LiCe₉Mo₁₆O₃₅

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The structure of lithium nonacerium hexadecamolybdenum pentatridecaoxide, $LiCe_9Mo_{16}O_{35}$, is isotypic with $LiNd_9Mo_{16}O_{35}$ [Gougeon Gall, Cuny, Gautier, Le Polles, Delevoye & Trebosc (2011). *Chem. Eur. J.* **17**, 13806–13813]. It is characterized by $Mo_{16}O_{26}{}^iO_{10}{}^a$ units (where i = inner and a = apical) containing Mo_{16} clusters that share some of their O atoms to form infinite molybdenum cluster chains running parallel to the b axis and separated by Li^+ and Ce^{3+} cations. The Mo_{16} cluster units are centred at Wyckoff positions $2c$ and have point-group symmetry $2/m$. The Li^+ atom, in a flattened octahedron of O atoms, is in a $2a$ Wyckoff position with $2/m$ symmetry. The Ce^{3+} cations have coordination numbers to the O atoms of 6, 9 or 10. Two Ce, two Mo and five O atoms lie on sites with m symmetry (Wyckoff site $4i$), and one Ce and one O atom on sites with $2/m$ symmetry (Wyckoff sites $2b$ and $2d$, respectively).

Related literature

For the crystal structure of the $LiNd_9Mo_{16}O_{35}$ compound, see: Gougeon *et al.* (2011). For details of the i- and a-type ligand notation, see: Schäfer & von Schnering (1964). For compounds containing Mo_{10} clusters, see: Hibble *et al.* (1988); Dronskowski & Simon (1989); Gougeon *et al.* (1990, 1991, 2003, 2007); Dronskowski *et al.* (1991); Gall *et al.* (1993, 1995, 1999); Gall & Gougeon (1993, 1994*a*,*b*, 1998); Gougeon & Gall (2002). The oxidation states of the Mo, Ce and Li atoms were estimated using the data given by Brown & Wu (1976).

Experimental

Crystal data

$LiCe_9Mo_{16}O_{35}$	V = 1516.46 (3) Å³
M_r = 3363.06	Z = 2
Monoclinic, $C2/m$	Mo $K\alpha$ radiation
a = 18.3000 (2) Å	μ = 19.66 mm⁻¹
b = 8.6326 (1) Å	T = 293 K
c = 9.8172 (1) Å	0.15 × 0.12 × 0.06 mm
β = 102.0953 (7)°	

Data collection

Nonius KappaCCD diffractometer	21270 measured reflections
Absorption correction: multi-scan	3511 independent reflections
(*PLATON*; Spek, 2009)	3383 reflections with $I > 2\sigma(I)$
T_{min} = 0.190, T_{max} = 0.418	R_{int} = 0.027

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.016	158 parameters
$wR(F^2)$ = 0.033	$\Delta\rho_{max}$ = 1.13 e Å⁻³
S = 1.29	$\Delta\rho_{min}$ = −1.33 e Å⁻³
3511 reflections	

Table 1
Selected bond lengths (Å).

Li—O7	1.861 (3)	Mo1—O2	1.9759 (16)
Li—O10	2.4135 (16)	Mo1—O2^v	1.9759 (16)
Ce1—O3^i	2.3603 (16)	Mo1—O4^v	2.0332 (17)
Ce1—O12	2.3916 (16)	Mo1—O4	2.0332 (17)
Ce1—O1^{ii}	2.4055 (5)	Mo1—O1	2.045 (3)
Ce1—O8	2.4159 (16)	Mo1—Mo3	2.7003 (3)
Ce1—O10^{iii}	2.5499 (16)	Mo1—Mo2	2.7129 (3)
Ce1—O4^{ii}	2.7161 (18)	Mo2—O3^{ix}	2.0277 (16)
Ce1—O2^{ii}	2.874 (2)	Mo2—O2	2.077 (2)
Ce1—O11	2.8865 (16)	Mo2—O7	2.0773 (16)
Ce1—O7^{iv}	2.8959 (17)	Mo2—O5	2.0985 (16)
Ce2—O12	2.337 (3)	Mo2—O10	2.0997 (16)
Ce2—O3^v	2.3829 (19)	Mo2—Mo4^{ii}	2.6412 (3)
Ce2—O3	2.3829 (19)	Mo2—Mo5^{xii}	2.7691 (3)
Ce2—O1^{iv}	2.622 (2)	Mo2—Mo3	2.7739 (2)
Ce2—O2^{vi}	2.6352 (17)	Mo2—Mo2^v	2.7851 (4)
Ce2—O2^{iv}	2.6352 (17)	Mo3—O8	2.0315 (16)
Ce2—O5^{ii}	2.8054 (16)	Mo3—O5	2.0688 (16)
Ce2—O5^{vii}	2.8054 (16)	Mo3—O11	2.0795 (16)
Ce2—O2^{vii}	2.9625 (17)	Mo3—O4	2.0860 (19)
Ce2—O2^{ii}	2.9625 (17)	Mo3—Mo3^v	2.7338 (4)
Ce3—O8	2.3670 (17)	Mo3—Mo4^{ii}	2.7375 (3)
Ce3—O8^{viii}	2.3670 (17)	Mo3—Mo5	2.7405 (3)
Ce3—O4^{ii}	2.5309 (18)	Mo3—Mo4^{xiii}	2.8391 (3)
Ce3—O4^{ix}	2.5309 (18)	Mo3—Mo5^{xii}	2.8928 (3)
Ce3—O5^{viii}	2.7980 (17)	Mo4—O6	2.0145 (14)
Ce3—O5	2.7980 (17)	Mo4—O8^{xiv}	2.0758 (19)
Ce3—O4^{viii}	3.0001 (17)	Mo4—O5^{ii}	2.0797 (19)
Ce3—O4	3.0001 (17)	Mo4—O10^{ii}	2.0857 (16)
Ce3—O11^{ii}	3.089 (3)	Mo4—O9	2.1141 (2)
Ce4—O6^x	2.280 (2)	Mo4—Mo4^{xv}	2.7958 (3)
Ce4—O6	2.280 (2)	Mo5—O11	2.078 (3)
Ce4—O3	2.4244 (19)	Mo5—O10^{xii}	2.0950 (16)
Ce4—O3^x	2.4244 (19)	Mo5—O10^{iii}	2.0950 (16)
Ce4—O3^v	2.4244 (19)	Mo5—Mo5^{xii}	2.9030 (5)
Ce4—O3^{xi}	2.4244 (19)		

Symmetry codes: (i) $-x-\frac{1}{2}, y+\frac{1}{2}, -z$; (ii) $-x-\frac{1}{2}, -y-\frac{1}{2}, -z+1$; (iii) $-x-1, y, -z+1$; (iv) $x, y, z-1$; (v) $x, -y-1, z$; (vi) $x, -y-1, z-1$; (vii) $-x-\frac{1}{2}, y-\frac{1}{2}, -z+1$; (viii) $x, -y, z$; (ix) $-x-\frac{1}{2}, y+\frac{1}{2}, -z+1$; (x) $-x, -y-1, -z$; (xi) $-x, y, -z$; (xii) $-x-1, -y-1, -z+1$; (xiii) $x-\frac{1}{2}, -y-\frac{1}{2}, z$; (xiv) $x+\frac{1}{2}, -y-\frac{1}{2}, z$; (xv) $-x, y, -z+1$.

Data collection: *COLLECT* (Nonius, 1998); cell refinement: *COLLECT*; data reduction: *EVALCCD* (Duisenberg *et al.*, 2003); program(s) used to solve structure: *SIR97* (Altomare *et al.*, 1999); program(s) used to refine structure: *SHELXL97* (Sheldrick, 2008); molecular graphics: *DIAMOND* (Bergerhoff, 1996); software used to prepare material for publication: *SHELXL97*.

Intensity data were collected on the Nonius KappaCCD X-ray diffactometer system of the 'Centre de diffractométrie de l'Université de Rennes I'.

inorganic compounds

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supplementary materials

LiCe$_9$Mo$_{16}$O$_{35}$

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Comment

LiCe$_9$Mo$_{16}$O$_{35}$ is isotopic with the LiNd$_9$Mo$_{16}$O$_{35}$ (Gougeon *et al.*, 2011) structure type. The crystal structure (Fig. 1) is based on Mo$_{16}$O$_{26}^i$O$_{10}^a$ cluster units (Fig. 2) sharing two O^i or four O^a ligands (for details of the i- and a-type ligand notation, see Schäfer & von Schnering (1964)) to form infinite molybdenum cluster chains running parallel to the b axis. The Mo$_{16}$ core of the Mo$_{16}$O$_{26}^i$O$_{10}^a$ unit can be seen as resulting of the fusion of two bioctahedral Mo$_{10}$ clusters through the sharing of three edges per Mo$_{10}$ cluster. The Mo$_{10}$ cluster results itself from metal edge-sharing of two Mo$_6$ octahedra and was first observed forming infinite chains in the MMo$_5$O$_8$ (M = Ca, Sr, Sn, Pb, La–Gd) compounds (Hibble *et al.*, 1988; Dronskowski & Simon, 1989; Gougeon *et al.*, 1990, 1991, 2003, 2007; Dronskowski *et al.*, 1991; Gall *et al.*, 1993, 1995; Gall & Gougeon, 1994*a*,*b*; Gougeon & Gall, 2002) and more later as isolated cluster in the R$_{16}$Mo$_{21}$O$_{56}$ (R = La, Ce, Pr, and Nd) series (Gall & Gougeon, 1993, 1998; Gall *et al.*, 1999). The Mo$_{16}$O$_{26}^i$O$_{10}^a$ cluster is centered on 2b position and thus has point-group symmetry 2/m. The Mo—Mo distances lie between 2.6412 (3) and 2.9030 (5) Å compared to 2.725 Å in the Mo metal and the Mo—O distances between 1.9759 (16) and 2.11407 (18) Å. The Mo—O chains, which have the connectivity formula Mo$_{16}$O$_{24}^i$O$_{2/2}^{i\text{-}i}$O$_6^a$O$_{4/2}^{a\text{-}a}$ are separated by the Li$^+$ and Ce^{3+} cations. The Li$^+$ cation occupies a highly tetragonally distorted octahedral site of O atoms of symmetry 2/m centered at the origin of the unit cell. The Li—O distances in the equatorial plane are 2.4135 (16) Å [Li—O10] and the two trans Li—O7 bonds are 1.861 (3) Å. The coordination numbers of the Ce ions are 6, 9 or 10 with Ce—O distances spreading over a wide range [2.280 (2) to 3.089 (3) Å]. By using the bond-length–bond-strength formula (Brown & Wu, 1976) for the Mo—O, Ce—O and Li—O bonds (s = [d(Mo—O)/1.882]$^{-6}$, s = [d(Ce—O)/2.160]$^{-6.5}$ and s = [d(Li—O)/1.378]$^{-4.065}$), an assignment of oxidation states to the Mo, Ce and Li atoms was made. The valence of each independent Mo atom was determined as follows: Mo(1) +3.36, Mo(2) +2.78, Mo(3) +2.29, Mo(4) + 2.81, and Mo(5) + 1.6. From these values, we could deduce an average Mo oxidation state of + 2.60 which is close to that based on the stoichiometry, + 2.625, when considering all the Ce ions as trivalent and the Li ion monovalent. Bond-valence sums of the Ce—O bonds was +3.08, +3.11, +3.09, and +3.30 for Ce1, Ce2, Ce3, and Ce4, respectively. For the Li atom, a value of +1.00 was found. It is interesting to note that for the total valence sum Σ(Mo—O) + Σ(Ce—O) + Σ(Li—O), we obtained a value of 70.5 per formula unit, which is in very good agreement with the theoretical value of 70 based on the 35 O atoms.

