Title

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Abstract

Table 1

Experimental details

Crystal data	
Chemical formula	$Ca_4Li_2O_{13}Si_4$
M_r	494.56
Crystal system, space group	Triclinic, $P\overline{1}$
Temperature (K)	301
a, b, c (Å)	7.1593 (4), 8.2192 (4), 10.4182 (6)
α, β, γ (°)	70.737 (5), 89.858 (4), 77.719 (5)
V (Å^3)	563.96 (6)
Z	2
Radiation type	Mo $K\alpha$
μ (mm^{-1})	2.42
Crystal size (mm)	0.04 × 0.03 × 0.02
Data collection	
Diffractometer	ROD, Synergy Custom system, HyPix-Arc 150
Absorption correction	Gaussian *CrysAlis PRO* 1.171.42.53a (Rigaku Oxford Diffraction, 2022) Numerical absorption correction based on gaussian integration over a multifaceted crystal model Empirical absorption correction using spherical harmonics, implemented in SCALE3 ABSPACK scaling algorithm.
T_{min}, T_{max}	0.939, 0.995
No. of measured, independent and observed [$I > 2\sigma(I)$] reflections	18107, 3412, 3039
R_{int}	0.052
(sin $\theta/\lambda)_{max}$ (Å^{-1})	0.714
Refinement	
$R[F^2 > 2\sigma(F^2)]$, $wR(F^2)$, S	0.045, 0.109, 1.20
No. of reflections	3412
No. of parameters	208
$\Delta\rho_{max}$, $\Delta\rho_{min}$ (e Å^{-3})	1.07, −0.67

Computer programs: *CrysAlis PRO* 1.171.42.53a (Rigaku OD, 2022), *SHELXT* (Sheldrick, 2015), *SHELXL* 2018/3 (Sheldrick, 2015), Olex2 1.5-ac5-023 (Dolomanov *et al.*, 2009).

Acknowledgements

Funding information

References

Dolomanov, O. V., Bourhis, L. J., Gildea, R. J., Howard, J. A. K. & Puschmann, H. (2009). J. Appl. Cryst. 42, 339-341.

Sheldrick, G. M. (2015). Acta Cryst. A71, 3-8.

Sheldrick, G. M. (2015). Acta Cryst. C71, 3-8.

Figure 1

supporting information

Title

Computing details

Data collection: *CrysAlis PRO* 1.171.42.53a (Rigaku OD, 2022); cell refinement: *CrysAlis PRO* 1.171.42.53a (Rigaku OD, 2022); data reduction: *CrysAlis PRO* 1.171.42.53a (Rigaku OD, 2022); program(s) used to solve structure: *SHELXT* (Sheldrick, 2015); program(s) used to refine structure: *SHELXL* 2018/3 (Sheldrick, 2015); molecular graphics: Olex2 1.5-ac5-023 (Dolomanov *et al.*, 2009); software used to prepare material for publication: Olex2 1.5-ac5-023 (Dolomanov *et al.*, 2009).

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Crystal data

$Ca_4Li_2O_{13}Si_4$
$M_r = 494.56$
Triclinic, $P\overline{1}$
$a = 7.1593$ (4) Å
$b = 8.2192$ (4) Å
$c = 10.4182$ (6) Å
$\alpha = 70.737$ (5)°
$\beta = 89.858$ (4)°
$\gamma = 77.719$ (5)°
$V = 563.96$ (6) Å^3
$Z = 2$
$F(000) = 492$
$D_x = 2.912$ Mg m^{-3}
Mo $K\alpha$ radiation, $\lambda = 0.71073$ Å
Cell parameters from 7346 reflections
$\theta = 2.7$–$52.2°$
$\mu = 2.42$ mm^{-1}
$T = 301$ K
Irregular, light brown
0.04 × 0.03 × 0.02 mm

Data collection

ROD, Synergy Custom system, HyPix-Arc 150 diffractometer
Radiation source: Rotating-anode X-ray tube, Rigaku (Mo) X-ray Source
Mirror monochromator
Detector resolution: 10.0000 pixels mm^{-1}
ω scans
Absorption correction: gaussian
CrysAlis PRO 1.171.42.53a (Rigaku Oxford Diffraction, 2022) Numerical absorption correction based on gaussian integration over a multifaceted crystal model Empirical absorption correction using spherical harmonics, implemented in SCALE3 ABSPACK scaling algorithm.
$T_{min} = 0.939$, $T_{max} = 0.995$
18107 measured reflections
3412 independent reflections
3039 reflections with $I > 2\sigma(I)$
$R_{int} = 0.052$
$\theta_{max} = 30.5°$, $\theta_{min} = 2.7°$
$h = -10 \rightarrow 10$
$k = -11 \rightarrow 11$
$l = -14 \rightarrow 14$

Refinement

Refinement on F^2
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)] = 0.045$
$wR(F^2) = 0.109$
$S = 1.20$
3412 reflections
208 parameters
0 restraints
Primary atom site location: dual
$w = 1/[\sigma^2(F_o^2) + (0.0476P)^2 + 1.1556P]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max} < 0.001$
$\Delta\rho_{max} = 1.07$ e Å^{-3}
$\Delta\rho_{min} = -0.67$ e Å^{-3}

Special details

Geometry. All e.s.d.'s (except the e.s.d. in the dihedral angle between two l.s. planes) are estimated using the full covariance matrix. The cell e.s.d.'s are taken into account individually in the estimation of e.s.d.'s in distances, angles and torsion angles; correlations between e.s.d.'s in cell parameters are only used when they are defined by crystal symmetry. An approximate (isotropic) treatment of cell e.s.d.'s is used for estimating e.s.d.'s involving l.s. planes.

Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å²)

	x	*y*	*z*	U_{iso}*/U_{eq}
Ca01	0.92881 (8)	0.29223 (8)	0.10560 (6)	0.01033 (13)
Ca02	0.07009 (8)	0.69707 (8)	0.50534 (6)	0.01015 (13)
Ca03	0.41678 (8)	0.30573 (8)	0.49700 (6)	0.01070 (13)
Ca04	0.42446 (8)	0.28960 (8)	0.09733 (6)	0.01048 (13)
Si01	0.57438 (12)	0.58482 (11)	0.22141 (8)	0.00860 (16)
Si02	0.13667 (12)	0.59303 (11)	0.21937 (8)	0.00882 (16)
Si03	0.21748 (12)	0.11724 (11)	0.80437 (8)	0.00912 (16)
Si04	0.23332 (12)	0.07255 (11)	0.32133 (8)	0.00987 (17)
Li01	0.2535 (13)	0.9079 (9)	0.0922 (7)	0.0318 (16)
Li02	0.7275 (17)	0.0749 (10)	0.3856 (9)	0.050 (3)
O01	0.0141 (3)	0.1653 (3)	0.3412 (2)	0.0147 (4)
O02	0.7133 (3)	0.1246 (3)	0.5676 (2)	0.0131 (4)
O03	0.4002 (3)	0.1765 (3)	0.3363 (2)	0.0143 (4)
O04	0.3660 (3)	0.5077 (3)	0.6200 (2)	0.0111 (4)
O05	0.1179 (3)	0.5030 (3)	0.3777 (2)	0.0108 (4)
O06	0.1206 (3)	0.4900 (3)	0.1162 (2)	0.0115 (4)
O07	0.6354 (3)	0.4676 (3)	0.1259 (2)	0.0128 (4)
O08	0.2286 (3)	0.0885 (3)	0.1600 (2)	0.0114 (4)
O09	0.0058 (3)	0.2080 (3)	0.8434 (2)	0.0149 (4)
O10	0.3628 (3)	0.2258 (3)	0.8470 (2)	0.0159 (5)
O11	0.7269 (3)	0.0874 (3)	0.1011 (2)	0.0120 (4)
O12	0.2150 (3)	0.1490 (3)	0.6435 (2)	0.0127 (4)
O13	0.3410 (3)	0.6558 (3)	0.1981 (2)	0.0131 (4)

