1165(1)	3.0(9)	0.16 Si
TM	2/3	1/3	0.1366(1)	1.8(1)	0.42 Si + 0.42 Al
T3a	0	0	0.1861(1)	2.6(1)	0.9 Mn
T3b	0	0	0.2160(1)	2.9(9)	0.1 Si
T4a	0	0	0.2884(1)	0.6(1)	0.8 Si
T4b	0	0	0.3051(4)	1.0(8)	0.2 Si
Ti	0.3734(9)	0.1867(6)	0.1641(1)	2.1(1)	
Fe1	0.3142(5)	0.1571(4)	0.1674(1)	1.5(1)	
Fe2	–0.0136(20)	0.4932(16)	0.0005(4)	1.1(4)	
M5	0.2228(5)	0.4456(9)	0.3348(2)	2.3(2)	0.67 Na + 0.23 Ce
M6	0.0973(2)	0.1946(3)	0.1429(1)	3.3(1)	2.6 Na + 0.4 Sr
M7	0.2227(4)	0.4454(5)	0.2434(1)	4.9(1)	1.83 Na + 0.27 Ce
M8	0.4459(9)	0.2228(7)	0.2573(1)	3.3(2)	0.94 Na + 0.23 Ce
M9	0.4416(6)	0.5584(6)	–0.0019(2)	2.1(2)	1.46 Na + 0.37 Sr
Na1	0.1032(8)	0.5516(6)	0.3039(1)	2.9(2)	
Na2	0.2176(9)	0.1088(6)	0.0768(1)	3.1(3)	
Na3	0.2132(3)	0.4264(5)	0.0280(2)	3.8(2)	
Na4	0.4450(5)	0.5550(5)	0.0898(1)	4.7(3)	

Table 2 (cont.)

Atom	*x*	*y*	*z*	B_{eq} [Å^2]	Site occupation
Na5a	0.5731(3)	0.1462(4)	0.1878(2)	2.4(2)	
Na5b	0.5395(11)	0.4605(11)	0.1939(15)	2(1)[a)]	
Na6	0.2634(25)	0.5268(36)	0.2499(6)	4(1)[a)]	
Na7	0.5072(20)	0.2536(15)	0.2476(3)	4.9(2)	
Na8a	0.1478(10)	0.0739(7)	0.2403(3)	5.0(3)	
Na8b	0.1115(40)	0.1616(50)	0.2528(9)	7.4(9)[a)]	
Na9a	0.5040(15)	0.2620(9)	0.0865(3)	3.7(3)	
Na9b	0.5087(30)	0.2087(30)	0.0863(5)	3.7(5)[a)]	
Na10	0.2002(47)	0.1001(33)	0.1721(8)	3.1(9)	1.33 Na + 1.0 OH
Cl1	1/3	2/3	0.3131(1)	0.9(2)	
Cl2	0	0	0.1165(9)	2.7(7)	
OH1	1/3	2/3	0.3250(9)	3(2)[a)]	
OH2	2/3	1/3	0.0678(2)	1.0(4)	
OH3	2/3	1/3	0.0928(50)	5(4)[a)]	
OH4	0.5462(47)	0.2731(33)	0.1721(11)	4.9(9)	
OH5	2/3	1/3	0.1637(9)	1.0(7)	
OH6	0	0	0.1463(12)	7.8(7)	
OH7	0	0	0.2410(11)	2.1(5)[a)]	
OH8	0	0	0.2597(12)	0.4(4)	
OH9	0	0	0.3333(11)	3.4(4)[a)]	
H_2O1	1/3	2/3	0.2683(5)	3(2)[a)]	
H_2O2	2/3	1/3	0.2241(15)	7(4)[a)]	
H_2O3	1/3	2/3	0.0228(2)	2.8(1)	
H_2O4	0	0	0.0026(9)	7(1)[a)]	

[a)] Isotropic thermal parameters.

g) Gaidonnayite, $Na_2ZrSi_3O_9 \cdot 2H_2O$, having monoclinic structure, space group I2/m [85C1].