Experimental

Single crystals of LiCe$_9$Mo$_{16}$O$_{35}$ were obtained from a mixture of Li$_2$MoO$_4$, CeO$_2$, MoO$_3$, and Mo with the nominal composition Li$_2$CeMo$_6$O$_{12}$. Before use, Mo powder was reduced under H$_2$ flowing gas at 1273 K during 10 h in order to eliminate any trace of oxygen. The initial mixture (ca 4 g) was cold pressed and loaded into a molybdenum crucible, which was sealed under a low argon pressure using an arc welding system. The charge was heated at the rate of 300 K/h up to 2000 K, temperature which was held for 18 h, then cooled at 100 K/h down to 1373 K and finally furnace cooled.

Computing details

Data collection: *COLLECT* (Nonius, 1998); cell refinement: *COLLECT* (Nonius, 1998); data reduction: *EVALCCD* (Duisenberg *et al.*, 2003); program(s) used to solve structure: *SIR97* (Altomare *et al.*, 1999); program(s) used to refine structure: *SHELXL97* (Sheldrick, 2008); molecular graphics: *DIAMOND* (Bergerhoff, 1996); software used to prepare material for publication: *SHELXL97* (Sheldrick, 2008).
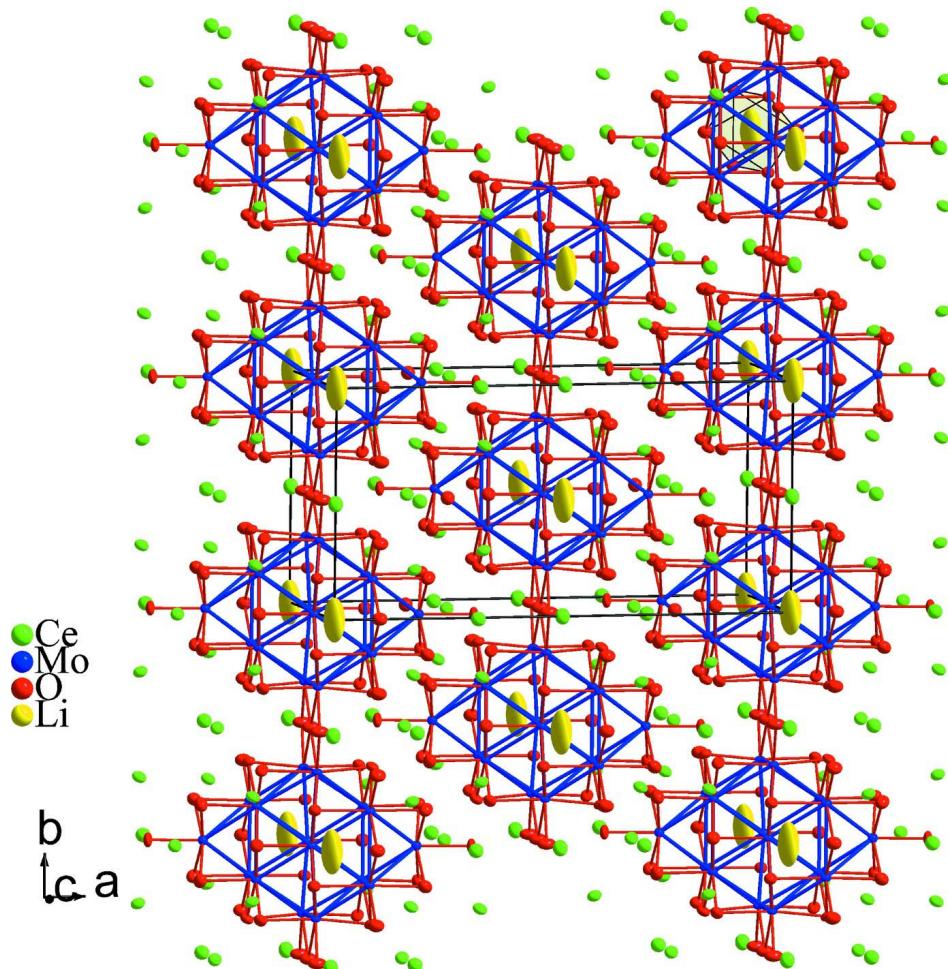
Figure 1

View of the crystal structure of $LiCe_9Mo_{16}O_{35}$ (Displacement ellipsoids are drawn at the 97% probability level).
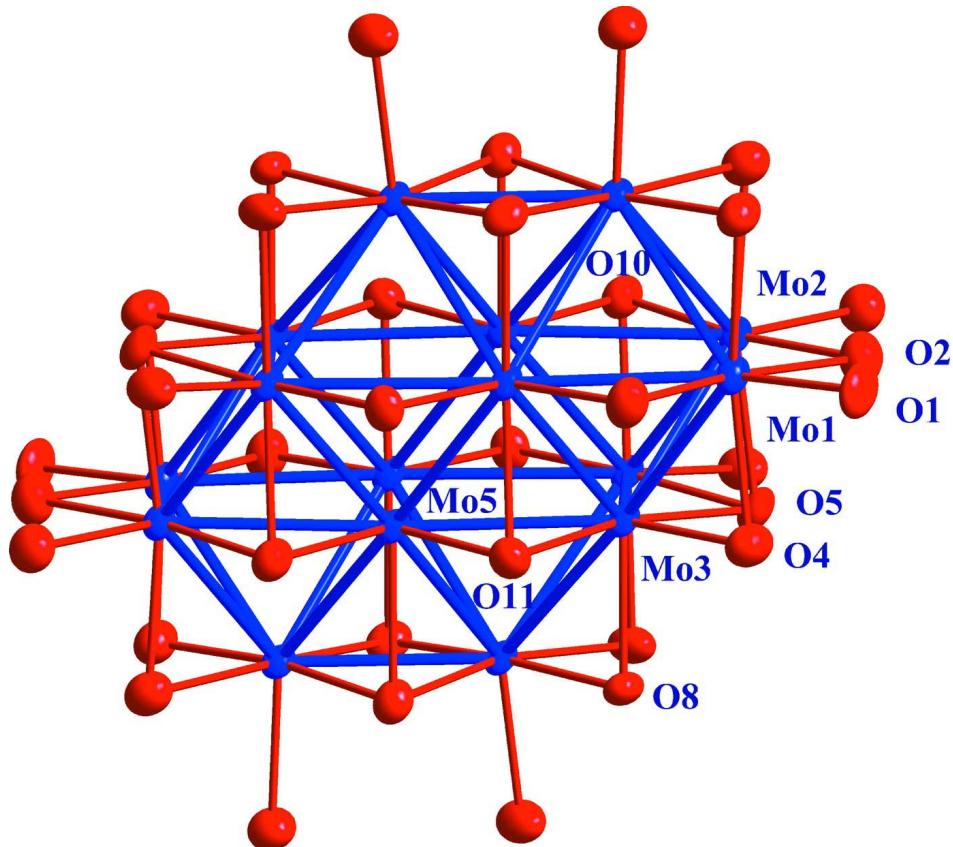
Figure 2

Plot showing the atom-numbering scheme of the $Mo_{16}O_{26}{}^iO_{10}{}^a$ units. Displacement ellipsoids are drawn at the 97% probability level.

lithium nonacerium hexadecamolybdenum pentatridecaoxide

Crystal data

$LiCe_9Mo_{16}O_{35}$	$F(000) = 2954$
$M_r = 3363.06$	$D_x = 7.365$ Mg m^{-3}
Monoclinic, $C2/m$	Mo $K\alpha$ radiation, $\lambda = 0.71069$ Å
$a = 18.3000$ (2) Å	Cell parameters from 21270 reflections
$b = 8.6326$ (1) Å	$\theta = 0.9$–35.0°
$c = 9.8172$ (1) Å	$\mu = 19.66$ mm^{-1}
$\beta = 102.0953$ (7)°	$T = 293$ K
$V = 1516.46$ (3) Å^3	Multi-faceted fragment, black
$Z = 2$	$0.15 \times 0.12 \times 0.06$ mm

Data collection

Nonius KappaCCD diffractometer	21270 measured reflections
Radiation source: fine-focus sealed tube	3511 independent reflections
Graphite monochromator	3383 reflections with $I > 2\sigma(I)$
φ scans ($\kappa = 0$) and additional ω scans	$R_{int} = 0.027$
Absorption correction: multi-scan	$\theta_{max} = 35.0°$, $\theta_{min} = 3.5°$
(*PLATON*; Spek, 2009)	$h = -26 \rightarrow 29$
$T_{min} = 0.190$, $T_{max} = 0.418$	$k = -13 \rightarrow 13$
	$l = -15 \rightarrow 10$

Refinement

Refinement on F^2	Secondary atom site location: difference Fourier map
Least-squares matrix: full	
$R[F^2 > 2\sigma(F^2)] = 0.016$	$w = 1/[\sigma^2(F_o^2) + (0.P)^2 + 6.2844P]$
$wR(F^2) = 0.033$	where $P = (F_o^2 + 2F_c^2)/3$
$S = 1.29$	$(\Delta/\sigma)_{max} = 0.004$
3511 reflections	$\Delta\rho_{max} = 1.13$ e Å^{-3}
158 parameters	$\Delta\rho_{min} = -1.33$ e Å^{-3}
0 restraints	Extinction correction: *SHELXL97* (Sheldrick, 2008), Fc*=kFc[1+0.001xFc$^2\lambda^3$/sin(2θ)]$^{-1/4}$
Primary atom site location: structure-invariant direct methods	Extinction coefficient: 0.00166 (3)

Special details

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

Refinement. Refinement of F^2 against ALL reflections. The weighted R-factor wR and goodness of fit S are based on F^2, conventional R-factors R are based on F, with F set to zero for negative F^2. The threshold expression of $F^2 > 2$sigma(F^2) is used only for calculating R-factors(gt) etc. and is not relevant to the choice of reflections for refinement. R-factors based on F^2 are statistically about twice as large as those based on F, and R-factors based on ALL data will be even larger.

Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters ($Å^2$)

	x	*y*	*z*	U_{iso}*/U_{eq}
Li	−0.5000	−0.5000	1.0000	0.038 (4)
Ce1	−0.345982 (8)	−0.273486 (15)	0.201055 (12)	0.00556 (3)
Ce2	−0.191529 (11)	−0.5000	0.071345 (17)	0.00625 (4)
Ce3	−0.298077 (11)	0.0000	0.534154 (17)	0.00582 (4)
Ce4	0.0000	−0.5000	0.0000	0.00664 (5)
Mo1	−0.290730 (16)	−0.5000	0.74596 (2)	0.00368 (5)
Mo2	−0.401044 (12)	−0.33869 (2)	0.828637 (17)	0.00338 (4)
Mo3	−0.388827 (11)	−0.34166 (2)	0.551746 (17)	0.00319 (4)
Mo4	−0.000772 (11)	−0.31629 (2)	0.357312 (17)	0.00311 (4)
Mo5	−0.490663 (16)	−0.5000	0.35678 (2)	0.00316 (5)
O1	−0.17701 (15)	−0.5000	0.8112 (2)	0.0070 (4)
O2	−0.28523 (11)	−0.3349 (2)	0.88711 (16)	0.0064 (3)
O3	−0.10014 (11)	−0.6759 (2)	0.02198 (16)	0.0062 (3)
O4	−0.27246 (11)	−0.3355 (2)	0.60863 (16)	0.0059 (3)
O5	−0.38352 (11)	−0.1616 (2)	0.69257 (16)	0.0051 (3)
O6	0.00695 (16)	−0.5000	0.2346 (2)	0.0066 (4)
O7	−0.40015 (16)	−0.5000	0.9860 (2)	0.0067 (4)
O8	−0.38482 (10)	−0.1769 (2)	0.40574 (15)	0.0050 (3)
O9	0.0000	−0.5000	0.5000	0.0059 (6)
O10	−0.51815 (10)	−0.33622 (19)	0.79643 (16)	0.0050 (3)
O11	−0.37455 (15)	−0.5000	0.3998 (2)	0.0052 (4)
O12	−0.26903 (15)	−0.5000	0.2327 (2)	0.0063 (4)

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Li	0.007 (6)	0.070 (12)	0.037 (7)	0.000	0.005 (5)	0.000
Ce1	0.00563 (6)	0.00466 (5)	0.00630 (5)	0.00095 (4)	0.00106 (4)	0.00077 (3)
Ce2	0.00587 (9)	0.00703 (8)	0.00639 (6)	0.000	0.00251 (5)	0.000
Ce3	0.00568 (9)	0.00564 (7)	0.00553 (6)	0.000	−0.00025 (5)	0.000
Ce4	0.00575 (12)	0.00932 (11)	0.00530 (9)	0.000	0.00216 (7)	0.000
Mo1	0.00269 (12)	0.00349 (10)	0.00447 (9)	0.000	−0.00012 (7)	0.000
Mo2	0.00339 (9)	0.00276 (7)	0.00372 (6)	0.00000 (6)	0.00011 (5)	−0.00036 (5)
Mo3	0.00291 (9)	0.00265 (7)	0.00385 (6)	−0.00007 (6)	0.00036 (5)	0.00014 (5)
Mo4	0.00306 (9)	0.00221 (7)	0.00386 (6)	−0.00005 (6)	0.00029 (5)	−0.00010 (5)
Mo5	0.00309 (12)	0.00254 (10)	0.00372 (9)	0.000	0.00047 (7)	0.000
O1	0.0034 (11)	0.0067 (10)	0.0095 (9)	0.000	−0.0014 (7)	0.000
O2	0.0061 (8)	0.0056 (7)	0.0068 (6)	0.0004 (6)	−0.0004 (5)	−0.0021 (5)
O3	0.0073 (8)	0.0050 (7)	0.0063 (6)	0.0000 (6)	0.0010 (5)	0.0013 (5)
O4	0.0038 (8)	0.0062 (7)	0.0077 (6)	−0.0006 (6)	0.0010 (5)	0.0006 (5)
O5	0.0044 (8)	0.0043 (7)	0.0062 (6)	−0.0001 (6)	0.0006 (5)	0.0000 (5)
O6	0.0110 (12)	0.0039 (10)	0.0047 (8)	0.000	0.0013 (7)	0.000
O7	0.0089 (12)	0.0051 (10)	0.0058 (8)	0.000	0.0011 (7)	0.000
O8	0.0039 (8)	0.0051 (7)	0.0055 (6)	−0.0001 (6)	0.0000 (5)	0.0009 (5)
O9	0.0100 (17)	0.0036 (13)	0.0041 (11)	0.000	0.0014 (10)	0.000
O10	0.0037 (8)	0.0041 (7)	0.0073 (6)	−0.0001 (6)	0.0013 (5)	0.0000 (5)
O11	0.0046 (11)	0.0060 (10)	0.0053 (8)	0.000	0.0017 (7)	0.000
O12	0.0063 (12)	0.0063 (10)	0.0060 (8)	0.000	0.0002 (7)	0.000

Geometric parameters (Å, º)

Li—O7^i	1.861 (3)	Mo3—O11	2.0795 (16)
Li—O7	1.861 (3)	Mo3—O4	2.0860 (19)
Li—O10^{ii}	2.4135 (16)	Mo3—Mo3^{ii}	2.7338 (4)
Li—O10^{iii}	2.4135 (16)	Mo3—Mo4^v	2.7375 (3)
Li—O10^i	2.4135 (16)	Mo3—Mo5	2.7405 (3)
Li—O10	2.4135 (16)	Mo3—Mo4^{xv}	2.8391 (3)
Ce1—O3^{iv}	2.3603 (16)	Mo3—Mo5^{xiv}	2.8928 (3)
Ce1—O12	2.3916 (16)	Mo4—O6	2.0145 (14)
Ce1—O1^v	2.4055 (5)	Mo4—O8^{xvi}	2.0758 (19)
Ce1—O8	2.4159 (16)	Mo4—O5^v	2.0797 (19)
Ce1—O10^{vi}	2.5499 (19)	Mo4—O10^v	2.0857 (16)
Ce1—O4^v	2.7161 (18)	Mo4—O9	2.1141 (2)
Ce1—O2^v	2.874 (2)	Mo4—Mo2^v	2.6412 (3)
Ce1—O11	2.8865 (16)	Mo4—Mo5^{xvii}	2.7367 (2)
Ce1—O7^{vii}	2.8959 (17)	Mo4—Mo3^v	2.7375 (3)
Ce2—O12	2.337 (3)	Mo4—Mo4^{xviii}	2.7958 (3)
Ce2—O3^{ii}	2.3829 (19)	Mo4—Mo3^{xvi}	2.8391 (3)
Ce2—O3	2.3829 (19)	Mo4—Mo4^{ii}	3.1718 (4)
Ce2—O1^{vii}	2.622 (2)	Mo5—O11	2.078 (3)
Ce2—O2^{viii}	2.6352 (17)	Mo5—O10^{xiv}	2.0950 (16)
Ce2—O2^{vii}	2.6352 (17)	Mo5—O10^{vi}	2.0950 (16)
Ce2—O5^v	2.8054 (16)	Mo5—Mo4^{xix}	2.7367 (2)

Ce2—O5^{ix}	2.8054 (16)	Mo5—Mo4^{xv}	2.7367 (2)
Ce2—O2^{ix}	2.9625 (17)	Mo5—Mo3^{ii}	2.7405 (3)
Ce2—O2^{v}	2.9625 (17)	Mo5—Mo2^{xiv}	2.7691 (3)
Ce3—O12^{v}	2.360 (2)	Mo5—Mo2^{vi}	2.7691 (3)
Ce3—O8	2.3670 (17)	Mo5—Mo3^{xiv}	2.8928 (3)
Ce3—O8^{x}	2.3670 (17)	Mo5—Mo3^{vi}	2.8928 (3)
Ce3—O4^{v}	2.5309 (18)	Mo5—Mo5^{xiv}	2.9030 (5)
Ce3—O4^{xi}	2.5309 (18)	O1—Ce1^{v}	2.4055 (5)
Ce3—O5^{x}	2.7980 (17)	O1—Ce1^{ix}	2.4055 (5)
Ce3—O5	2.7980 (17)	O1—Ce2^{xx}	2.622 (2)
Ce3—O4^{x}	3.0001 (17)	O1—Ce3^{v}	3.325 (2)
Ce3—O4	3.0001 (17)	O2—Ce2^{xx}	2.6352 (17)
Ce3—O11^{v}	3.089 (3)	O2—Ce1^{v}	2.874 (2)
Ce4—O6^{xii}	2.280 (2)	O2—Ce2^{v}	2.9625 (17)
Ce4—O6	2.280 (2)	O3—Mo2^{ix}	2.0277 (16)
Ce4—O3	2.4244 (19)	O3—Ce1^{xxi}	2.3603 (16)
Ce4—O3^{xii}	2.4244 (19)	O4—Ce3^{v}	2.5309 (18)
Ce4—O3^{ii}	2.4244 (19)	O4—Ce1^{v}	2.7161 (18)
Ce4—O3^{xiii}	2.4244 (19)	O5—Mo4^{v}	2.0797 (19)
Mo1—O2	1.9759 (16)	O5—Ce2^{v}	2.8054 (16)
Mo1—O2^{ii}	1.9759 (16)	O6—Mo4^{ii}	2.0145 (14)
Mo1—O4^{ii}	2.0332 (17)	O7—Mo2^{ii}	2.0773 (16)
Mo1—O4	2.0332 (17)	O7—Ce1^{xx}	2.8959 (17)
Mo1—O1	2.045 (3)	O7—Ce1^{xxii}	2.8959 (17)
Mo1—Mo3^{ii}	2.7003 (3)	O8—Mo4^{xv}	2.0758 (19)
Mo1—Mo3	2.7003 (3)	O9—Mo4^{ii}	2.1141 (2)
Mo1—Mo2^{ii}	2.7129 (3)	O9—Mo4^{xviii}	2.1141 (2)
Mo1—Mo2	2.7129 (3)	O9—Mo4^{xxiii}	2.1141 (2)
Mo2—O3^{xi}	2.0277 (16)	O9—Ce3^{v}	3.6397 (2)
Mo2—O2	2.077 (2)	O9—Ce3^{xxiv}	3.6397 (2)
Mo2—O7	2.0773 (16)	O10—Mo4^{v}	2.0857 (16)
Mo2—O5	2.0985 (16)	O10—Mo5^{xiv}	2.0950 (16)
Mo2—O10	2.0997 (19)	O10—Ce1^{vi}	2.5499 (19)
Mo2—Mo4^{v}	2.6412 (3)	O11—Mo3^{ii}	2.0795 (16)
Mo2—Mo5^{xiv}	2.7691 (3)	O11—Ce1^{ii}	2.8865 (16)
Mo2—Mo3	2.7739 (2)	O11—Ce3^{v}	3.089 (3)
Mo2—Mo2^{ii}	2.7851 (4)	O12—Ce3^{v}	2.360 (2)
Mo3—O8	2.0315 (16)	O12—Ce1^{ii}	2.3916 (16)
Mo3—O5	2.0688 (16)		
O7^{i}—Li—O7	180.0	O2^{ii}—Mo1—Mo2	95.29 (6)
O7^{i}—Li—O10^{ii}	95.41 (7)	O4^{ii}—Mo1—Mo2	142.46 (6)
O7—Li—O10^{ii}	84.59 (7)	O4—Mo1—Mo2	94.36 (5)
O7^{i}—Li—O10^{iii}	84.59 (7)	O1—Mo1—Mo2	132.72 (5)
O7—Li—O10^{iii}	95.41 (7)	Mo3^{ii}—Mo1—Mo2	92.568 (10)
O10^{ii}—Li—O10^{iii}	180.0	Mo3—Mo1—Mo2	61.651 (7)
O7^{i}—Li—O10^{i}	84.59 (7)	Mo2^{ii}—Mo1—Mo2	61.767 (10)
O7—Li—O10^{i}	95.41 (7)	O2—Mo1—Ce2^{xx}	52.36 (5)
O10^{ii}—Li—O10^{i}	108.28 (8)	O2^{ii}—Mo1—Ce2^{xx}	52.36 (5)