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Ca01	0.0095 (3)	0.0077 (3)	0.0129 (3)	−0.0017 (2)	0.0001 (2)	−0.0025 (2)
Ca02	0.0094 (3)	0.0102 (3)	0.0121 (3)	−0.0028 (2)	0.0024 (2)	−0.0052 (2)
Ca03	0.0096 (3)	0.0101 (3)	0.0130 (3)	−0.0020 (2)	0.0013 (2)	−0.0046 (2)
Ca04	0.0100 (3)	0.0080 (3)	0.0129 (3)	−0.0025 (2)	0.0018 (2)	−0.0025 (2)
Si01	0.0094 (4)	0.0070 (4)	0.0097 (3)	−0.0026 (3)	0.0011 (3)	−0.0028 (3)
Si02	0.0102 (4)	0.0070 (4)	0.0095 (3)	−0.0021 (3)	0.0012 (3)	−0.0031 (3)
Si03	0.0095 (4)	0.0068 (4)	0.0108 (4)	−0.0021 (3)	0.0013 (3)	−0.0024 (3)
Si04	0.0119 (4)	0.0068 (4)	0.0105 (4)	−0.0016 (3)	0.0011 (3)	−0.0027 (3)
Li01	0.061 (5)	0.015 (3)	0.021 (3)	−0.008 (3)	0.006 (3)	−0.008 (3)
Li02	0.098 (8)	0.012 (3)	0.041 (5)	−0.004 (4)	0.006 (5)	−0.015 (3)
O01	0.0178 (11)	0.0125 (11)	0.0130 (10)	−0.0003 (8)	0.0031 (8)	−0.0051 (8)
O02	0.0117 (10)	0.0078 (10)	0.0169 (10)	−0.0005 (8)	0.0004 (8)	−0.0016 (8)
O03	0.0194 (11)	0.0123 (11)	0.0139 (10)	−0.0071 (9)	0.0018 (8)	−0.0057 (8)
O04	0.0118 (10)	0.0083 (10)	0.0119 (9)	−0.0016 (8)	−0.0001 (8)	−0.0023 (8)
O05	0.0120 (10)	0.0091 (10)	0.0110 (9)	−0.0022 (8)	0.0022 (8)	−0.0029 (8)
O06	0.0155 (10)	0.0108 (10)	0.0101 (9)	−0.0043 (8)	0.0021 (8)	−0.0051 (8)

O07	0.0123 (10)	0.0131 (10)	0.0147 (10)	−0.0016 (8)	0.0024 (8)	−0.0080 (8)
O08	0.0138 (10)	0.0096 (10)	0.0113 (9)	−0.0025 (8)	0.0011 (8)	−0.0045 (8)
O09	0.0136 (10)	0.0100 (10)	0.0173 (10)	0.0003 (8)	0.0033 (8)	−0.0016 (8)
O10	0.0167 (11)	0.0127 (11)	0.0180 (11)	−0.0079 (9)	−0.0008 (9)	−0.0021 (9)
O11	0.0114 (10)	0.0062 (9)	0.0169 (10)	−0.0012 (8)	0.0006 (8)	−0.0024 (8)
O12	0.0133 (10)	0.0108 (10)	0.0130 (10)	−0.0011 (8)	0.0012 (8)	−0.0038 (8)
O13	0.0102 (10)	0.0113 (10)	0.0175 (10)	−0.0021 (8)	0.0012 (8)	−0.0045 (8)

Geometric parameters (Å, º)

Ca01—Ca04^{i}	3.5450 (8)	Ca04—Si04	2.9626 (10)
Ca01—Si02^{ii}	3.2069 (10)	Ca04—Li02	3.427 (10)
Ca01—Si04^{i}	2.9558 (10)	Ca04—O03	2.373 (2)
Ca01—Li01^{ii}	3.438 (7)	Ca04—O06	2.484 (2)
Ca01—Li02	3.379 (10)	Ca04—O07^{ii}	2.481 (2)
Ca01—O01^{i}	2.352 (2)	Ca04—O07	2.396 (2)
Ca01—O06^{i}	2.369 (2)	Ca04—O08	2.322 (2)
Ca01—O06^{ii}	2.382 (2)	Ca04—O10^{ix}	2.877 (2)
Ca01—O07	2.334 (2)	Ca04—O11	2.425 (2)
Ca01—O08^{i}	2.363 (2)	Si01—Li01	3.034 (8)
Ca01—O09^{iii}	3.053 (2)	Si01—O04^{vi}	1.589 (2)
Ca01—O11	2.452 (2)	Si01—O07	1.600 (2)
Ca02—Ca03^{iv}	3.4908 (8)	Si01—O10^{vi}	1.642 (2)
Ca02—Si02	3.3668 (10)	Si01—O13	1.639 (2)
Ca02—Si04^{v}	3.4906 (10)	Si02—Li01	2.794 (7)
Ca02—Si04^{iv}	3.4716 (10)	Si02—O05	1.588 (2)
Ca02—Li02^{vi}	3.078 (10)	Si02—O06	1.590 (2)
Ca02—Li02^{vii}	3.382 (9)	Si02—O09^{iv}	1.653 (2)
Ca02—O01^{iv}	2.258 (2)	Si02—O13	1.643 (2)
Ca02—O02^{vi}	2.315 (2)	Si03—Li01^{x}	2.903 (7)
Ca02—O04	2.392 (2)	Si03—Li02^{viii}	2.891 (8)
Ca02—O05^{iv}	2.369 (2)	Si03—O09	1.654 (2)
Ca02—O05	2.365 (2)	Si03—O10	1.654 (2)
Ca02—O12^{iv}	2.407 (2)	Si03—O11^{viii}	1.607 (2)
Ca03—Si01	3.3939 (10)	Si03—O12	1.608 (2)
Ca03—Si01^{vi}	3.3445 (10)	Si04—Li01^{xi}	3.098 (7)
Ca03—Si02	3.3869 (10)	Si04—Li02^{viii}	2.879 (9)
Ca03—Si04	3.4850 (10)	Si04—O01	1.637 (2)
Ca03—Li02	3.089 (10)	Si04—O02^{viii}	1.616 (2)
Ca03—Li02^{viii}	3.346 (9)	Si04—O03	1.645 (2)
Ca03—O02	2.281 (2)	Si04—O08	1.642 (2)
Ca03—O03	2.274 (2)	Li01—O08^{v}	1.820 (7)
Ca03—O04	2.382 (2)	Li01—O09^{iv}	2.264 (9)
Ca03—O04^{vi}	2.455 (2)	Li01—O11^{ii}	2.006 (7)
Ca03—O05	2.441 (2)	Li01—O13	1.961 (7)
Ca03—O12	2.358 (2)	Li02—O01^{i}	2.322 (12)
Ca04—Si01	3.4489 (10)	Li02—O02	2.066 (9)
Ca04—Si01^{ii}	3.1360 (10)	Li02—O03	2.311 (12)
Ca04—Si02	3.4604 (10)	Li02—O12^{viii}	1.922 (8)
Si02^{ii}—Ca01—Ca04^{i}	93.58 (2)	O05—Si02—Ca04	109.33 (9)
Si02^{ii}—Ca01—Li01^{ii}	49.58 (12)	O05—Si02—Li01	127.21 (16)