Atom	*x*	*y*	*z*	$\beta_{ij} \cdot 10^4$					
				β_{11}	β_{22}	β_{33}	β_{12}	β_{13}	β_{23}
Na1	0.7466(3)	0.1567(2)	0.4307(4)	51(2)	45(2)	162(8)	7(4)	–19(8)	–5(6)
Na2	–0.0041(3)	0.3876(3)	0.3316(5)	47(2)	37(2)	180(10)	6(4)	–10(6)	–49(6)
Zr	0.2500	0.0531(1)	0.1510(1)	24(1)	15(1)	63(1)	0(1)	–4(1)	0(1)
Si1	0.2809(1)	0.2883(1)	0.3927(2)	21(1)	7(1)	59(4)	–1(1)	–4(3)	0(2)
Si2	0.4981(1)	0.4180(1)	0.3911(2)	20(1)	15(1)	58(4)	–1(1)	–5(3)	–1(3)
Si3	0.7144(1)	0.3918(1)	0.1501(2)	20(1)	15(1)	51(4)	1(1)	4(3)	–8(2)
O1	0.2116(5)	0.3952(3)	0.3644(7)	25(3)	8(2)	90(10)	7(5)	–3(9)	–21(7)
O2	0.4173(4)	0.3155(3)	0.4186(7)	22(3)	9(2)	103(11)	–12(4)	–16(10)	15(8)
O3	0.7417(5)	0.2699(3)	0.1017(6)	29(3)	14(2)	56(8)	18(5)	21(11)	12(7)
O4	0.2654(5)	0.2096(3)	0.2065(7)	39(4)	17(2)	78(9)	–18(5)	36(12)	3(8)
O5	0.4225(4)	0.1940(4)	0.1562(7)	23(3)	14(3)	107(12)	12(5)	–16(9)	–23(8)
O6	0.5759(4)	0.3940(4)	0.1960(7)	22(3)	35(3)	60(9)	–1(5)	10(9)	–29(9)
O7	0.0743(4)	0.0706(4)	0.0898(7)	15(3)	23(2)	67(10)	2(4)	–5(9)	–3(9)
O8	0.2398(5)	0.0361(3)	0.4583(7)	27(3)	12(2)	6(8)	3(5)	11(10)	–6(6)
O9	0.7817(5)	0.4258(4)	0.3474(6)	31(3)	19(2)	47(10)	–11(5)	–20(9)	–18(7)
H_2O1	0.5397(5)	0.1326(4)	0.4739(10)	48(5)	32(3)	186(17)	11(6)	–30(15)	–32(12)
H_2O2	0.9558(7)	0.1991(5)	0.3821(10)	60(6)	35(4)	118(14)	26(7)	–18(14)	23(11)

Table 3. Crystal structures and lattice parameters.