$O10^{iii}$—Li—$O10^{i}$	71.72 (8)	$O4^{ii}$—Mo1—$Ce2^{xx}$	120.27 (5)
$O7^{i}$—Li—O10	95.41 (7)	O4—Mo1—$Ce2^{xx}$	120.27 (5)
O7—Li—O10	84.59 (7)	O1—Mo1—$Ce2^{xx}$	52.01 (7)
$O10^{ii}$—Li—O10	71.72 (8)	$Mo3^{ii}$—Mo1—$Ce2^{xx}$	145.707 (6)
$O10^{iii}$—Li—O10	108.28 (8)	Mo3—Mo1—$Ce2^{xx}$	145.707 (6)
$O10^{i}$—Li—O10	180.000 (1)	$Mo2^{ii}$—Mo1—$Ce2^{xx}$	90.187 (8)
$O7^{i}$—Li—Mo2	138.20 (5)	Mo2—Mo1—$Ce2^{xx}$	90.187 (8)
O7—Li—Mo2	41.80 (5)	O2—Mo1—$Ce1^{v}$	57.59 (6)
$O10^{ii}$—Li—Mo2	78.79 (4)	$O2^{ii}$—Mo1—$Ce1^{v}$	117.78 (5)
$O10^{iii}$—Li—Mo2	101.21 (4)	$O4^{ii}$—Mo1—$Ce1^{v}$	111.62 (5)
$O10^{i}$—Li—Mo2	136.78 (4)	O4—Mo1—$Ce1^{v}$	53.03 (5)
O10—Li—Mo2	43.22 (4)	O1—Mo1—$Ce1^{v}$	44.290 (8)
$O7^{i}$—Li—$Mo2^{i}$	41.80 (5)	$Mo3^{ii}$—Mo1—$Ce1^{v}$	144.943 (9)
O7—Li—$Mo2^{i}$	138.20 (5)	Mo3—Mo1—$Ce1^{v}$	96.635 (6)
$O10^{ii}$—Li—$Mo2^{i}$	101.21 (4)	$Mo2^{ii}$—Mo1—$Ce1^{v}$	151.707 (9)
$O10^{iii}$—Li—$Mo2^{i}$	78.79 (4)	Mo2—Mo1—$Ce1^{v}$	99.651 (5)
$O10^{i}$—Li—$Mo2^{i}$	43.22 (4)	$Ce2^{xx}$—Mo1—$Ce1^{v}$	67.487 (5)
O10—Li—$Mo2^{i}$	136.78 (4)	O2—Mo1—$Ce1^{ix}$	117.78 (5)
$Mo2$—Li—$Mo2^{i}$	180.000 (6)	$O2^{ii}$—Mo1—$Ce1^{ix}$	57.59 (6)
$O7^{i}$—Li—$Mo2^{ii}$	138.20 (5)	$O4^{ii}$—Mo1—$Ce1^{ix}$	53.03 (5)
O7—Li—$Mo2^{ii}$	41.80 (5)	O4—Mo1—$Ce1^{ix}$	111.62 (5)
$O10^{ii}$—Li—$Mo2^{ii}$	43.22 (4)	O1—Mo1—$Ce1^{ix}$	44.290 (8)
$O10^{iii}$—Li—$Mo2^{ii}$	136.78 (4)	$Mo3^{ii}$—Mo1—$Ce1^{ix}$	96.635 (6)
$O10^{i}$—Li—$Mo2^{ii}$	101.21 (4)	Mo3—Mo1—$Ce1^{ix}$	144.943 (9)
O10—Li—$Mo2^{ii}$	78.79 (4)	$Mo2^{ii}$—Mo1—$Ce1^{ix}$	99.651 (5)
$Mo2$—Li—$Mo2^{ii}$	54.260 (7)	Mo2—Mo1—$Ce1^{ix}$	151.707 (9)
$Mo2^{i}$—Li—$Mo2^{ii}$	125.740 (7)	$Ce2^{xx}$—Mo1—$Ce1^{ix}$	67.487 (5)
$O7^{i}$—Li—$Mo2^{iii}$	41.80 (5)	$Ce1^{v}$—Mo1—$Ce1^{ix}$	87.964 (8)
O7—Li—$Mo2^{iii}$	138.20 (5)	$O3^{xi}$—Mo2—O2	86.18 (7)
$O10^{ii}$—Li—$Mo2^{iii}$	136.78 (4)	$O3^{xi}$—Mo2—O7	85.95 (6)
$O10^{iii}$—Li—$Mo2^{iii}$	43.22 (4)	O2—Mo2—O7	87.51 (9)
$O10^{i}$—Li—$Mo2^{iii}$	78.79 (4)	$O3^{xi}$—Mo2—O5	88.61 (7)
O10—Li—$Mo2^{iii}$	101.21 (4)	O2—Mo2—O5	83.17 (7)
$Mo2$—Li—$Mo2^{iii}$	125.740 (7)	O7—Mo2—O5	169.50 (9)
$Mo2^{i}$—Li—$Mo2^{iii}$	54.260 (7)	$O3^{xi}$—Mo2—O10	87.58 (7)
$Mo2^{ii}$—Li—$Mo2^{iii}$	180.0	O2—Mo2—O10	172.63 (6)
$O7^{i}$—Li—$Ce1^{xx}$	128.23 (5)	O7—Mo2—O10	88.14 (9)
O7—Li—$Ce1^{xx}$	51.77 (5)	O5—Mo2—O10	100.61 (7)
$O10^{ii}$—Li—$Ce1^{xx}$	135.89 (4)	$O3^{xi}$—Mo2—$Mo4^{v}$	92.95 (5)
$O10^{iii}$—Li—$Ce1^{xx}$	44.11 (4)	O2—Mo2—$Mo4^{v}$	133.64 (5)
$O10^{i}$—Li—$Ce1^{xx}$	84.80 (4)	O7—Mo2—$Mo4^{v}$	138.74 (8)
O10—Li—$Ce1^{xx}$	95.20 (4)	O5—Mo2—$Mo4^{v}$	50.48 (5)
$Mo2$—Li—$Ce1^{xx}$	64.780 (4)	O10—Mo2—$Mo4^{v}$	50.64 (4)
$Mo2^{i}$—Li—$Ce1^{xx}$	115.220 (4)	$O3^{xi}$—Mo2—Mo1	132.54 (6)
$Mo2^{ii}$—Li—$Ce1^{xx}$	93.573 (4)	O2—Mo2—Mo1	46.41 (5)
$Mo2^{iii}$—Li—$Ce1^{xx}$	86.427 (4)	O7—Mo2—Mo1	89.31 (7)
$O7^{i}$—Li—$Ce1^{xiv}$	51.77 (5)	O5—Mo2—Mo1	87.76 (5)
O7—Li—$Ce1^{xiv}$	128.23 (5)	O10—Mo2—Mo1	139.47 (5)
$O10^{ii}$—Li—$Ce1^{xiv}$	44.11 (4)	$Mo4^{v}$—Mo2—Mo1	119.623 (9)

O10ⁱⁱⁱ—Li—Ce1ˣⁱᵛ	135.89 (4)	O3ˣⁱ—Mo2—Mo5ˣⁱᵛ	136.18 (6)
O10ⁱ—Li—Ce1ˣⁱᵛ	95.20 (4)	O2—Mo2—Mo5ˣⁱᵛ	137.57 (5)
O10—Li—Ce1ˣⁱᵛ	84.80 (4)	O7—Mo2—Mo5ˣⁱᵛ	92.57 (6)
Mo2—Li—Ce1ˣⁱᵛ	115.220 (4)	O5—Mo2—Mo5ˣⁱᵛ	97.57 (5)
Mo2ⁱ—Li—Ce1ˣⁱᵛ	64.780 (4)	O10—Mo2—Mo5ˣⁱᵛ	48.62 (4)
Mo2ⁱⁱ—Li—Ce1ˣⁱᵛ	86.427 (4)	Mo4ᵛ—Mo2—Mo5ˣⁱᵛ	60.718 (6)
Mo2ⁱⁱⁱ—Li—Ce1ˣⁱᵛ	93.573 (4)	Mo1—Mo2—Mo5ˣⁱᵛ	91.153 (9)
Ce1ˣˣ—Li—Ce1ˣⁱᵛ	180.000 (3)	O3ˣⁱ—Mo2—Mo3	136.41 (5)
O3ⁱᵛ—Ce1—O12	122.15 (7)	O2—Mo2—Mo3	89.08 (4)
O3ⁱᵛ—Ce1—O1ᵛ	69.32 (7)	O7—Mo2—Mo3	137.13 (4)
O12—Ce1—O1ᵛ	134.79 (8)	O5—Mo2—Mo3	47.81 (4)
O3ⁱᵛ—Ce1—O8	120.66 (6)	O10—Mo2—Mo3	98.15 (4)
O12—Ce1—O8	116.24 (7)	Mo4ᵛ—Mo2—Mo3	60.674 (7)
O1ᵛ—Ce1—O8	77.76 (7)	Mo1—Mo2—Mo3	58.951 (7)
O3ⁱᵛ—Ce1—O10ᵛⁱ	82.31 (6)	Mo5ˣⁱᵛ—Mo2—Mo3	62.917 (8)
O12—Ce1—O10ᵛⁱ	111.96 (7)	O3ˣⁱ—Mo2—Mo2ⁱⁱ	133.86 (5)
O1ᵛ—Ce1—O10ᵛⁱ	112.96 (7)	O2—Mo2—Mo2ⁱⁱ	90.91 (5)
O8—Ce1—O10ᵛⁱ	66.91 (6)	O7—Mo2—Mo2ⁱⁱ	47.91 (4)
O3ⁱᵛ—Ce1—O4ᵛ	129.24 (6)	O5—Mo2—Mo2ⁱⁱ	136.76 (4)
O12—Ce1—O4ᵛ	80.26 (6)	O10—Mo2—Mo2ⁱⁱ	90.58 (5)
O1ᵛ—Ce1—O4ᵛ	64.64 (7)	Mo4ᵛ—Mo2—Mo2ⁱⁱ	120.433 (6)
O8—Ce1—O4ᵛ	68.88 (6)	Mo1—Mo2—Mo2ⁱⁱ	59.117 (5)
O10ᵛⁱ—Ce1—O4ᵛ	134.92 (5)	Mo5ˣⁱᵛ—Mo2—Mo2ⁱⁱ	59.809 (5)
O3ⁱᵛ—Ce1—O2ᵛ	79.48 (6)	Mo3—Mo2—Mo2ⁱⁱ	89.470 (5)
O12—Ce1—O2ᵛ	78.39 (7)	O3ˣⁱ—Mo2—Li	80.52 (5)
O1ᵛ—Ce1—O2ᵛ	59.97 (7)	O2—Mo2—Li	122.93 (5)
O8—Ce1—O2ᵛ	123.24 (5)	O7—Mo2—Li	36.66 (8)
O10ᵛⁱ—Ce1—O2ᵛ	161.79 (5)	O5—Mo2—Li	150.49 (5)
O4ᵛ—Ce1—O2ᵛ	59.85 (5)	O10—Mo2—Li	51.92 (4)
O3ⁱᵛ—Ce1—O11	140.28 (7)	Mo4ᵛ—Mo2—Li	102.456 (8)
O12—Ce1—O11	62.84 (7)	Mo1—Mo2—Li	119.677 (7)
O1ᵛ—Ce1—O11	139.21 (6)	Mo5ˣⁱᵛ—Mo2—Li	72.991 (7)
O8—Ce1—O11	62.94 (5)	Mo3—Mo2—Li	135.603 (8)
O10ᵛⁱ—Ce1—O11	62.26 (6)	Mo2ⁱⁱ—Mo2—Li	62.870 (4)
O4ᵛ—Ce1—O11	90.07 (6)	O3ˣⁱ—Mo2—Ce2ᵛ	43.12 (5)
O2ᵛ—Ce1—O11	134.84 (6)	O2—Mo2—Ce2ᵛ	59.43 (5)
O3ⁱᵛ—Ce1—O7ᵛⁱⁱ	63.38 (5)	O7—Mo2—Ce2ᵛ	115.69 (5)
O12—Ce1—O7ᵛⁱⁱ	69.19 (7)	O5—Mo2—Ce2ᵛ	55.05 (4)
O1ᵛ—Ce1—O7ᵛⁱⁱ	131.52 (6)	O10—Mo2—Ce2ᵛ	117.60 (5)
O8—Ce1—O7ᵛⁱⁱ	136.39 (7)	Mo4ᵛ—Mo2—Ce2ᵛ	89.410 (7)
O10ᵛⁱ—Ce1—O7ᵛⁱⁱ	71.23 (7)	Mo1—Mo2—Ce2ᵛ	99.782 (8)
O4ᵛ—Ce1—O7ᵛⁱⁱ	146.86 (6)	Mo5ˣⁱᵛ—Mo2—Ce2ᵛ	149.571 (7)
O2ᵛ—Ce1—O7ᵛⁱⁱ	100.38 (6)	Mo3—Mo2—Ce2ᵛ	98.774 (7)
O11—Ce1—O7ᵛⁱⁱ	87.29 (5)	Mo2ⁱⁱ—Mo2—Ce2ᵛ	148.794 (4)
O3ⁱᵛ—Ce1—Mo1ᵛ	92.59 (5)	Li—Mo2—Ce2ᵛ	123.174 (6)
O12—Ce1—Mo1ᵛ	98.83 (5)	O8—Mo3—O5	86.67 (6)
O1ᵛ—Ce1—Mo1ᵛ	36.42 (6)	O8—Mo3—O11	85.73 (6)
O8—Ce1—Mo1ᵛ	88.19 (4)	O5—Mo3—O11	167.88 (8)
O10ᵛⁱ—Ce1—Mo1ᵛ	146.49 (4)	O8—Mo3—O4	89.16 (7)