Si02^{ii}—Ca01—Li02	138.26 (18)	O05—Si02—O06	120.64 (12)
Si04^{i}—Ca01—Ca04^{i}	53.29 (2)	O05—Si02—O09^{iv}	112.22 (12)
Si04^{i}—Ca01—Si02^{ii}	137.80 (3)	O05—Si02—O13	108.97 (12)
Si04^{i}—Ca01—Li01^{ii}	118.05 (13)	O06—Si02—Ca01^{xii}	28.60 (8)
Si04^{i}—Ca01—Li02	70.64 (19)	O06—Si02—Ca01^{ii}	45.58 (8)
Si04^{i}—Ca01—O09^{iii}	110.21 (5)	O06—Si02—Ca02^{iv}	95.20 (8)
Li01^{ii}—Ca01—Ca04^{i}	117.41 (14)	O06—Si02—Ca02	157.38 (9)
Li02—Ca01—Ca04^{i}	123.52 (19)	O06—Si02—Ca03	107.51 (9)
Li02—Ca01—Li01^{ii}	92.8 (2)	O06—Si02—Ca04	40.79 (8)
O01^{i}—Ca01—Ca04^{i}	81.58 (6)	O06—Si02—Li01	111.48 (16)
O01^{i}—Ca01—Si02^{ii}	170.17 (6)	O06—Si02—O09^{iv}	108.08 (12)
O01^{i}—Ca01—Si04^{i}	33.55 (6)	O06—Si02—O13	107.10 (12)
O01^{i}—Ca01—Li01^{ii}	125.49 (13)	O09^{iv}—Si02—Ca01^{ii}	69.61 (9)
O01^{i}—Ca01—Li02	43.4 (2)	O09^{iv}—Si02—Ca01^{xii}	107.75 (9)
O01^{i}—Ca01—O06^{ii}	158.30 (8)	O09^{iv}—Si02—Ca02	79.63 (9)
O01^{i}—Ca01—O06^{i}	83.75 (8)	O09^{iv}—Si02—Ca02^{iv}	111.68 (9)
O01^{i}—Ca01—O08^{i}	66.48 (8)	O09^{iv}—Si02—Ca03	144.02 (9)
O01^{i}—Ca01—O09^{iii}	139.71 (7)	O09^{iv}—Si02—Ca04	137.84 (9)
O01^{i}—Ca01—O11	94.92 (8)	O09^{iv}—Si02—Li01	54.13 (19)
O06^{ii}—Ca01—Ca04^{i}	88.62 (6)	O13—Si02—Ca01^{ii}	88.52 (9)
O06^{i}—Ca01—Ca04^{i}	44.37 (6)	O13—Si02—Ca01^{xii}	133.93 (9)
O06^{ii}—Ca01—Si02^{ii}	28.46 (5)	O13—Si02—Ca02^{iv}	135.85 (9)
O06^{i}—Ca01—Si02^{ii}	98.83 (6)	O13—Si02—Ca02	92.56 (9)
O06^{ii}—Ca01—Si04^{i}	141.91 (6)	O13—Si02—Ca03	77.19 (8)
O06^{i}—Ca01—Si04^{i}	76.10 (6)	O13—Si02—Ca04	75.54 (9)
O06^{ii}—Ca01—Li01^{ii}	76.20 (13)	O13—Si02—Li01	43.5 (2)
O06^{i}—Ca01—Li01^{ii}	146.62 (13)	O13—Si02—O09^{iv}	97.16 (12)
O06^{i}—Ca01—Li02	120.58 (17)	Ca01^{viii}—Si03—Ca04^{viii}	60.693 (19)
O06^{ii}—Ca01—Li02	147.0 (2)	Ca02^{iv}—Si03—Ca01^{viii}	93.72 (2)
O06^{i}—Ca01—O06^{ii}	75.78 (8)	Ca02^{iv}—Si03—Ca04^{viii}	125.42 (3)
O06^{i}—Ca01—O09^{iii}	107.57 (7)	Ca03—Si03—Ca01^{viii}	124.16 (3)
O06^{ii}—Ca01—O09^{iii}	56.12 (7)	Ca03—Si03—Ca02^{iv}	59.479 (19)
O06^{i}—Ca01—O11	178.33 (8)	Ca03—Si03—Ca04^{viii}	94.24 (2)
O06^{ii}—Ca01—O11	105.41 (8)	Li01^{x}—Si03—Ca01^{viii}	63.23 (15)
O07—Ca01—Ca04^{i}	141.18 (6)	Li01^{x}—Si03—Ca02^{iv}	147.91 (17)
O07—Ca01—Si02^{ii}	93.56 (6)	Li01^{x}—Si03—Ca03	151.70 (18)
O07—Ca01—Si04^{i}	128.55 (6)	Li01^{x}—Si03—Ca04^{viii}	64.48 (15)
O07—Ca01—Li01^{ii}	95.84 (15)	Li02^{viii}—Si03—Ca01^{viii}	62.06 (19)
O07—Ca01—Li02	70.18 (18)	Li02^{viii}—Si03—Ca02^{iv}	62.7 (2)
O07—Ca01—O01^{i}	95.55 (8)	Li02^{viii}—Si03—Ca03	62.10 (19)
O07—Ca01—O06^{ii}	80.03 (8)	Li02^{viii}—Si03—Ca04^{viii}	62.7 (2)
O07—Ca01—O06^{i}	96.82 (8)	Li02^{viii}—Si03—Li01^{x}	116.8 (2)
O07—Ca01—O08^{i}	162.04 (8)	O09—Si03—Ca01^{viii}	88.51 (9)
O07—Ca01—O09^{iii}	120.25 (7)	O09—Si03—Ca02^{iv}	74.59 (9)
O07—Ca01—O11	82.29 (8)	O09—Si03—Ca03	122.84 (9)
O08^{i}—Ca01—Ca04^{i}	40.40 (5)	O09—Si03—Ca04^{viii}	141.90 (9)
O08^{i}—Ca01—Si02^{ii}	104.35 (6)	O09—Si03—Li01^{x}	82.38 (19)
O08^{i}—Ca01—Si04^{i}	33.68 (5)	O09—Si03—Li02^{viii}	124.4 (3)
O08^{i}—Ca01—Li01^{ii}	94.82 (15)	O09—Si03—O10	103.22 (13)
O08^{i}—Ca01—Li02	94.92 (18)	O10—Si03—Ca01^{viii}	145.09 (9)
O08^{i}—Ca01—O06^{ii}	116.64 (8)	O10—Si03—Ca02^{iv}	121.01 (9)
O08^{i}—Ca01—O06^{i}	81.92 (8)	O10—Si03—Ca03	76.70 (9)