Silicate	Space group	Lattice parameters						Refs.
		a [Å]	*b* [Å]	*c* [Å]	α	β	γ	
Wadeite[1)]	$P\bar{6}$	6.926(1)		10.177(1)				77B1
Wadeite[1)]		6.893(4)		10.172(2)				55H1
$K_2TiSi_3O_9$		6.772		9.927				71A1
$K_2TiSi_3O_9$		6.774		9.922				71C1
$K_2TiSi_3O_9$		6.79(3)		9.87(4)				73S1
$K_2^{[6]}Si^{[4]}Si_3O_9$	$P6_3/m$	6.6124(9)		9.5102(8)				83S1
$Na_2SiSi_3O_9$	$P2_1/n$	10.875(2)	9.326(1)	19.224(7)		90.18(2)°		96F1
Benitoite[2)]		6.61		9.73				30Z1
Benitoite[2)]	$P\bar{6}$ c2	6.6410(7)		9.7597(10)				65G1, 69F1
Benitoite[3)]	$P\bar{6}$ c2	6.63(1)		9.73(1)				72L1
Pabsite[4)]	$P\bar{6}$ c2	6.706(2)		9.829(2)				65G1
$BaSnSi_3O_9$		6.724(2)		9.854(2)				65G1
$BaSiSi_3O_9$	P3	11.2469(11)		4.4851(6)				99H1
$Ba_3Nb_6Si_4O_{26}$	$P\bar{6}$ 2m	9.00(1)		7.89(1)				70S1
$Ba_3Nb_6Si_4O_{26}$	$P\bar{6}$ 2m	8.98_1		7.84_0				76C1
$Ba_3Ta_6Si_4O_{26}$	$P\bar{6}$ 2m	9.00_1		7.73_4				76C1
$Sr_3Ta_6Si_4O_{26}$	$P\bar{6}$ 2m	8.91_3		7.63_3				76C1
$K_6Ta_6Si_4O_{26}$	$P\bar{6}$ 2m	9.06_6		7.87_3				76C1
$K_6Nb_6Si_4O_{26}$	$P\bar{6}$ 2m	9.03_2		8.04_1				76C1
$BaSn(Ge_{3-x}Si_x)O_9$								72C1
x = 0.0		6.89_4		10.23_3				
0.5		6.87_1		10.17_2				
1.0		6.83_8		10.12_0				
1.5		6.79_8		10.01_3				
2.0		6.77_5		9.97_1				
2.5		6.75_1		9.89_0				
3.0		6.72_8		9.83_8				
$KTa(Ge_{3-x}Si_x)O_9$								72C1
x = 0.0		6.97_2		10.14_4				
0.5		6.94_1		10.09_4				
1.0		6.90_3		10.03_2				
1.5		6.87_6		9.97_0				
$RbTa(Ge_{3-x}Si_x)O_9$								72C1
x = 0.0		7.04_1		10.11_6				
0.5		7.01_5		10.07_4				
1.0		6.98_0		10.02_4				
1.5		6.92_9		9.95_4				
$TlTa(Ge_{3-x}Si_x)O_9$								72C1
x = 0.0		7.03_6		10.12_4				
0.5		7.01_3		10.08_8				
1.0		6.99_1		10.04_6				
Walstromite[5)]	$P\bar{1}$ or P1	6.734(5)	9.607(5)	6.687(5)	69°51′	102°14′	97°6.5′	65A1
Walstromite[6)]	$P\bar{1}$	6.73_3	9.61_6	6.72_3	69°37′	102°20′	96°54′	68D1
Margarosanite[7)]	$P\bar{1}$	6.768(4)	9.575(4)	6.718(5)	110.36(3)°	102.98(4)°	83.02(5)°	69F2
Roeblingite[8)]	C2/m	13.208(4)	8.287(2)	13.089(9)		106.65(6)°		84M2
Scawtite[9)]	A-centered	6.61	15.22	10.98		115°24′		55M1
Scawtite[9)]	I2/m	10.118(3)	15.187(4)	6.626(1)		100°40(1)′		73P1
Scawtite[9)]	I2/m	10.22	15.42	6.70		100°29’		55M2

Table 3 (cont.)

Silicate	Space group	Lattice parameters						Refs.
		a [Å]	*b* [Å]	*c* [Å]	α	β	γ	
Eudialyte[10)]		14.252		30.018				71G2
Eucolite[11)]	R3m	14.255(2)		29.915(5)				88R2
Eudialyte[12)]		14.250		30.083				91P1
Eudialyte[13)]		14.257		30.05				87R1
Eudialyte[14)]		14.275		29.996				91P1
Eudialyte[15)]		14.249		29.997				91P1
Low-Fe eudialyte[16)]	R3m	14.170(4)		35.35(2)				98R1
Ti-rich eudialyte[17)]	R3m	14.153(9)		60.72(5)				99R2
Kentbrooksite[18)]	R3m	14.1686(2)		30.0847(4)				98J1
Mn-Na ordered eudialyte[19)]	R3	14.205(7)		30.265(15)				00R1
Eudialyte[25)] (Barnasovite)	C2/m C2 or Cm	21.6	14.4	13.0			118°	53D1
Catapleiite[20)]	B2/b	23.917	20.148	7.432			147.46°	88I1
Catapleiite[26)]	I2/c	12.770(9)	7.419(5)	20.158(8)			90.41(4)°	74C1
Gaidonnayite[21)]	$P2_1nb$	11.740(3)	12.820(3)	6.691(1)				74C1, 85C1
Georgechaoite[22)]	$P2_1nb$	11.836(4)	12.940(6)	6.735(4)				85B1, 85G1