O4ᵛ—Ce1—Mo1ᵛ	36.73 (4)	O5—Mo3—O4	84.24 (7)
O2ᵛ—Ce1—Mo1ᵛ	35.48 (3)	O11—Mo3—O4	86.22 (9)
O11—Ce1—Mo1ᵛ	126.78 (5)	O8—Mo3—Mo1	137.36 (5)
O7ᵛⁱⁱ—Ce1—Mo1ᵛ	135.15 (5)	O5—Mo3—Mo1	88.70 (5)
O3ⁱᵛ—Ce1—Mo4ˣᵛ	96.09 (5)	O11—Mo3—Mo1	90.50 (6)
O12—Ce1—Mo4ˣᵛ	128.25 (6)	O4—Mo3—Mo1	48.20 (5)
O1ᵛ—Ce1—Mo4ˣᵛ	88.36 (6)	O8—Mo3—Mo3ⁱⁱ	134.44 (5)
O8—Ce1—Mo4ˣᵛ	34.03 (4)	O5—Mo3—Mo3ⁱⁱ	138.70 (4)
O10ᵛⁱ—Ce1—Mo4ˣᵛ	34.97 (4)	O11—Mo3—Mo3ⁱⁱ	48.91 (4)
O4ᵛ—Ce1—Mo4ˣᵛ	102.68 (4)	O4—Mo3—Mo3ⁱⁱ	91.45 (5)
O2ᵛ—Ce1—Mo4ˣᵛ	147.69 (3)	Mo1—Mo3—Mo3ⁱⁱ	59.590 (5)
O11—Ce1—Mo4ˣᵛ	65.48 (4)	O8—Mo3—Mo4ᵛ	91.12 (5)
O7ᵛⁱⁱ—Ce1—Mo4ˣᵛ	106.14 (6)	O5—Mo3—Mo4ᵛ	48.88 (5)
Mo1ᵛ—Ce1—Mo4ˣᵛ	114.039 (6)	O11—Mo3—Mo4ᵛ	140.67 (7)
O3ⁱᵛ—Ce1—Mo2ᵛⁱⁱ	31.40 (4)	O4—Mo3—Mo4ᵛ	132.99 (5)
O12—Ce1—Mo2ᵛⁱⁱ	92.04 (5)	Mo1—Mo3—Mo4ᵛ	116.662 (9)
O1ᵛ—Ce1—Mo2ᵛⁱⁱ	96.68 (5)	Mo3ⁱⁱ—Mo3—Mo4ᵛ	119.873 (6)
O8—Ce1—Mo2ᵛⁱⁱ	145.48 (4)	O8—Mo3—Mo5	88.64 (5)
O10ᵛⁱ—Ce1—Mo2ᵛⁱⁱ	84.91 (3)	O5—Mo3—Mo5	140.47 (5)
O4ᵛ—Ce1—Mo2ᵛⁱⁱ	139.49 (4)	O11—Mo3—Mo5	48.74 (7)
O2ᵛ—Ce1—Mo2ᵛⁱⁱ	79.64 (3)	O4—Mo3—Mo5	134.94 (5)
O11—Ce1—Mo2ᵛⁱⁱ	121.66 (4)	Mo1—Mo3—Mo5	119.660 (8)
O7ᵛⁱⁱ—Ce1—Mo2ᵛⁱⁱ	34.91 (3)	Mo3ⁱⁱ—Mo3—Mo5	60.081 (5)
Mo1ᵛ—Ce1—Mo2ᵛⁱⁱ	107.584 (6)	Mo4ᵛ—Mo3—Mo5	92.056 (9)
Mo4ˣᵛ—Ce1—Mo2ᵛⁱⁱ	112.839 (6)	O8—Mo3—Mo2	135.01 (5)
O12—Ce2—O3ⁱⁱ	133.58 (5)	O5—Mo3—Mo2	48.73 (4)
O12—Ce2—O3	133.58 (5)	O11—Mo3—Mo2	139.20 (4)
O3ⁱⁱ—Ce2—O3	79.20 (9)	O4—Mo3—Mo2	91.42 (4)
O12—Ce2—O1ᵛⁱⁱ	149.28 (9)	Mo1—Mo3—Mo2	59.398 (8)
O3ⁱⁱ—Ce2—O1ᵛⁱⁱ	65.37 (6)	Mo3ⁱⁱ—Mo3—Mo2	90.530 (5)
O3—Ce2—O1ᵛⁱⁱ	65.37 (6)	Mo4ᵛ—Mo3—Mo2	57.266 (7)
O12—Ce2—O2ᵛⁱⁱⁱ	93.73 (7)	Mo5—Mo3—Mo2	120.425 (10)
O3ⁱⁱ—Ce2—O2ᵛⁱⁱⁱ	126.07 (5)	O8—Mo3—Mo4ˣᵛ	46.92 (5)
O3—Ce2—O2ᵛⁱⁱⁱ	84.21 (6)	O5—Mo3—Mo4ˣᵛ	90.84 (5)
O1ᵛⁱⁱ—Ce2—O2ᵛⁱⁱⁱ	61.04 (6)	O11—Mo3—Mo4ˣᵛ	90.85 (6)
O12—Ce2—O2ᵛⁱⁱ	93.73 (7)	O4—Mo3—Mo4ˣᵛ	136.07 (5)
O3ⁱⁱ—Ce2—O2ᵛⁱⁱ	84.21 (6)	Mo1—Mo3—Mo4ˣᵛ	175.622 (10)
O3—Ce2—O2ᵛⁱⁱ	126.07 (5)	Mo3ⁱⁱ—Mo3—Mo4ˣᵛ	118.702 (5)
O1ᵛⁱⁱ—Ce2—O2ᵛⁱⁱ	61.04 (6)	Mo4ᵛ—Mo3—Mo4ˣᵛ	60.145 (7)
O2ᵛⁱⁱⁱ—Ce2—O2ᵛⁱⁱ	65.50 (7)	Mo5—Mo3—Mo4ˣᵛ	58.713 (6)
O12—Ce2—O5ᵛ	72.64 (6)	Mo2—Mo3—Mo4ˣᵛ	117.351 (9)
O3ⁱⁱ—Ce2—O5ᵛ	66.93 (5)	O8—Mo3—Mo5ˣⁱᵛ	133.82 (5)
O3—Ce2—O5ᵛ	104.01 (6)	O5—Mo3—Mo5ˣⁱᵛ	94.57 (5)
O1ᵛⁱⁱ—Ce2—O5ᵛ	132.27 (6)	O11—Mo3—Mo5ˣⁱᵛ	97.51 (6)
O2ᵛⁱⁱⁱ—Ce2—O5ᵛ	166.30 (5)	O4—Mo3—Mo5ˣⁱᵛ	136.95 (5)
O2ᵛⁱⁱ—Ce2—O5ᵛ	115.69 (5)	Mo1—Mo3—Mo5ˣⁱᵛ	88.790 (9)
O12—Ce2—O5ⁱˣ	72.64 (6)	Mo3ⁱⁱ—Mo3—Mo5ˣⁱᵛ	61.803 (5)
O3ⁱⁱ—Ce2—O5ⁱˣ	104.01 (6)	Mo4ᵛ—Mo3—Mo5ˣⁱᵛ	58.087 (6)
O3—Ce2—O5ⁱˣ	66.93 (5)	Mo5—Mo3—Mo5ˣⁱᵛ	61.970 (9)