O08^{i}—Ca01—O09^{iii}	76.80 (7)	O10—Si03—Ca04^{viii}	92.88 (9)
O08^{i}—Ca01—O11	98.49 (8)	O10—Si03—Li01^{x}	85.56 (18)
O09^{iii}—Ca01—Ca04^{i}	80.99 (5)	O10—Si03—Li02^{viii}	128.4 (3)
O09^{iii}—Ca01—Si02^{ii}	30.49 (5)	O11^{viii}—Si03—Ca01^{viii}	35.88 (8)
O09^{iii}—Ca01—Li01^{ii}	40.29 (14)	O11^{viii}—Si03—Ca02^{iv}	127.15 (9)
O09^{iii}—Ca01—Li02	129.52 (15)	O11^{viii}—Si03—Ca03	125.67 (9)
O11—Ca01—Ca04^{i}	136.49 (6)	O11^{viii}—Si03—Ca04^{viii}	33.65 (8)
O11—Ca01—Si02^{ii}	82.66 (6)	O11^{viii}—Si03—Li01^{x}	41.52 (16)
O11—Ca01—Si04^{i}	103.33 (6)	O11^{viii}—Si03—Li02^{viii}	75.37 (19)
O11—Ca01—Li01^{ii}	35.02 (13)	O11^{viii}—Si03—O09	108.38 (12)
O11—Ca01—Li02	57.79 (17)	O11^{viii}—Si03—O10	109.79 (12)
O11—Ca01—O09^{iii}	74.10 (7)	O11^{viii}—Si03—O12	114.10 (12)
Si02—Ca02—Ca03^{iv}	94.30 (2)	O12—Si03—Ca01^{viii}	95.32 (9)
Si02—Ca02—Si04^{iv}	146.98 (3)	O12—Si03—Ca02^{iv}	35.61 (8)
Si02—Ca02—Si04^{v}	84.01 (2)	O12—Si03—Ca03	34.03 (8)
Si02—Ca02—Li02^{vii}	100.28 (15)	O12—Si03—Ca04^{viii}	95.50 (9)
Si04^{v}—Ca02—Ca03^{iv}	121.60 (2)	O12—Si03—Li01^{x}	155.53 (16)
Si04^{iv}—Ca02—Ca03^{iv}	60.07 (2)	O12—Si03—Li02^{viii}	38.75 (19)
Si04^{iv}—Ca02—Si04^{v}	92.15 (2)	O12—Si03—O09	110.19 (12)
Li02^{vii}—Ca02—Ca03^{iv}	58.23 (19)	O12—Si03—O10	110.58 (12)
Li02^{vi}—Ca02—Ca03^{iv}	127.6 (2)	Ca01^{xii}—Si04—Ca02^{xi}	106.47 (3)
Li02^{vi}—Ca02—Si02	129.15 (19)	Ca01^{xii}—Si04—Ca02^{iv}	78.43 (3)
Li02^{vi}—Ca02—Si04^{iv}	68.0 (2)	Ca01^{xii}—Si04—Ca03^{viii}	156.36 (3)
Li02^{vii}—Ca02—Si04^{v}	64.70 (18)	Ca01^{xii}—Si04—Ca03	114.36 (3)
Li02^{vi}—Ca02—Si04^{v}	51.52 (17)	Ca01^{xii}—Si04—Ca04	73.59 (3)
Li02^{vii}—Ca02—Si04^{iv}	49.66 (15)	Ca01^{xii}—Si04—Li01^{xi}	71.65 (15)
Li02^{vi}—Ca02—Li02^{vii}	83.3 (3)	Ca02^{iv}—Si04—Ca02^{xi}	87.85 (2)
O01^{iv}—Ca02—Ca03^{iv}	81.51 (6)	Ca02^{iv}—Si04—Ca03	60.24 (2)
O01^{iv}—Ca02—Si02	165.23 (7)	Ca02^{iv}—Si04—Ca03^{viii}	120.19 (3)
O01^{iv}—Ca02—Si04^{v}	86.16 (6)	Ca02^{xi}—Si04—Ca03^{viii}	63.17 (2)
O01^{iv}—Ca02—Si04^{iv}	22.64 (6)	Ca03—Si04—Ca02^{xi}	119.17 (3)
O01^{iv}—Ca02—Li02^{vi}	48.7 (2)	Ca03—Si04—Ca03^{viii}	88.67 (2)
O01^{iv}—Ca02—Li02^{vii}	65.45 (16)	Ca04—Si04—Ca02^{iv}	115.69 (3)
O01^{iv}—Ca02—O02^{vi}	87.92 (9)	Ca04—Si04—Ca02^{xi}	155.40 (3)
O01^{iv}—Ca02—O04	98.37 (8)	Ca04—Si04—Ca03^{viii}	106.69 (3)
O01^{iv}—Ca02—O05	166.10 (9)	Ca04—Si04—Ca03	81.07 (3)
O01^{iv}—Ca02—O05^{iv}	86.08 (8)	Ca04—Si04—Li01^{xi}	73.26 (14)
O01^{iv}—Ca02—O12^{iv}	94.11 (8)	Li01^{xi}—Si04—Ca02^{iv}	144.79 (17)
O02^{vi}—Ca02—Ca03^{iv}	143.74 (6)	Li01^{xi}—Si04—Ca02^{xi}	83.34 (13)
O02^{vi}—Ca02—Si02	87.21 (6)	Li01^{xi}—Si04—Ca03	150.81 (16)
O02^{vi}—Ca02—Si04^{iv}	101.56 (6)	Li01^{xi}—Si04—Ca03^{viii}	85.66 (15)
O02^{vi}—Ca02—Si04^{v}	22.49 (6)	Li02^{viii}—Si04—Ca01^{xii}	137.7 (2)
O02^{vi}—Ca02—Li02^{vi}	42.15 (19)	Li02^{viii}—Si04—Ca02^{iv}	63.55 (19)
O02^{vi}—Ca02—Li02^{vii}	85.80 (19)	Li02^{viii}—Si04—Ca02^{xi}	56.82 (19)
O02^{vi}—Ca02—O04	77.35 (8)	Li02^{viii}—Si04—Ca03^{viii}	56.73 (19)
O02^{vi}—Ca02—O05^{iv}	168.72 (8)	Li02^{viii}—Si04—Ca03	62.58 (18)
O02^{vi}—Ca02—O05	105.52 (8)	Li02^{viii}—Si04—Ca04	138.7 (2)
O02^{vi}—Ca02—O12^{iv}	104.77 (8)	Li02^{viii}—Si04—Li01^{xi}	133.5 (2)
O04—Ca02—Ca03^{iv}	138.38 (6)	O01—Si04—Ca01^{xii}	52.54 (8)
O04—Ca02—Si02	94.16 (6)	O01—Si04—Ca02^{xi}	80.10 (9)
O04—Ca02—Si04^{iv}	118.77 (6)	O01—Si04—Ca02^{iv}	32.07 (8)
O04—Ca02—Si04^{v}	99.79 (6)	O01—Si04—Ca03	90.66 (9)