1) $K_2ZrSi_3O_9$;
2) $BaTiSi_3O_9$;
3) $Ba_{0.01}Na_{0.02}Ti_{1.01}Si_{2.98}O_9$;
4) $BaSn_{0.77}Ti_{0.23}Si_3O_9$;
5) $BaCa_2Si_3O_9$;
6) $BaCa_2Si_3O_9$ synthetic;
7) $Pb_{2.04}Ca_{4.06}Mn_{0.17}Si_{5.87}O_{18.01}$;
8) $Ca_6MnPb_2(Si_3O_9)_2(SO_4)_2(OH)_2 \cdot 4H_2O$;
9) Natural samples, composition not mentioned;
10) Composition [wt %]: SiO_2 – 50.14; TiO_2 – 0.46; ZrO_2 – 11.83; Al_2O_3 – 0.07; Fe_2O_3 – 0.50; FeO – 5.32; MgO – 0.24; CaO – 11.18; Na_2O – 14.06; K_2O – 1.39; MnO – 0.60; SrO – 0.47; R_2O_3 – 0.37; $(Ta,Nb)_2O_5$ – 0.11; H_2O^- – 0.12; H_2O^+ – 1.07; S – 0.04; Cl – 1.82; O = Cl_2 – 0.41;
11) Composition [wt %]: SiO_2 – 45.51; ZrO_2 – 11.86; CaO – 10.78; FeO – 4.52; Fe_2O_3 – 0.73; R_2O_3 – 5.62; TiO_2 – 0.39; Nb_2O_5 – 1.72; Al_2O_3 – 0.44; MnO – 1.70; MgO – 1.17; SrO – 1.43; Na_2O – 12.38; K_2O – 0.59; H_2O – 0.56; Cl – 1.28;
12) Composition [wt %]: SiO_2 – 50.69; ZrO_2 – 11.39; TiO_2 – 0.55; Nb_2O_5 – 0.49; Ta_2O_5 – 0.03; R_2O_3 – 0.37; Al_2O_3 – 0.17; Fe_2O_3 – 0.40; FeO – 4.99; MnO – 0.55; CaO – 10.62; SrO – 0.79; BaO – (n.d.); Na_2O – 14.49; K_2O – 2.07; H_2O^- – 0.61; Cl – 1.91;
13) Composition [wt %]: SiO_2 – 49.93; ZrO_2 – 12.23; TiO_2 – 0.78; Nb_2O_5 – 0.16; R_2O_3 – 0.39; Al_2O_3 – 0.16; Fe_2O_3 – 0.67; FeO – 4.35; MnO – 0.46; MgO – 0.03; CaO – 11.08; SrO – 0.90; BaO – 0.20; Na_2O – 15.02; K_2O – 2.13; H_2O^- – 0.50; Cl – 2.06;
14) Composition [wt %]: SiO_2 – 45.96; ZrO_2 – 13.58; TiO_2 – 0.25; Nb_2O_5 – 2.48; Ta_2O_5 – 0.08; R_2O_3 – 4.13; Al_2O_3 – 0.35; Fe_2O_3 – 0.97; FeO – 5.11; MnO – 2.29; MgO – 0.58, CaO – 9.55; SrO – 0.68; BaO – (n.d.); Na_2O – 11.92; K_2O – 0.60; H_2O^- – 0.60; Cl – 0.99;
15) Composition [wt %]: SiO_2 – 48.46; ZrO_2 – 11.61; TiO_2 – 0.23; Nb_2O_5 – 1.56; Ta_2O_5 – 0.16; R_2O_3 – 3.33; Al_2O_3 – 0.31; Fe_2O_3 – 0.32; FeO – 5.30; MnO – 1.98; CaO – 9.79; SrO – 0.59; BaO – (n.d.); Na_2O – 13.69; K_2O – 0.54; H_2O^- – 0.84; Cl – 1.33;
16) $Na_{16.83}K_{0.29}Sr_{0.61}Ba_{0.04}Ca_{4.33}Mn_{1.62}Fe_{0.15}R_{0.41}Zr_{2.88}Ti_{0.19}Si_{25.29}Nb_{0.35}O_{73.3}Cl_{0.61} \cdot nH_2O$;
17) $Zr_{3.63}Ti_{3.37}Ca_{8.5}Mn_{2.13}Si_{50.68}Al_{0.42}Fe_{0.94}Na_{34.43}Sr_{0.77}Ce_{1.13}O_{144}Cl_{0.9}(OH)_{5.7} \cdot 1.5H_2O$;