O1[vii]—Ce2—O5[ix]	132.27 (6)	Mo2—Mo3—Mo5[xiv]	58.461 (7)
O2[viii]—Ce2—O5[ix]	115.69 (5)	Mo4[xv]—Mo3—Mo5[xiv]	86.906 (8)
O2[vii]—Ce2—O5[ix]	166.30 (5)	O8—Mo3—Ce3	42.95 (5)
O5[v]—Ce2—O5[ix]	59.64 (7)	O5—Mo3—Ce3	55.13 (5)
O12—Ce2—O2[ix]	77.39 (4)	O11—Mo3—Ce3	113.38 (5)
O3[ii]—Ce2—O2[ix]	140.99 (6)	O4—Mo3—Ce3	60.69 (5)
O3—Ce2—O2[ix]	62.17 (6)	Mo1—Mo3—Ce3	102.416 (8)
O1[vii]—Ce2—O2[ix]	100.42 (3)	Mo3[ii]—Mo3—Ce3	149.964 (5)
O2[viii]—Ce2—O2[ix]	58.34 (6)	Mo4[v]—Mo3—Ce3	89.212 (7)
O2[vii]—Ce2—O2[ix]	122.06 (3)	Mo5—Mo3—Ce3	131.587 (7)
O5[v]—Ce2—O2[ix]	115.54 (5)	Mo2—Mo3—Ce3	100.481 (7)
O5[ix]—Ce2—O2[ix]	57.35 (5)	Mo4[xv]—Mo3—Ce3	80.844 (7)
O12—Ce2—O2[v]	77.39 (4)	Mo5[xiv]—Mo3—Ce3	146.743 (8)
O3[ii]—Ce2—O2[v]	62.17 (6)	O6—Mo4—O8[xvi]	85.31 (9)
O3—Ce2—O2[v]	140.99 (6)	O6—Mo4—O5[v]	89.00 (9)
O1[vii]—Ce2—O2[v]	100.42 (3)	O8[xvi]—Mo4—O5[v]	173.10 (7)
O2[viii]—Ce2—O2[v]	122.06 (3)	O6—Mo4—O10[v]	91.20 (7)
O2[vii]—Ce2—O2[v]	58.34 (6)	O8[xvi]—Mo4—O10[v]	82.35 (7)
O5[v]—Ce2—O2[v]	57.35 (5)	O5[v]—Mo4—O10[v]	101.70 (7)
O5[ix]—Ce2—O2[v]	115.54 (5)	O6—Mo4—O9	79.29 (5)
O2[ix]—Ce2—O2[v]	154.73 (7)	O8[xvi]—Mo4—O9	87.84 (5)
O12—Ce2—Mo1[vii]	111.35 (6)	O5[v]—Mo4—O9	87.27 (4)
O3[ii]—Ce2—Mo1[vii]	94.00 (4)	O10[v]—Mo4—O9	166.89 (5)
O3—Ce2—Mo1[vii]	94.00 (4)	O6—Mo4—Mo2[v]	96.21 (6)
O1[vii]—Ce2—Mo1[vii]	37.93 (6)	O8[xvi]—Mo4—Mo2[v]	133.42 (5)
O2[viii]—Ce2—Mo1[vii]	36.42 (4)	O5[v]—Mo4—Mo2[v]	51.11 (4)
O2[vii]—Ce2—Mo1[vii]	36.42 (4)	O10[v]—Mo4—Mo2[v]	51.11 (5)
O5[v]—Ce2—Mo1[vii]	150.15 (3)	O9—Mo4—Mo2[v]	138.338 (10)
O5[ix]—Ce2—Mo1[vii]	150.15 (3)	O6—Mo4—Mo5[xvii]	140.45 (5)
O2[ix]—Ce2—Mo1[vii]	93.84 (3)	O8[xvi]—Mo4—Mo5[xvii]	87.85 (5)
O2[v]—Ce2—Mo1[vii]	93.84 (3)	O5[v]—Mo4—Mo5[xvii]	99.03 (5)
O12—Ce2—Mo2[v]	98.05 (3)	O10[v]—Mo4—Mo5[xvii]	49.26 (5)
O3[ii]—Ce2—Mo2[v]	35.57 (4)	O9—Mo4—Mo5[xvii]	139.345 (9)
O3—Ce2—Mo2[v]	106.07 (5)	Mo2[v]—Mo4—Mo5[xvii]	61.952 (8)
O1[vii]—Ce2—Mo2[v]	97.73 (3)	O6—Mo4—Mo3[v]	137.41 (8)
O2[viii]—Ce2—Mo2[v]	150.68 (4)	O8[xvi]—Mo4—Mo3[v]	136.74 (4)
O2[vii]—Ce2—Mo2[v]	86.93 (4)	O5[v]—Mo4—Mo3[v]	48.54 (5)
O5[v]—Ce2—Mo2[v]	37.81 (3)	O10[v]—Mo4—Mo3[v]	99.64 (5)
O5[ix]—Ce2—Mo2[v]	93.48 (4)	O9—Mo4—Mo3[v]	93.467 (8)
O2[ix]—Ce2—Mo2[v]	150.67 (3)	Mo2[v]—Mo4—Mo3[v]	62.060 (7)
O2[v]—Ce2—Mo2[v]	37.12 (4)	Mo5[xvii]—Mo4—Mo3[v]	63.801 (8)
Mo1[vii]—Ce2—Mo2[v]	114.434 (4)	O6—Mo4—Mo4[xviii]	127.74 (5)
O12[v]—Ce3—O8	132.16 (5)	O8[xvi]—Mo4—Mo4[xviii]	88.58 (4)
O12[v]—Ce3—O8[x]	132.16 (5)	O5[v]—Mo4—Mo4[xviii]	91.83 (4)
O8—Ce3—O8[x]	80.35 (8)	O10[v]—Mo4—Mo4[xviii]	139.18 (4)
O12[v]—Ce3—O4[v]	108.37 (7)	O9—Mo4—Mo4[xviii]	48.606 (5)
O8—Ce3—O4[v]	72.90 (6)	Mo2[v]—Mo4—Mo4[xviii]	123.722 (10)
O8[x]—Ce3—O4[v]	115.46 (5)	Mo5[xvii]—Mo4—Mo4[xviii]	90.884 (6)
O12[v]—Ce3—O4[xi]	108.37 (7)	Mo3[v]—Mo4—Mo4[xviii]	61.730 (7)

O8—Ce3—O4^{xi}	115.46 (5)	O6—Mo4—Mo3^{xvi}	130.47 (8)
O8^x—Ce3—O4^{xi}	72.90 (6)	O8^{xvi}—Mo4—Mo3^{xvi}	45.63 (4)
O4^v—Ce3—O4^{xi}	68.25 (8)	O5^v—Mo4—Mo3^{xvi}	139.29 (4)
O12^v—Ce3—O5^x	72.46 (7)	O10^v—Mo4—Mo3^{xvi}	88.72 (5)
O8—Ce3—O5^x	103.13 (6)	O9—Mo4—Mo3^{xvi}	90.635 (7)
O8^x—Ce3—O5^x	65.41 (5)	Mo2^v—Mo4—Mo3^{xvi}	120.793 (9)
O4^v—Ce3—O5^x	175.45 (6)	Mo5^{xvii}—Mo4—Mo3^{xvi}	58.843 (8)
O4^{xi}—Ce3—O5^x	115.94 (5)	Mo3^v—Mo4—Mo3^{xvi}	91.111 (9)
O12^v—Ce3—O5	72.47 (7)	Mo4^{xviii}—Mo4—Mo3^{xvi}	58.125 (7)
O8—Ce3—O5	65.41 (5)	O6—Mo4—Mo4ⁱⁱ	38.07 (5)
O8^x—Ce3—O5	103.13 (6)	O8^{xvi}—Mo4—Mo4ⁱⁱ	88.38 (5)
O4^v—Ce3—O5	115.94 (5)	O5^v—Mo4—Mo4ⁱⁱ	84.74 (5)
O4^{xi}—Ce3—O5	175.45 (6)	O10^v—Mo4—Mo4ⁱⁱ	129.14 (5)
O5^x—Ce3—O5	59.82 (7)	O9—Mo4—Mo4ⁱⁱ	41.395 (5)
O12^v—Ce3—O4^x	74.97 (3)	Mo2^v—Mo4—Mo4ⁱⁱ	120.433 (6)
O8—Ce3—O4^x	143.69 (6)	Mo5^{xvii}—Mo4—Mo4ⁱⁱ	176.099 (7)
O8^x—Ce3—O4^x	63.90 (5)	Mo3^v—Mo4—Mo4ⁱⁱ	119.873 (6)
O4^v—Ce3—O4^x	127.22 (4)	Mo4^{xviii}—Mo4—Mo4ⁱⁱ	90.0
O4^{xi}—Ce3—O4^x	61.42 (6)	Mo3^{xvi}—Mo4—Mo4ⁱⁱ	118.702 (5)
O5^x—Ce3—O4^x	57.32 (5)	O6—Mo4—Ce1^{xvi}	75.70 (7)
O5—Ce3—O4^x	115.02 (5)	O8^{xvi}—Mo4—Ce1^{xvi}	40.64 (4)
O12^v—Ce3—O4	74.97 (3)	O5^v—Mo4—Ce1^{xvi}	141.03 (4)
O8—Ce3—O4	63.90 (5)	O10^v—Mo4—Ce1^{xvi}	44.48 (5)
O8^x—Ce3—O4	143.69 (6)	O9—Mo4—Ce1^{xvi}	123.412 (8)
O4^v—Ce3—O4	61.42 (6)	Mo2^v—Mo4—Ce1^{xvi}	94.531 (7)
O4^{xi}—Ce3—O4	127.22 (3)	Mo5^{xvii}—Mo4—Ce1^{xvi}	73.927 (8)
O5^x—Ce3—O4	115.02 (5)	Mo3^v—Mo4—Ce1^{xvi}	137.453 (8)
O5—Ce3—O4	57.32 (5)	Mo4^{xviii}—Mo4—Ce1^{xvi}	125.945 (10)
O4^x—Ce3—O4	149.80 (6)	Mo3^{xvi}—Mo4—Ce1^{xvi}	70.101 (6)
O12^v—Ce3—O11^v	59.67 (8)	Mo4ⁱⁱ—Mo4—Ce1^{xvi}	102.511 (4)
O8—Ce3—O11^v	130.85 (5)	O11—Mo5—O10^{xiv}	85.23 (7)
O8^x—Ce3—O11^v	130.85 (5)	O11—Mo5—O10^{vi}	85.23 (7)
O4^v—Ce3—O11^v	59.89 (5)	O10^{xiv}—Mo5—O10^{vi}	84.89 (9)
O4^{xi}—Ce3—O11^v	59.89 (5)	O11—Mo5—Mo4^{xix}	93.800 (8)
O5^x—Ce3—O11^v	123.33 (5)	O10^{xiv}—Mo5—Mo4^{xix}	48.96 (4)
O5—Ce3—O11^v	123.33 (5)	O10^{vi}—Mo5—Mo4^{xix}	133.64 (5)
O4^x—Ce3—O11^v	81.27 (4)	O11—Mo5—Mo4^{xv}	93.800 (8)
O4—Ce3—O11^v	81.27 (4)	O10^{xiv}—Mo5—Mo4^{xv}	133.64 (5)
O12^v—Ce3—O1^v	157.12 (8)	O10^{vi}—Mo5—Mo4^{xv}	48.96 (4)
O8—Ce3—O1^v	61.54 (5)	Mo4^{xix}—Mo5—Mo4^{xv}	172.199 (15)
O8^x—Ce3—O1^v	61.54 (5)	O11—Mo5—Mo3	48.79 (4)
O4^v—Ce3—O1^v	53.99 (5)	O10^{xiv}—Mo5—Mo3	134.00 (5)
O4^{xi}—Ce3—O1^v	53.99 (5)	O10^{vi}—Mo5—Mo3	91.23 (5)
O5^x—Ce3—O1^v	126.41 (5)	Mo4^{xix}—Mo5—Mo3	122.183 (10)
O5—Ce3—O1^v	126.41 (5)	Mo4^{xv}—Mo5—Mo3	62.444 (6)
O4^x—Ce3—O1^v	103.27 (3)	O11—Mo5—Mo3ⁱⁱ	48.79 (4)
O4—Ce3—O1^v	103.27 (3)	O10^{xiv}—Mo5—Mo3ⁱⁱ	91.23 (5)
O11^v—Ce3—O1^v	97.45 (6)	O10^{vi}—Mo5—Mo3ⁱⁱ	134.00 (5)
O12^v—Ce3—Mo3	96.37 (3)	Mo4^{xix}—Mo5—Mo3ⁱⁱ	62.444 (6)