O04—Ca02—Li02^{vii}	157.23 (18)	O01—Si04—Ca03^{viii}	137.00 (9)
O04—Ca02—Li02^{vi}	73.90 (19)	O01—Si04—Ca04	115.65 (9)
O04—Ca02—O12^{iv}	167.43 (8)	O01—Si04—Li01^{xi}	112.72 (19)
O05^{iv}—Ca02—Ca03^{iv}	44.29 (5)	O01—Si04—Li02^{viii}	85.3 (2)
O05—Ca02—Ca03^{iv}	89.36 (6)	O01—Si04—O03	116.13 (13)
O05—Ca02—Si02	25.24 (5)	O01—Si04—O08	104.00 (12)
O05^{iv}—Ca02—Si02	100.87 (6)	O02^{viii}—Si04—Ca01^{xii}	138.52 (9)
O05^{iv}—Ca02—Si04^{iv}	75.95 (6)	O02^{viii}—Si04—Ca02^{xi}	33.22 (8)
O05^{iv}—Ca02—Si04^{v}	164.95 (6)	O02^{viii}—Si04—Ca02^{iv}	101.88 (9)
O05—Ca02—Si04^{v}	107.60 (6)	O02^{viii}—Si04—Ca03	100.48 (9)
O05—Ca02—Si04^{iv}	149.32 (6)	O02^{viii}—Si04—Ca03^{viii}	30.78 (8)
O05—Ca02—Li02^{vi}	142.6 (2)	O02^{viii}—Si04—Ca04	136.33 (9)
O05—Ca02—Li02^{vii}	118.16 (16)	O02^{viii}—Si04—Li01^{xi}	89.03 (15)
O05^{iv}—Ca02—Li02^{vi}	128.65 (19)	O02^{viii}—Si04—Li02^{viii}	44.53 (17)
O05^{iv}—Ca02—Li02^{vii}	100.31 (19)	O02^{viii}—Si04—O01	107.99 (12)
O05—Ca02—O04	81.51 (8)	O02^{viii}—Si04—O03	108.50 (12)
O05^{iv}—Ca02—O04	94.08 (8)	O02^{viii}—Si04—O08	116.90 (12)
O05—Ca02—O05^{iv}	80.08 (8)	O03—Si04—Ca01^{xii}	112.98 (9)
O05—Ca02—O12^{iv}	86.00 (8)	O03—Si04—Ca02^{iv}	89.98 (9)
O05^{iv}—Ca02—O12^{iv}	85.20 (8)	O03—Si04—Ca02^{xi}	139.17 (9)
O12^{iv}—Ca02—Ca03^{iv}	42.35 (5)	O03—Si04—Ca03	32.42 (8)
O12^{iv}—Ca02—Si02	73.71 (6)	O03—Si04—Ca03^{viii}	83.28 (9)
O12^{iv}—Ca02—Si04^{v}	82.53 (6)	O03—Si04—Ca04	53.11 (8)
O12^{iv}—Ca02—Si04^{iv}	73.27 (6)	O03—Si04—Li01^{xi}	118.40 (18)
O12^{iv}—Ca02—Li02^{vi}	116.18 (19)	O03—Si04—Li02^{viii}	86.0 (2)
O12^{iv}—Ca02—Li02^{vii}	33.75 (17)	O08—Si04—Ca01^{xii}	52.93 (8)
Si01^{vi}—Ca03—Si01	114.27 (2)	O08—Si04—Ca02^{iv}	131.14 (9)
Si01^{vi}—Ca03—Si02	118.63 (3)	O08—Si04—Ca02^{xi}	108.30 (8)
Si01—Ca03—Si04	96.26 (2)	O08—Si04—Ca03	132.08 (9)
Si01^{vi}—Ca03—Si04	147.79 (3)	O08—Si04—Ca03^{viii}	108.03 (9)
Si01^{vi}—Ca03—Li02^{viii}	101.36 (15)	O08—Si04—Ca04	51.32 (8)
Si02—Ca03—Si01	54.79 (2)	O08—Si04—Li01^{xi}	28.03 (15)
Si02—Ca03—Si04	70.29 (2)	O08—Si04—Li02^{viii}	161.43 (18)
Li02—Ca03—Si01	73.26 (16)	O08—Si04—O03	103.60 (12)
Li02^{viii}—Ca03—Si01	144.19 (15)	Ca01^{ii}—Li01—Ca01^{vii}	112.8 (2)
Li02—Ca03—Si01^{vi}	130.7 (2)	Ca01^{vii}—Li01—Ca04^{v}	59.32 (11)
Li02^{viii}—Ca03—Si02	111.21 (19)	Ca01^{ii}—Li01—Ca04^{v}	146.2 (2)
Li02—Ca03—Si02	105.30 (18)	Ca01^{ii}—Li01—Ca04^{ii}	62.69 (12)
Li02^{viii}—Ca03—Si04	49.80 (16)	Ca04^{ii}—Li01—Ca01^{vii}	147.7 (2)
Li02—Ca03—Si04	66.2 (2)	Ca04^{ii}—Li01—Ca04^{v}	105.2 (2)
Li02—Ca03—Li02^{viii}	81.1 (3)	Si01—Li01—Ca01^{vii}	151.0 (2)
O02—Ca03—Si01^{vi}	89.00 (6)	Si01—Li01—Ca01^{ii}	92.27 (18)
O02—Ca03—Si01	93.71 (6)	Si01—Li01—Ca04^{v}	107.2 (2)
O02—Ca03—Si02	143.67 (6)	Si01—Li01—Ca04^{ii}	56.66 (13)
O02—Ca03—Si04	99.48 (6)	Si01—Li01—Si04^{v}	98.8 (2)
O02—Ca03—Li02^{viii}	83.0 (2)	Si02—Li01—Ca01^{vii}	114.3 (3)
O02—Ca03—Li02	42.0 (2)	Si02—Li01—Ca01^{ii}	60.91 (14)
O02—Ca03—O04	107.74 (8)	Si02—Li01—Ca04^{v}	152.6 (2)
O02—Ca03—O04^{vi}	76.70 (8)	Si02—Li01—Ca04^{ii}	91.96 (18)
O02—Ca03—O05	169.02 (8)	Si02—Li01—Si01	64.59 (15)
O02—Ca03—O12	102.96 (8)	Si02—Li01—Si03^{xiii}	128.6 (3)
O03—Ca03—Si01^{vi}	167.89 (6)	Si02—Li01—Si04^{v}	102.2 (2)