Table 3 (cont.)

[18] $(Na_{14.93}R_{0.44}Y_{0.42}K_{0.30}Sr_{0.15})(Ca_{3.27}Mn_{1.78}R_{0.62}Na_{0.30})(Mn_{1.90}Fe_{0.72}Al_{0.13}Mg_{0.05})(Nb_{0.55}Zr_{0.12}Ti_{0.10})Si_{0.60}$ $(Zr_{2.81}Hf_{0.06}Ti_{0.13})[(Si_3O_9)_2(Si_9O_{27})_2O_2](F_{1.51}Cl_{0.27}OH_{0.22}) \cdot 2.3H_2O$;
[19] $Zr_3[(Mn_{2.1}Ca_{0.72}Ce_{0.18})(Na_{1.35}Ca_{1.05}Ce_{0.45}Sr_{0.15})][Si_3O_9]_2[Si_9O_{27}]_2[^{[4]}Fe_{1.51}(^{[4]}Zr_{0.6}{}^{[6]}Na_{0.58})$ $(^{[5]}(Ti_{0.15}Nb_{0.12})\,{}^{[6]}[Si_{1.9}Al_{0.1}](Na_{14}Sr_{0.4}K_{0.2})(OH,O)_4(F,Cl)_{0.7} \cdot 1.1H_2O$;
[20] $Na_2ZrSi_3O_9 \cdot 2H_2O$;
[21] $(Na_{1.72}K_{0.19})(Zr_{1.00}Nb_{0.09}Ti_{0.02})Si_{2.88}O_9 \cdot 10H_2O$;
[22] $Na_{1.02}K_{0.96}(Zr_{0.99}Ti_{0.01}Fe_{0.01})(Si_{3.01}O_9) \cdot 2.14H_2O$;
[23] $(Na_{0.85}K_{0.09}Ca_{0.06})(Ca_{4.31}Fe_{0.56}Mg_{0.15})Zr_{4.22}(Si_{15.44}Al_{0.32})O_{40}(OH)_{10.70} \cdot 7.92H_2O$;
[24] $(Ca_{0.98}Na_{0.04})Zr_{1.00}(Si_{2.94}Al_{0.04})O_9 \cdot 2.01H_2O$;
[25] $(Na_{5.45}Ca_{3.06}Sr_{0.38}R_{0.28})(Fe_{1.15}Mn_{0.82})(Zr_{1.62}Nb_{0.30}Ti_{0.06})Si_{12}(O_{36.33}Cl_{0.67})$;
[26] Natural sample, Mont St. Hilaire, Quebec.

Table 4. Hyperfine parameters determined by ^{57}Fe NGR method [91P1].