O8—Ce3—Mo3	35.79 (4)	Mo4^{xv}—Mo5—Mo3^{ii}	122.183 (10)
O8^{x}—Ce3—Mo3	107.81 (4)	Mo3—Mo5—Mo3^{ii}	59.838 (9)
O4^{v}—Ce3—Mo3	81.55 (4)	O11—Mo5—Mo2^{xiv}	133.96 (4)
O4^{xi}—Ce3—Mo3	145.52 (4)	O10^{xiv}—Mo5—Mo2^{xiv}	48.76 (5)
O5^{x}—Ce3—Mo3	93.92 (4)	O10^{vi}—Mo5—Mo2^{xiv}	91.12 (5)
O5—Ce3—Mo3	37.35 (3)	Mo4^{xix}—Mo5—Mo2^{xiv}	57.330 (6)
O4^{x}—Ce3—Mo3	151.21 (4)	Mo4^{xv}—Mo5—Mo2^{xiv}	117.621 (10)
O4—Ce3—Mo3	37.32 (4)	Mo3—Mo5—Mo2^{xiv}	176.566 (12)
O11^{v}—Ce3—Mo3	118.510 (8)	Mo3^{ii}—Mo5—Mo2^{xiv}	119.773 (6)
O1^{v}—Ce3—Mo3	95.02 (2)	O11—Mo5—Mo2^{vi}	133.96 (4)
O12^{v}—Ce3—Mo3^{x}	96.37 (3)	O10^{xiv}—Mo5—Mo2^{vi}	91.12 (5)
O8—Ce3—Mo3^{x}	107.81 (4)	O10^{vi}—Mo5—Mo2^{vi}	48.76 (5)
O8^{x}—Ce3—Mo3^{x}	35.79 (4)	Mo4^{xix}—Mo5—Mo2^{vi}	117.621 (10)
O4^{v}—Ce3—Mo3^{x}	145.52 (4)	Mo4^{xv}—Mo5—Mo2^{vi}	57.330 (6)
O4^{xi}—Ce3—Mo3^{x}	81.55 (4)	Mo3—Mo5—Mo2^{vi}	119.773 (6)
O5^{x}—Ce3—Mo3^{x}	37.35 (3)	Mo3^{ii}—Mo5—Mo2^{vi}	176.566 (12)
O5—Ce3—Mo3^{x}	93.92 (4)	Mo2^{xiv}—Mo5—Mo2^{vi}	60.381 (9)
O4^{x}—Ce3—Mo3^{x}	37.32 (4)	O11—Mo5—Mo3^{xiv}	138.63 (4)
O4—Ce3—Mo3^{x}	151.21 (4)	O10^{xiv}—Mo5—Mo3^{xiv}	94.72 (5)
O11^{v}—Ce3—Mo3^{x}	118.510 (8)	O10^{vi}—Mo5—Mo3^{xiv}	136.07 (5)
O1^{v}—Ce3—Mo3^{x}	95.02 (2)	Mo4^{xix}—Mo5—Mo3^{xiv}	58.113 (6)
Mo3—Ce3—Mo3^{x}	119.929 (9)	Mo4^{xv}—Mo5—Mo3^{xiv}	114.493 (10)
O12^{v}—Ce3—Mo1^{v}	122.20 (7)	Mo3—Mo5—Mo3^{xiv}	118.030 (9)
O8—Ce3—Mo1^{v}	87.20 (4)	Mo3^{ii}—Mo5—Mo3^{xiv}	89.919 (9)
O8^{x}—Ce3—Mo1^{v}	87.20 (4)	Mo2^{xiv}—Mo5—Mo3^{xiv}	58.622 (7)
O4^{v}—Ce3—Mo1^{v}	35.35 (4)	Mo2^{vi}—Mo5—Mo3^{xiv}	87.395 (10)
O4^{xi}—Ce3—Mo1^{v}	35.35 (4)	O11—Mo5—Mo3^{vi}	138.63 (4)
O5^{x}—Ce3—Mo1^{v}	148.03 (3)	O10^{xiv}—Mo5—Mo3^{vi}	136.07 (5)
O5—Ce3—Mo1^{v}	148.03 (3)	O10^{vi}—Mo5—Mo3^{vi}	94.72 (5)
O4^{x}—Ce3—Mo1^{v}	96.76 (3)	Mo4^{xix}—Mo5—Mo3^{vi}	114.493 (10)
O4—Ce3—Mo1^{v}	96.76 (3)	Mo4^{xv}—Mo5—Mo3^{vi}	58.113 (6)
O11^{v}—Ce3—Mo1^{v}	62.53 (4)	Mo3—Mo5—Mo3^{vi}	89.919 (9)
O1^{v}—Ce3—Mo1^{v}	34.92 (5)	Mo3^{ii}—Mo5—Mo3^{vi}	118.030 (9)
Mo3—Ce3—Mo1^{v}	110.725 (4)	Mo2^{xiv}—Mo5—Mo3^{vi}	87.395 (10)
Mo3^{x}—Ce3—Mo1^{v}	110.725 (4)	Mo2^{vi}—Mo5—Mo3^{vi}	58.622 (7)
O12^{v}—Ce3—O9^{xxv}	113.66 (7)	Mo3^{xiv}—Mo5—Mo3^{vi}	56.395 (9)
O8—Ce3—O9^{xxv}	52.86 (4)	O11—Mo5—Mo5^{xiv}	97.23 (6)
O8^{x}—Ce3—O9^{xxv}	52.86 (4)	O10^{xiv}—Mo5—Mo5^{xiv}	137.55 (4)
O4^{v}—Ce3—O9^{xxv}	125.08 (4)	O10^{vi}—Mo5—Mo5^{xiv}	137.55 (4)
O4^{xi}—Ce3—O9^{xxv}	125.08 (4)	Mo4^{xix}—Mo5—Mo5^{xiv}	88.648 (6)
O5^{x}—Ce3—O9^{xxv}	51.42 (4)	Mo4^{xv}—Mo5—Mo5^{xiv}	88.648 (6)
O5—Ce3—O9^{xxv}	51.42 (4)	Mo3—Mo5—Mo5^{xiv}	61.593 (9)
O4^{x}—Ce3—O9^{xxv}	97.25 (4)	Mo3^{ii}—Mo5—Mo5^{xiv}	61.593 (9)
O4—Ce3—O9^{xxv}	97.25 (4)	Mo2^{xiv}—Mo5—Mo5^{xiv}	115.053 (13)
O11^{v}—Ce3—O9^{xxv}	173.33 (4)	Mo2^{vi}—Mo5—Mo5^{xiv}	115.053 (13)
O1^{v}—Ce3—O9^{xxv}	89.22 (5)	Mo3^{xiv}—Mo5—Mo5^{xiv}	56.437 (9)
Mo3—Ce3—O9^{xxv}	60.555 (5)	Mo3^{vi}—Mo5—Mo5^{xiv}	56.437 (9)
Mo3^{x}—Ce3—O9^{xxv}	60.555 (5)	Mo1—O1—Ce1^{v}	99.29 (6)
Mo1^{v}—Ce3—O9^{xxv}	124.139 (7)	Mo1—O1—Ce1^{ix}	99.29 (6)

O12^v—Ce3—Ce1^{xi}	36.60 (3)	Ce1^v—O1—Ce1^{ix}	157.89 (13)
O8—Ce3—Ce1^{xi}	168.71 (4)	Mo1—O1—Ce2^{xx}	90.06 (9)
O8^x—Ce3—Ce1^{xi}	108.76 (4)	Ce1^v—O1—Ce2^{xx}	95.93 (6)
O4^v—Ce3—Ce1^{xi}	107.70 (4)	Ce1^{ix}—O1—Ce2^{xx}	95.93 (6)
O4^{xi}—Ce3—Ce1^{xi}	74.40 (4)	Mo1—O1—Ce3^v	76.55 (7)
O5^x—Ce3—Ce1^{xi}	75.73 (4)	Ce1^v—O1—Ce3^v	86.38 (6)
O5—Ce3—Ce1^{xi}	105.23 (3)	Ce1^{ix}—O1—Ce3^v	86.38 (6)
O4^x—Ce3—Ce1^{xi}	44.87 (3)	Ce2^{xx}—O1—Ce3^v	166.61 (11)
O4—Ce3—Ce1^{xi}	106.11 (3)	Mo1—O2—Mo2	84.01 (7)
O11^v—Ce3—Ce1^{xi}	47.87 (3)	Mo1—O2—Ce2^{xx}	91.22 (7)
O1^v—Ce3—Ce1^{xi}	128.32 (4)	Mo2—O2—Ce2^{xx}	131.36 (8)
Mo3—Ce3—Ce1^{xi}	132.947 (5)	Mo1—O2—Ce1^v	86.94 (6)
Mo3^x—Ce3—Ce1^{xi}	78.291 (4)	Mo2—O2—Ce1^v	142.24 (7)
Mo1^v—Ce3—Ce1^{xi}	99.649 (6)	Ce2^{xx}—O2—Ce1^v	85.31 (6)
O9^{xxv}—Ce3—Ce1^{xi}	127.147 (5)	Mo1—O2—Ce2^v	144.38 (7)
O6^{xii}—Ce4—O6	180.0	Mo2—O2—Ce2^v	83.45 (6)
O6^{xii}—Ce4—O3	101.93 (7)	Ce2^{xx}—O2—Ce2^v	121.66 (6)
O6—Ce4—O3	78.07 (7)	Ce1^v—O2—Ce2^v	82.93 (5)
O6^{xii}—Ce4—O3^{xii}	78.07 (7)	Mo2^{ix}—O3—Ce1^{xxi}	111.27 (8)
O6—Ce4—O3^{xii}	101.93 (7)	Mo2^{ix}—O3—Ce2	101.31 (7)
O3—Ce4—O3^{xii}	180.00 (6)	Ce1^{xxi}—O3—Ce2	103.98 (7)
O6^{xii}—Ce4—O3^{ii}	101.93 (7)	Mo2^{ix}—O3—Ce4	127.21 (8)
O6—Ce4—O3^{ii}	78.07 (7)	Ce1^{xxi}—O3—Ce4	108.51 (6)
O3—Ce4—O3^{ii}	77.58 (9)	Ce2—O3—Ce4	101.22 (6)
O3^{xii}—Ce4—O3^{ii}	102.42 (9)	Mo1—O4—Mo3	81.91 (7)
O6^{xii}—Ce4—O3^{xiii}	78.07 (7)	Mo1—O4—Ce3^v	98.59 (7)
O6—Ce4—O3^{xiii}	101.93 (7)	Mo3—O4—Ce3^v	116.62 (7)
O3—Ce4—O3^{xiii}	102.42 (9)	Mo1—O4—Ce1^v	90.24 (6)
O3^{xii}—Ce4—O3^{xiii}	77.58 (9)	Mo3—O4—Ce1^v	144.66 (8)
O3^{ii}—Ce4—O3^{xiii}	180.00 (6)	Ce3^v—O4—Ce1^v	98.58 (6)
O6^{xii}—Ce4—Ce2	109.59 (7)	Mo1—O4—Ce3	142.82 (8)
O6—Ce4—Ce2	70.41 (7)	Mo3—O4—Ce3	81.99 (6)
O3—Ce4—Ce2	38.98 (4)	Ce3^v—O4—Ce3	118.58 (6)
O3^{xii}—Ce4—Ce2	141.02 (4)	Ce1^v—O4—Ce3	83.95 (5)
O3^{ii}—Ce4—Ce2	38.98 (4)	Mo3—O5—Mo4^v	82.58 (6)
O3^{xiii}—Ce4—Ce2	141.02 (4)	Mo3—O5—Mo2	83.46 (6)
O6^{xii}—Ce4—Ce2^{xii}	70.41 (7)	Mo4^v—O5—Mo2	78.42 (6)
O6—Ce4—Ce2^{xii}	109.59 (7)	Mo3—O5—Ce3	87.52 (6)
O3—Ce4—Ce2^{xii}	141.02 (4)	Mo4^v—O5—Ce3	125.09 (7)
O3^{xii}—Ce4—Ce2^{xii}	38.98 (4)	Mo2—O5—Ce3	153.48 (9)
O3^{ii}—Ce4—Ce2^{xii}	141.02 (4)	Mo3—O5—Ce2^v	150.69 (9)
O3^{xiii}—Ce4—Ce2^{xii}	38.98 (4)	Mo4^v—O5—Ce2^v	122.56 (7)
Ce2—Ce4—Ce2^{xii}	180.000 (1)	Mo2—O5—Ce2^v	87.13 (5)
O6^{xii}—Ce4—Ce1^{xvi}	113.22 (5)	Ce3—O5—Ce2^v	88.70 (5)
O6—Ce4—Ce1^{xvi}	66.78 (5)	Mo4—O6—Mo4^{ii}	103.86 (10)
O3—Ce4—Ce1^{xvi}	144.81 (4)	Mo4—O6—Ce4	127.46 (5)
O3^{xii}—Ce4—Ce1^{xvi}	35.19 (4)	Mo4^{ii}—O6—Ce4	127.46 (5)
O3^{ii}—Ce4—Ce1^{xvi}	93.18 (4)	Li—O7—Mo2^{ii}	101.54 (10)
O3^{xiii}—Ce4—Ce1^{xvi}	86.82 (4)	Li—O7—Mo2	101.54 (10)