O03—Ca03—Si01	77.58 (6)	Si03^{xiii}—Li01—Ca01^{vii}	81.26 (17)
O03—Ca03—Si02	69.61 (6)	Si03^{xiii}—Li01—Ca01^{ii}	67.83 (15)
O03—Ca03—Si04	22.82 (6)	Si03^{xiii}—Li01—Ca04^{v}	78.38 (16)
O03—Ca03—Li02^{viii}	66.68 (16)	Si03^{xiii}—Li01—Ca04^{ii}	67.32 (14)
O03—Ca03—Li02	48.2 (2)	Si03^{xiii}—Li01—Si01	123.3 (3)
O03—Ca03—O02	87.67 (9)	Si03^{xiii}—Li01—Si04^{v}	123.0 (2)
O03—Ca03—O04^{vi}	96.03 (8)	Si04^{v}—Li01—Ca01^{ii}	153.2 (3)
O03—Ca03—O04	163.32 (9)	Si04^{v}—Li01—Ca01^{vii}	52.31 (11)
O03—Ca03—O05	83.75 (8)	Si04^{v}—Li01—Ca04^{v}	51.65 (11)
O03—Ca03—O12	95.09 (8)	Si04^{v}—Li01—Ca04^{ii}	142.8 (3)
O04—Ca03—Si01^{vi}	25.90 (5)	O08^{v}—Li01—Ca01^{vii}	37.06 (19)
O04^{vi}—Ca03—Si01	25.67 (5)	O08^{v}—Li01—Ca01^{ii}	149.8 (4)
O04^{vi}—Ca03—Si01^{vi}	94.52 (6)	O08^{v}—Li01—Ca04^{ii}	138.2 (4)
O04—Ca03—Si01	94.66 (6)	O08^{v}—Li01—Ca04^{v}	33.30 (17)
O04—Ca03—Si02	93.82 (6)	O08^{v}—Li01—Si01	117.3 (4)
O04^{vi}—Ca03—Si02	77.94 (5)	O08^{v}—Li01—Si02	124.5 (3)
O04^{vi}—Ca03—Si04	117.65 (6)	O08^{v}—Li01—Si03^{xiii}	97.9 (3)
O04—Ca03—Si04	149.87 (6)	O08^{v}—Li01—Si04^{v}	25.09 (13)
O04^{vi}—Ca03—Li02^{viii}	153.97 (18)	O08^{v}—Li01—O09^{iv}	104.8 (4)
O04^{vi}—Ca03—Li02	72.92 (18)	O08^{v}—Li01—O11^{ii}	129.5 (4)
O04—Ca03—Li02^{viii}	120.38 (16)	O08^{v}—Li01—O13	125.5 (4)
O04—Ca03—Li02	143.9 (2)	O09^{iv}—Li01—Ca01^{ii}	60.69 (18)
O04—Ca03—O04^{vi}	81.79 (8)	O09^{iv}—Li01—Ca01^{vii}	80.9 (2)
O04—Ca03—O05	80.15 (8)	O09^{iv}—Li01—Ca04^{v}	137.4 (3)
O05—Ca03—Si01^{vi}	100.77 (6)	O09^{iv}—Li01—Ca04^{ii}	117.0 (3)
O05—Ca03—Si01	77.78 (5)	O09^{iv}—Li01—Si01	100.6 (2)
O05—Ca03—Si02	25.64 (5)	O09^{iv}—Li01—Si02	36.27 (12)
O05—Ca03—Si04	74.89 (6)	O09^{iv}—Li01—Si03^{xiii}	112.0 (3)
O05—Ca03—Li02	127.65 (19)	O09^{iv}—Li01—Si04^{v}	93.1 (2)
O05—Ca03—Li02^{viii}	99.7 (2)	O11^{ii}—Li01—Ca01^{ii}	44.54 (17)
O05—Ca03—O04^{vi}	97.36 (7)	O11^{ii}—Li01—Ca01^{vii}	110.5 (3)
O12—Ca03—Si01	161.57 (6)	O11^{ii}—Li01—Ca04^{ii}	41.90 (17)
O12—Ca03—Si01^{vi}	74.33 (6)	O11^{ii}—Li01—Ca04^{v}	104.4 (3)
O12—Ca03—Si02	106.85 (6)	O11^{ii}—Li01—Si01	97.4 (3)
O12—Ca03—Si04	73.49 (6)	O11^{ii}—Li01—Si02	102.7 (3)
O12—Ca03—Li02	114.48 (18)	O11^{ii}—Li01—Si03^{xiii}	32.07 (12)
O12—Ca03—Li02^{viii}	34.14 (17)	O11^{ii}—Li01—Si04^{v}	154.3 (3)
O12—Ca03—O04^{vi}	168.84 (8)	O11^{ii}—Li01—O09^{iv}	103.2 (3)
O12—Ca03—O04	87.78 (8)	O13—Li01—Ca01^{ii}	77.4 (2)
O12—Ca03—O05	84.67 (8)	O13—Li01—Ca01^{vii}	140.4 (3)
Si01^{ii}—Ca04—Si01	110.38 (2)	O13—Li01—Ca04^{v}	131.3 (3)
Si01^{ii}—Ca04—Si02	113.89 (3)	O13—Li01—Ca04^{ii}	71.8 (2)
Si01—Ca04—Si02	53.69 (2)	O13—Li01—Si01	29.42 (15)
Si01^{ii}—Ca04—Li02	141.11 (18)	O13—Li01—Si02	35.22 (14)
Si04—Ca04—Si01^{ii}	140.27 (3)	O13—Li01—Si03^{xiii}	134.9 (3)
Si04—Ca04—Si01	105.82 (3)	O13—Li01—Si04^{v}	100.9 (3)
Si04—Ca04—Si02	75.60 (3)	O13—Li01—O09^{iv}	71.2 (2)
Si04—Ca04—Li02	68.30 (18)	O13—Li01—O11^{ii}	103.0 (3)
Li02—Ca04—Si01	68.61 (13)	Ca01—Li02—Ca02^{xiv}	99.9 (3)
Li02—Ca04—Si02	96.81 (15)	Ca01—Li02—Ca04	64.20 (16)
O03—Ca04—Si01	75.29 (6)	Ca02^{vi}—Li02—Ca01	78.3 (2)
O03—Ca04—Si01^{ii}	173.92 (6)	Ca02^{vi}—Li02—Ca02^{xiv}	96.7 (3)