	T [K]	Site	δ [1)] [mm/s]	ΔQ [mm/s]	DH [mm/s]	DH_L [2)] [mm/s]	DH_H [2)] [mm/s]	A [%)]
Eudialyte[12)]	77	$Fe1^{2+}$	1.195_7	0.375_7		0.429_6	0.640_7	76_1
		$Fe2^{2+}$	1.45_2	2.72_2	0.55_2			12_1
		Fe^{3+}	0.69	0.53_2	0.65_3			12_1
	300	$Fe1^{2+}$	1.079_7	0.345_8		0.39_1	0.50_1	81_4
		$Fe2^{2+}$	1.34_1	2.46_1	0.46_1			8_1
		Fe^{3+}	0.58_3	0.53_3	0.60_3			11_1

[1)] Relative to α-Fe; [2)] H and L are the high-velocity and low-velocity components of the $Fe1^{2+}$ doublet;
[12)] See Table 3 for composition

Table 5. Data obtained by NMR studies.

Sample	Nucleus	Site	η	e^2qQ/h [MHz]	δ [1)] [ppm]	Relative intensity	Refs.
$K_2Si_4O_9$	^{17}O	O1	0.35(5)	4.45(5)	62.5(1)	1	94X1
		O2	0.20(5)	4.90(5)	97(1)	2	
$K_2Si_4O_9$	^{17}O	BO[2)]	0	4.9(2)	52(4)	7	94X1
glass		NBO[3)]	0	2.3(1)	76(2)	2	
$Na_2Si_4O_9$	^{17}O	BO	0	5.0(2)	50(4)	7	94X1
glass		NBO	0	2.3(1)	36(3)	2	
$Na_2Si_4O_9$	^{29}Si	Q^3			–92.6[4)]		91X1
glass (1atm)		Q^4			–105.5[4)]		
$BaTiSi_3O_9$	^{29}Si	Si(2Ti)			–94.2		84M1
$BaTiSi_3O_9$	^{29}Si	Si(2Ti)			–94.3		97B1
$K_2TiSi_3O_9$	^{29}Si	Si(2Ti)			–94.4		97B1

[1)] Relative to deionized H_2O; [2)] BO-bridging oxygen atom; [3)] NBO-nonbridging oxygen atom; [4)] Relative to tetrametylsilane.

Table 6. Refractive indices.

Sample	n_α	n_β	n_γ	$2V$			Refs.
				exp.	calc.		
Benitoite[3)]	1.756(1) (ω)		1.800(1) (ε)			uniaxial, positive	72L1
$BaTiSi_3O_9$	1.757		1.804			uniaxial, positive	65G1
Pabsite[4)]	1.685(2) (ω)		1.674(2) (ε)			uniaxial, negative	65G1
Scawtite[9)]	1.595	1.605	1.662	+75°			55M1
Walstromite[5)]	1.668	1.684	1.685	30°		biaxial negative	65A2
Eudialyte[11)]	1.624…1.626		1.620…1.622				88R2
Eudialyte-yellowish-green[25)] (Barnasovite)	1.633	1.639	1.639	13°…17°		biaxial negative	53D1
Eudialyte-reddish-brown[25)] (Barnasovite)	1.624	1.628	1.628	12°		biaxial negative	53D1
Kentbrooksite[18)]	1.628(2) (ω)		1.623(2) (ε)			uniaxial, negative	98J1
Calcium catapleiite[24)]	1.603		1.639			uniaxial, positive	64P1
Catapleiite[26)]	1.588(1)	1.591(1)	1.624(1)	40(1)°	34°		74C1
Gaidonnayite[21)]	1.573(1)	1.592(1)	1.599(1)	121(1)°	119.5°	biaxial	74C1
Georgechaoite[22)]	1.578(1)	1.597(1)	1.606(1)	67°	68°	biaxial negative	85B1, 85G1
Loudounite[23)]	1.536(4)		1.554(4)			biaxial	83D1

For footnotes (compositions) see Table 3.