Ce2—Ce4—Ce1[xvi]	121.134 (3)	Mo2[ii]—O7—Mo2	84.19 (8)
Ce2[xii]—Ce4—Ce1[xvi]	58.866 (3)	Li—O7—Ce1[xx]	97.91 (7)
O6[xii]—Ce4—Ce1[xxi]	66.78 (5)	Mo2[ii]—O7—Ce1[xx]	160.55 (13)
O6—Ce4—Ce1[xxi]	113.22 (5)	Mo2—O7—Ce1[xx]	92.16 (3)
O3—Ce4—Ce1[xxi]	35.19 (4)	Li—O7—Ce1[xxii]	97.91 (7)
O3[xii]—Ce4—Ce1[xxi]	144.81 (4)	Mo2[ii]—O7—Ce1[xxii]	92.16 (3)
O3[ii]—Ce4—Ce1[xxi]	86.82 (4)	Mo2—O7—Ce1[xxii]	160.55 (13)
O3[xiii]—Ce4—Ce1[xxi]	93.18 (4)	Ce1[xx]—O7—Ce1[xxii]	84.94 (6)
Ce2—Ce4—Ce1[xxi]	58.866 (3)	Mo3—O8—Mo4[xv]	87.45 (7)
Ce2[xii]—Ce4—Ce1[xxi]	121.134 (3)	Mo3—O8—Ce3	101.26 (6)
Ce1[xvi]—Ce4—Ce1[xxi]	180.000 (3)	Mo4[xv]—O8—Ce3	132.81 (8)
O6[xii]—Ce4—Ce1[xxiv]	113.22 (5)	Mo3—O8—Ce1	113.93 (8)
O6—Ce4—Ce1[xxiv]	66.78 (5)	Mo4[xv]—O8—Ce1	105.34 (6)
O3—Ce4—Ce1[xxiv]	93.18 (4)	Ce3—O8—Ce1	112.60 (7)
O3[xii]—Ce4—Ce1[xxiv]	86.82 (4)	Mo4[ii]—O9—Mo4[xviii]	180.000 (11)
O3[ii]—Ce4—Ce1[xxiv]	144.81 (4)	Mo4[ii]—O9—Mo4	97.211 (10)
O3[xiii]—Ce4—Ce1[xxiv]	35.19 (4)	Mo4[xviii]—O9—Mo4	82.789 (10)
Ce2—Ce4—Ce1[xxiv]	121.134 (3)	Mo4[ii]—O9—Mo4[xxiii]	82.789 (10)
Ce2[xii]—Ce4—Ce1[xxiv]	58.866 (3)	Mo4[xviii]—O9—Mo4[xxiii]	97.211 (10)
Ce1[xvi]—Ce4—Ce1[xxiv]	74.878 (4)	Mo4—O9—Mo4[xxiii]	180.000 (11)
Ce1[xxi]—Ce4—Ce1[xxiv]	105.122 (4)	Mo4[ii]—O9—Ce3[v]	94.201 (6)
O6[xii]—Ce4—Ce1[xxvi]	66.78 (5)	Mo4[xviii]—O9—Ce3[v]	85.799 (6)
O6—Ce4—Ce1[xxvi]	113.22 (5)	Mo4—O9—Ce3[v]	94.201 (6)
O3—Ce4—Ce1[xxvi]	86.82 (4)	Mo4[xxiii]—O9—Ce3[v]	85.799 (6)
O3[xii]—Ce4—Ce1[xxvi]	93.18 (4)	Mo4[ii]—O9—Ce3[xxiv]	85.799 (6)
O3[ii]—Ce4—Ce1[xxvi]	35.19 (4)	Mo4[xviii]—O9—Ce3[xxiv]	94.201 (6)
O3[xiii]—Ce4—Ce1[xxvi]	144.81 (4)	Mo4—O9—Ce3[xxiv]	85.799 (6)
Ce2—Ce4—Ce1[xxvi]	58.866 (3)	Mo4[xxiii]—O9—Ce3[xxiv]	94.201 (6)
Ce2[xii]—Ce4—Ce1[xxvi]	121.134 (3)	Ce3[v]—O9—Ce3[xxiv]	180.000 (5)
Ce1[xvi]—Ce4—Ce1[xxvi]	105.122 (4)	Mo4[v]—O10—Mo5[xiv]	81.78 (6)
Ce1[xxi]—Ce4—Ce1[xxvi]	74.878 (4)	Mo4[v]—O10—Mo2	78.26 (6)
Ce1[xxiv]—Ce4—Ce1[xxvi]	180.000 (3)	Mo5[xiv]—O10—Mo2	82.62 (6)
O2—Mo1—O2[ii]	92.35 (10)	Mo4[v]—O10—Li	162.57 (9)
O2—Mo1—O4[ii]	167.83 (8)	Mo5[xiv]—O10—Li	100.44 (7)
O2[ii]—Mo1—O4[ii]	88.28 (7)	Mo2—O10—Li	84.86 (6)
O2—Mo1—O4	88.28 (7)	Mo4[v]—O10—Ce1[vi]	100.54 (7)
O2[ii]—Mo1—O4	167.83 (8)	Mo5[xiv]—O10—Ce1[vi]	111.85 (7)
O4[ii]—Mo1—O4	88.58 (10)	Mo2—O10—Ce1[vi]	165.29 (8)
O2—Mo1—O1	83.18 (7)	Li—O10—Ce1[vi]	94.68 (6)
O2[ii]—Mo1—O1	83.18 (7)	Mo5—O11—Mo3	82.47 (8)
O4[ii]—Mo1—O1	84.83 (7)	Mo5—O11—Mo3[ii]	82.47 (8)
O4—Mo1—O1	84.83 (7)	Mo3—O11—Mo3[ii]	82.19 (8)
O2—Mo1—Mo3[ii]	142.09 (6)	Mo5—O11—Ce1[ii]	100.65 (7)
O2[ii]—Mo1—Mo3[ii]	93.36 (5)	Mo3—O11—Ce1[ii]	176.28 (11)
O4[ii]—Mo1—Mo3[ii]	49.89 (5)	Mo3[ii]—O11—Ce1[ii]	96.162 (13)
O4—Mo1—Mo3[ii]	93.59 (5)	Mo5—O11—Ce1	100.65 (7)
O1—Mo1—Mo3[ii]	134.71 (5)	Mo3—O11—Ce1	96.162 (13)
O2—Mo1—Mo3	93.36 (5)	Mo3[ii]—O11—Ce1	176.28 (11)
O2[ii]—Mo1—Mo3	142.09 (6)	Ce1[ii]—O11—Ce1	85.28 (6)

O4[ii]—Mo1—Mo3	93.59 (5)	Mo5—O11—Ce3[v]	179.63 (10)
O4—Mo1—Mo3	49.89 (5)	Mo3—O11—Ce3[v]	97.25 (8)
O1—Mo1—Mo3	134.71 (5)	Mo3[ii]—O11—Ce3[v]	97.25 (8)
Mo3[ii]—Mo1—Mo3	60.821 (10)	Ce1[ii]—O11—Ce3[v]	79.62 (6)
O2—Mo1—Mo2[ii]	95.29 (6)	Ce1—O11—Ce3[v]	79.62 (6)
O2[ii]—Mo1—Mo2[ii]	49.58 (6)	Ce2—O12—Ce3[v]	113.01 (11)
O4[ii]—Mo1—Mo2[ii]	94.36 (5)	Ce2—O12—Ce1[ii]	109.67 (6)
O4—Mo1—Mo2[ii]	142.46 (6)	Ce3[v]—O12—Ce1[ii]	107.36 (6)
O1—Mo1—Mo2[ii]	132.72 (5)	Ce2—O12—Ce1	109.67 (6)
Mo3[ii]—Mo1—Mo2[ii]	61.651 (7)	Ce3[v]—O12—Ce1	107.36 (6)
Mo3—Mo1—Mo2[ii]	92.568 (10)	Ce1[ii]—O12—Ce1	109.69 (11)
O2—Mo1—Mo2	49.58 (6)		

Symmetry codes: (i) −x−1, −y−1, −z+2; (ii) x, −y−1, z; (iii) −x−1, y, −z+2; (iv) −x−1/2, y+1/2, −z; (v) −x−1/2, −y−1/2, −z+1; (vi) −x−1, y, −z+1; (vii) x, y, z−1; (viii) x, −y−1, z−1; (ix) −x−1/2, y−1/2, −z+1; (x) x, −y, z; (xi) −x−1/2, y+1/2, −z+1; (xii) −x, −y−1, −z; (xiii) −x, y, −z; (xiv) −x−1, −y−1, −z+1; (xv) x−1/2, −y−1/2, z; (xvi) x+1/2, −y−1/2, z; (xvii) x+1/2, y+1/2, z; (xviii) −x, y, −z+1; (xix) x−1/2, y−1/2, z; (xx) x, y, z+1; (xxi) −x−1/2, y−1/2, −z; (xxii) x, −y−1, z+1; (xxiii) −x, −y−1, −z+1; (xxiv) x+1/2, y−1/2, z; (xxv) x−1/2, y+1/2, z; (xxvi) −x−1/2, −y−1/2, −z.