O03—Ca04—Si02	67.33 (6)	Ca02^{vi}—Li02—Ca03^{viii}	138.9 (3)
O03—Ca04—Si04	33.67 (6)	Ca02^{vi}—Li02—Ca03	73.02 (17)
O03—Ca04—Li02	42.27 (19)	Ca02^{vi}—Li02—Ca04	117.0 (2)
O03—Ca04—O06	80.38 (8)	Ca02^{xiv}—Li02—Ca04	136.6 (3)
O03—Ca04—O07^{ii}	152.23 (8)	Ca03^{viii}—Li02—Ca01	136.9 (3)
O03—Ca04—O07	91.14 (8)	Ca03—Li02—Ca01	116.1 (2)
O03—Ca04—O10^{ix}	143.04 (7)	Ca03^{viii}—Li02—Ca02^{xiv}	62.52 (14)
O03—Ca04—O11	94.63 (8)	Ca03—Li02—Ca02^{xiv}	138.7 (3)
O06—Ca04—Si01^{ii}	98.61 (5)	Ca03—Li02—Ca03^{viii}	98.9 (3)
O06—Ca04—Si01	76.34 (5)	Ca03^{viii}—Li02—Ca04	100.5 (3)
O06—Ca04—Si02	24.71 (5)	Ca03—Li02—Ca04	80.3 (2)
O06—Ca04—Si04	74.37 (5)	Si03^{viii}—Li02—Ca01	68.8 (2)
O06—Ca04—Li02	117.68 (17)	Si03^{viii}—Li02—Ca02^{vi}	139.7 (4)
O06—Ca04—O10^{ix}	104.31 (7)	Si03^{viii}—Li02—Ca02^{xiv}	67.86 (17)
O07—Ca04—Si01^{ii}	94.94 (6)	Si03^{viii}—Li02—Ca03	142.6 (4)
O07^{ii}—Ca04—Si01	86.04 (6)	Si03^{viii}—Li02—Ca03^{viii}	68.09 (17)
O07^{ii}—Ca04—Si01^{ii}	30.34 (5)	Si03^{viii}—Li02—Ca04	68.7 (2)
O07—Ca04—Si01	24.19 (5)	Si04^{viii}—Li02—Ca01	144.9 (4)
O07—Ca04—Si02	76.48 (6)	Si04^{viii}—Li02—Ca02^{vi}	71.7 (2)
O07^{ii}—Ca04—Si02	85.09 (5)	Si04^{viii}—Li02—Ca02^{xiv}	66.80 (19)
O07—Ca04—Si04	124.51 (6)	Si04^{viii}—Li02—Ca03	72.1 (2)
O07^{ii}—Ca04—Si04	143.51 (6)	Si04^{viii}—Li02—Ca03^{viii}	67.62 (18)
O07^{ii}—Ca04—Li02	145.89 (18)	Si04^{viii}—Li02—Ca04	147.2 (4)
O07—Ca04—Li02	68.67 (17)	Si04^{viii}—Li02—Si03^{viii}	127.0 (3)
O07—Ca04—O06	96.84 (8)	O01^{i}—Li02—Ca01	44.06 (18)
O07^{ii}—Ca04—O06	75.28 (7)	O01^{i}—Li02—Ca02^{vi}	46.91 (19)
O07—Ca04—O07^{ii}	78.84 (8)	O01^{i}—Li02—Ca02^{xiv}	75.5 (3)
O07—Ca04—O10^{ix}	123.82 (7)	O01^{i}—Li02—Ca03	116.6 (3)
O07^{ii}—Ca04—O10^{ix}	58.21 (7)	O01^{i}—Li02—Ca03^{viii}	137.8 (4)
O07—Ca04—O11	81.60 (8)	O01^{i}—Li02—Ca04	107.1 (3)
O08—Ca04—Si01^{ii}	107.18 (6)	O01^{i}—Li02—Si03^{viii}	92.8 (3)
O08—Ca04—Si01	138.06 (6)	O01^{i}—Li02—Si04^{viii}	101.0 (4)
O08—Ca04—Si02	94.18 (6)	O02—Li02—Ca01	126.3 (4)
O08—Ca04—Si04	33.51 (5)	O02—Li02—Ca02^{xiv}	95.2 (3)
O08—Ca04—Li02	93.07 (18)	O02—Li02—Ca02^{vi}	48.8 (2)
O08—Ca04—O03	66.75 (8)	O02—Li02—Ca03	47.6 (2)
O08—Ca04—O06	80.29 (8)	O02—Li02—Ca03^{viii}	95.6 (3)
O08—Ca04—O07	157.88 (8)	O02—Li02—Ca04	127.3 (4)
O08—Ca04—O07^{ii}	120.84 (8)	O02—Li02—Si03^{viii}	160.3 (4)
O08—Ca04—O10^{ix}	77.80 (7)	O02—Li02—Si04^{viii}	33.27 (15)
O08—Ca04—O11	99.26 (8)	O02—Li02—O01^{i}	92.5 (4)
O10^{ix}—Ca04—Si01^{ii}	31.32 (5)	O02—Li02—O03	92.1 (4)
O10^{ix}—Ca04—Si01	141.67 (5)	O03—Li02—Ca01	105.7 (3)
O10^{ix}—Ca04—Si02	127.58 (5)	O03—Li02—Ca02^{vi}	115.9 (3)
O10^{ix}—Ca04—Si04	111.25 (5)	O03—Li02—Ca02^{xiv}	141.8 (4)
O10^{ix}—Ca04—Li02	134.89 (15)	O03—Li02—Ca03^{viii}	79.5 (3)
O11—Ca04—Si01^{ii}	86.52 (6)	O03—Li02—Ca03	47.16 (19)
O11—Ca04—Si01	100.96 (6)	O03—Li02—Ca04	43.69 (18)
O11—Ca04—Si02	150.99 (6)	O03—Li02—Si03^{viii}	95.5 (3)
O11—Ca04—Si04	102.35 (6)	O03—Li02—Si04^{viii}	103.5 (4)
O11—Ca04—Li02	57.09 (17)	O03—Li02—O01^{i}	141.6 (4)
O11—Ca04—O06	174.77 (8)	O12^{viii}—Li02—Ca01	95.5 (3)

O11—Ca04—O07^{ii}	109.18 (8)	O12^{viii}—Li02—Ca02^{vi}	139.2 (5)
O11—Ca04—O10^{ix}	80.62 (7)	O12^{viii}—Li02—Ca02^{xiv}	44.1 (2)
Ca01—Si01—Ca02^{vi}	68.82 (2)	O12^{viii}—Li02—Ca03^{viii}	43.5 (2)
Ca03—Si01—Ca01	103.31 (3)	O12^{viii}—Li02—Ca03	141.0 (5)
Ca03^{vi}—Si01—Ca01	130.07 (3)	O12^{viii}—Li02—Ca04	95.1 (4)
Ca03^{vi}—Si01—Ca02^{vi}	62.98 (2)	O12^{viii}—Li02—Si03^{viii}	31.58 (16)
Ca03—Si01—Ca02^{vi}	62.95 (2)	O12^{viii}—Li02—Si04^{viii}	95.5 (3)
Ca03^{vi}—Si01—Ca03	65.73 (2)	O12^{viii}—Li02—O01^{i}	101.8 (5)
Ca03^{vi}—Si01—Ca04	141.45 (3)	O12^{viii}—Li02—O02	128.7 (5)
Ca03—Si01—Ca04	75.92 (2)	O12^{viii}—Li02—O03	104.7 (5)
Ca04—Si01—Ca01	61.667 (19)	Ca02^{iv}—O01—Ca01^{xii}	124.67 (10)
Ca04^{ii}—Si01—Ca01	67.63 (2)	Ca02^{iv}—O01—Li02^{xii}	84.4 (2)
Ca04^{ii}—Si01—Ca02^{vi}	133.23 (3)	Si04—O01—Ca01^{xii}	93.91 (10)
Ca04—Si01—Ca02^{vi}	103.33 (3)	Si04—O01—Ca02^{iv}	125.28 (13)
Ca04^{ii}—Si01—Ca03^{vi}	146.88 (3)	Si04—O01—Li02^{xii}	135.9 (2)
Ca04^{ii}—Si01—Ca03	144.49 (3)	Li02^{xii}—O01—Ca01^{xii}	92.6 (2)
Ca04^{ii}—Si01—Ca04	69.62 (2)	Ca03—O02—Ca02^{vi}	105.93 (9)
Li01—Si01—Ca01	136.84 (13)	Si04^{viii}—O02—Ca02^{vi}	124.29 (12)
Li01—Si01—Ca02^{vi}	152.67 (13)	Si04^{viii}—O02—Ca03	127.96 (12)
Li01—Si01—Ca03	109.05 (14)	Si04^{viii}—O02—Li02	102.2 (3)
Li01—Si01—Ca03^{vi}	89.75 (13)	Li02—O02—Ca02^{vi}	89.1 (3)
Li01—Si01—Ca04	99.36 (14)	Li02—O02—Ca03	90.4 (3)
Li01—Si01—Ca04^{ii}	69.42 (13)	Ca03—O03—Ca04	129.83 (10)
O04^{vi}—Si01—Ca01	97.11 (9)	Ca03—O03—Li02	84.7 (2)
O04^{vi}—Si01—Ca02^{vi}	30.42 (8)	Si04—O03—Ca03	124.76 (13)
O04^{vi}—Si01—Ca03^{vi}	40.90 (8)	Si04—O03—Ca04	93.22 (10)
O04^{vi}—Si01—Ca03	42.00 (8)	Si04—O03—Li02	130.8 (2)
O04^{vi}—Si01—Ca04^{ii}	163.65 (9)	Li02—O03—Ca04	94.0 (2)
O04^{vi}—Si01—Ca04	109.15 (9)	Ca02—O04—Ca03^{vi}	98.39 (8)
O04^{vi}—Si01—Li01	126.05 (15)	Ca03—O04—Ca02	99.62 (8)
O04^{vi}—Si01—O07	117.06 (13)	Ca03—O04—Ca03^{vi}	98.21 (8)
O04^{vi}—Si01—O10^{vi}	114.28 (12)	Si01^{vi}—O04—Ca02	129.92 (12)
O04^{vi}—Si01—O13	109.35 (12)	Si01^{vi}—O04—Ca03^{vi}	112.33 (11)
O07—Si01—Ca01	28.87 (8)	Si01^{vi}—O04—Ca03	113.20 (11)
O07—Si01—Ca02^{vi}	93.68 (9)	Ca02—O05—Ca02^{iv}	99.92 (8)
O07—Si01—Ca03	103.58 (9)	Ca02^{iv}—O05—Ca03	93.05 (8)
O07—Si01—Ca03^{vi}	156.61 (9)	Ca02—O05—Ca03	98.70 (8)
O07—Si01—Ca04^{ii}	51.55 (9)	Si02—O05—Ca02^{iv}	131.00 (12)
O07—Si01—Ca04	37.85 (8)	Si02—O05—Ca02	115.35 (12)
O07—Si01—Li01	113.62 (16)	Si02—O05—Ca03	112.67 (11)
O07—Si01—O10^{vi}	108.35 (13)	Ca01^{xii}—O06—Ca01^{ii}	104.22 (8)
O07—Si01—O13	106.96 (12)	Ca01^{xii}—O06—Ca04	93.82 (8)
O10^{vi}—Si01—Ca01	101.62 (9)	Ca01^{ii}—O06—Ca04	101.53 (8)
O10^{vi}—Si01—Ca02^{vi}	108.27 (9)	Si02—O06—Ca01^{ii}	105.96 (11)
O10^{vi}—Si01—Ca03	147.46 (10)	Si02—O06—Ca01^{xii}	132.66 (12)
O10^{vi}—Si01—Ca03^{vi}	82.24 (9)	Si02—O06—Ca04	114.50 (12)
O10^{vi}—Si01—Ca04^{ii}	65.59 (9)	Ca01—O07—Ca04^{ii}	103.04 (8)
O10^{vi}—Si01—Ca04	135.18 (9)	Ca01—O07—Ca04	99.76 (9)
O10^{vi}—Si01—Li01	63.27 (17)	Ca04—O07—Ca04^{ii}	101.16 (8)
O13—Si01—Ca01	135.58 (9)	Si01—O07—Ca01	131.79 (13)
O13—Si01—Ca02^{vi}	138.35 (9)	Si01—O07—Ca04	117.96 (12)
O13—Si01—Ca03^{vi}	91.30 (9)	Si01—O07—Ca04^{ii}	98.11 (11)

O13—Si01—Ca03	77.01 (8)	Ca04—O08—Ca01^{xii}	98.34 (8)
O13—Si01—Ca04^{ii}	86.42 (9)	Si04—O08—Ca01^{xii}	93.38 (10)
O13—Si01—Ca04	75.95 (9)	Si04—O08—Ca04	95.17 (10)
O13—Si01—Li01	36.01 (17)	Si04—O08—Li01^{xi}	126.9 (3)
O13—Si01—O10^{vi}	99.12 (12)	Li01^{xi}—O08—Ca01^{xii}	115.3 (3)
Ca01^{ii}—Si02—Ca01^{xii}	66.07 (2)	Li01^{xi}—O08—Ca04	121.2 (3)
Ca01^{ii}—Si02—Ca02^{iv}	132.01 (3)	Si02^{iv}—O09—Ca01^{xv}	79.90 (9)
Ca01^{ii}—Si02—Ca02	149.11 (3)	Si02^{iv}—O09—Si03	133.18 (15)
Ca01^{ii}—Si02—Ca03	144.16 (3)	Si02^{iv}—O09—Li01^{iv}	89.6 (2)
Ca01^{ii}—Si02—Ca04	68.75 (2)	Si03—O09—Ca01^{xv}	125.13 (12)
Ca02^{iv}—Si02—Ca01^{xii}	68.51 (2)	Si03—O09—Li01^{iv}	130.3 (2)
Ca02—Si02—Ca01^{xii}	129.13 (3)	Li01^{iv}—O09—Ca01^{xv}	79.03 (18)
Ca02—Si02—Ca02^{iv}	62.42 (2)	Si01^{vi}—O10—Ca04^{xvi}	83.09 (10)
Ca02—Si02—Ca03	65.37 (2)	Si01^{vi}—O10—Si03	137.01 (16)
Ca02—Si02—Ca04	141.11 (3)	Si03—O10—Ca04^{xvi}	131.24 (12)
Ca03—Si02—Ca01^{xii}	100.92 (3)	Ca04—O11—Ca01	95.75 (8)
Ca03—Si02—Ca02^{iv}	59.700 (19)	Si03^{viii}—O11—Ca01	121.53 (12)
Ca03—Si02—Ca04	75.86 (2)	Si03^{viii}—O11—Ca04	124.80 (12)
Ca04—Si02—Ca01^{xii}	59.853 (19)	Si03^{viii}—O11—Li01^{ii}	106.4 (2)
Ca04—Si02—Ca02^{iv}	100.83 (2)	Li01^{ii}—O11—Ca01	100.4 (2)
Li01—Si02—Ca01^{ii}	69.51 (15)	Li01^{ii}—O11—Ca04	104.6 (3)
Li01—Si02—Ca01^{xii}	135.58 (15)	Ca03—O12—Ca02^{iv}	94.20 (8)
Li01—Si02—Ca02^{iv}	152.34 (14)	Si03—O12—Ca02^{iv}	121.51 (12)
Li01—Si02—Ca02	90.40 (14)	Si03—O12—Ca03	123.53 (12)
Li01—Si02—Ca03	115.55 (17)	Si03—O12—Li02^{viii}	109.7 (3)
Li01—Si02—Ca04	104.13 (16)	Li02^{viii}—O12—Ca02^{iv}	102.1 (3)
O05—Si02—Ca01^{xii}	96.78 (9)	Li02^{viii}—O12—Ca03	102.4 (3)
O05—Si02—Ca01^{ii}	161.63 (9)	Si01—O13—Si02	143.90 (16)
O05—Si02—Ca02	39.41 (8)	Si01—O13—Li01	114.6 (3)
O05—Si02—Ca02^{iv}	29.63 (8)	Si02—O13—Li01	101.3 (3)
O05—Si02—Ca03	41.69 (8)		

Symmetry codes: (i) $x+1, y, z$; (ii) $-x+1, -y+1, -z$; (iii) $x+1, y, z-1$; (iv) $-x, -y+1, -z+1$; (v) $x, y+1, z$; (vi) $-x+1, -y+1, -z+1$; (vii) $x-1, y+1, z$; (viii) $-x+1, -y, -z+1$; (ix) $x, y, z-1$; (x) $x, y-1, z+1$; (xi) $x, y-1, z$; (xii) $x-1, y, z$; (xiii) $x, y+1, z-1$; (xiv) $x+1, y-1, z$; (xv) $x-1, y, z+1$; (xvi) $x, y, z+1$.