Cs$_5$Sn$_9$(OH)·4NH$_3$

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The title compound, pentacaesium nonastannide hydroxide tetraammonia, crystallized from a solution of CsSnBi in liquid ammonia. The Sn$_9^{4-}$ unit forms a monocapped quadratic antiprism. The hydroxide ion is surrounded by five caesium cations, which form a distorted quadratic pyramidal polyhedron. A three-dimensional network is formed by Cs—Sn [3.8881 (7) Å to 4.5284 (7) Å] and Cs—NH$_3$ [3.276 (7)– 3.636 (7) Å] contacts.

Related literature

For the co-crystallization of Zintl anions and oxide or hydroxide ions see, for example: Boss *et al.* (2005), Röhr (1995) For the diagonal ratio value of the Sn$_9^{4-}$ anion, see: Fässler & Hoffmann (1999).

Experimental

Crystal data

Cs$_5$Sn$_9$(OH)·4NH$_3$	b = 14.8256 (2) Å
M_r = 1817.90	c = 20.0419 (3) Å
Orthorhombic, $P2_12_12_1$	V = 2999.11 (7) Å^3
a = 10.0935 (1) Å	Z = 4

Mo $K\alpha$ radiation	T = 123 K
μ = 13.34 mm^{-1}	0.32 × 0.15 × 0.06 mm

Data collection

Agilent SuperNova (single source at offset, Eos) diffractometer	34752 measured reflections
Absorption correction: multi-scan (*CrysAlis PRO*; Agilent, 2012) T_{min} = 0.263, T_{max} = 1.000	5910 independent reflections 5754 reflections with $I > 2\sigma(I)$ R_{int} = 0.045

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.020	$\Delta\rho_{min}$ = −0.61 e Å^{-3}
$wR(F^2)$ = 0.037	Absolute structure: Flack x determined using 2458 quotients $[(I^+)-(I^-)]/[(I^+)+(I^-)]$ (Parsons & Flack, 2004)
S = 1.05	
5910 reflections	
191 parameters	
H-atom parameters constrained	Absolute structure parameter: 0.037 (17)
$\Delta\rho_{max}$ = 0.69 e Å^{-3}	

Data collection: *CrysAlis PRO* (Agilent, 2012); cell refinement: *CrysAlis PRO*; data reduction: *CrysAlis PRO*; program(s) used to solve structure: *OLEX2.SOLVE* (Bourhis *et al.*, 2014); program(s) used to refine structure: *SHELXL2013* (Sheldrick, 2008); molecular graphics: *DIAMOND* (Brandenburg & Putz, 2011); software used to prepare material for publication: *OLEX2* (Dolomanov *et al.*, 2009).

References

Agilent (2012). *CrysAlis PRO*. Agilent Technologies, Yarnton, England.
Boss, M., Petri, D., Pickhard, F., Zönnchen, P. & Röhr, C. (2005). *Z. Anorg. Allg. Chem.* **631**, 1181–1190.
Bourhis, L. J., Dolomanov, O. V., Gildea, R. J., Howard, J. A. K. & Puschmann, H. (2014). In preparation.
Brandenburg, K. & Putz, H. (2011). *DIAMOND*. Crystal Impact, Bonn, Germany.
Dolomanov, O. V., Bourhis, L. J., Gildea, R. J., Howard, J. A. K. & Puschmann, H. (2009). *J. Appl. Cryst.* **42**, 339–341.
Fässler, T. F. & Hoffmann, R. (1999). *Dalton Trans.* **19**, 3339–3340.
Parsons, S. & Flack, H. (2004). *Acta Cryst.* A**60**, s61.
Röhr, C. (1995). *Z. Naturforsch. Teil B*, **50**, 802–808.
Sheldrick, G. M. (2008). *Acta Cryst.* A**64**, 112–122.

supporting information

Cs$_5$Sn$_9$(OH)·4NH$_3$

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S1. Comment

The crystal structure of Cs$_5$Sn$_9$(OH) × 4 NH$_3$ was determined in the course of solvation experiments on ternary alkali metal–Sn–Bi-phases.

The Sn$_9{}^{4-}$ anion has a diagonal ratio value (Fässler *et al.*, 1999) which is very close to 1, consequently it can be described as a monocapped quadratic antiprism (Fig. 1). Sn—Sn bond lengths range from 2.9310 (8) Å to 3.2457 (8) Å. The nonastannid cluster is surrounded by 15 caesium cations with distances ranging from 3.8881 (7) Å to 4.5284 (7) Å. The chemical origin of the hydroxide anion could not be determined, but it is likely that water was introduced to the system, which was deprotonated by the ammonia solvent. The caesium cations form a distorted quadratic pyramide around the hydroxide ion (Fig. 1). The distances $d_{Cs—O}$ have values between 2.818 (5) Å and 3.080 (6) Å. Angles between neighbouring equatorial cations Cs$_{eq}$–O(1)–Cs$_{eq}$ range from 86.43 (13)° to 95.28 (17)°, angles between the axial and the equatorial Cs cations Cs$_{ax}$–O(1)–Cs$_{eq}$ have values between 85.15 (15)° and 101.89 (16)°. The ammonia molecules coordinate with distances from 3.276 (7) Å to 3.636 (7) Å to the caesium cations, forming a three dimensional network (Fig. 2).

S2. Experimental

The educt material CsSnBi was synthesized in glas ampoules at 723 K from stochiometric amounts of the corresponding elements. 0.35 g (0.38 mmol) CsSnBi were weighed in a baked out reaction vessel, afterwards 10 ml of ammonia were condensed, leading to a brownish red solution. The solution was stored for four months at 236 K. The title compound formed as red plate-shaped crystals.

S3. Refinement

The H atoms of the ammonia molecules and the hydrogen atom of the hydroxide ion were positioned with idealized geometry and refined isotropically with U_{iso}(H) = 1.2 U_{eq}(O) and U_{iso}(H) = 1.5 U_{eq}(N) using a riding model. For a chemically reasonable alignment of the hydrogen atoms of three ammonia molecules dummy atoms were used. The hydrogen atom of the hydroxide anion was placed in elongation of the Cs(5)–O(1) axes with the HFIX 163 command.
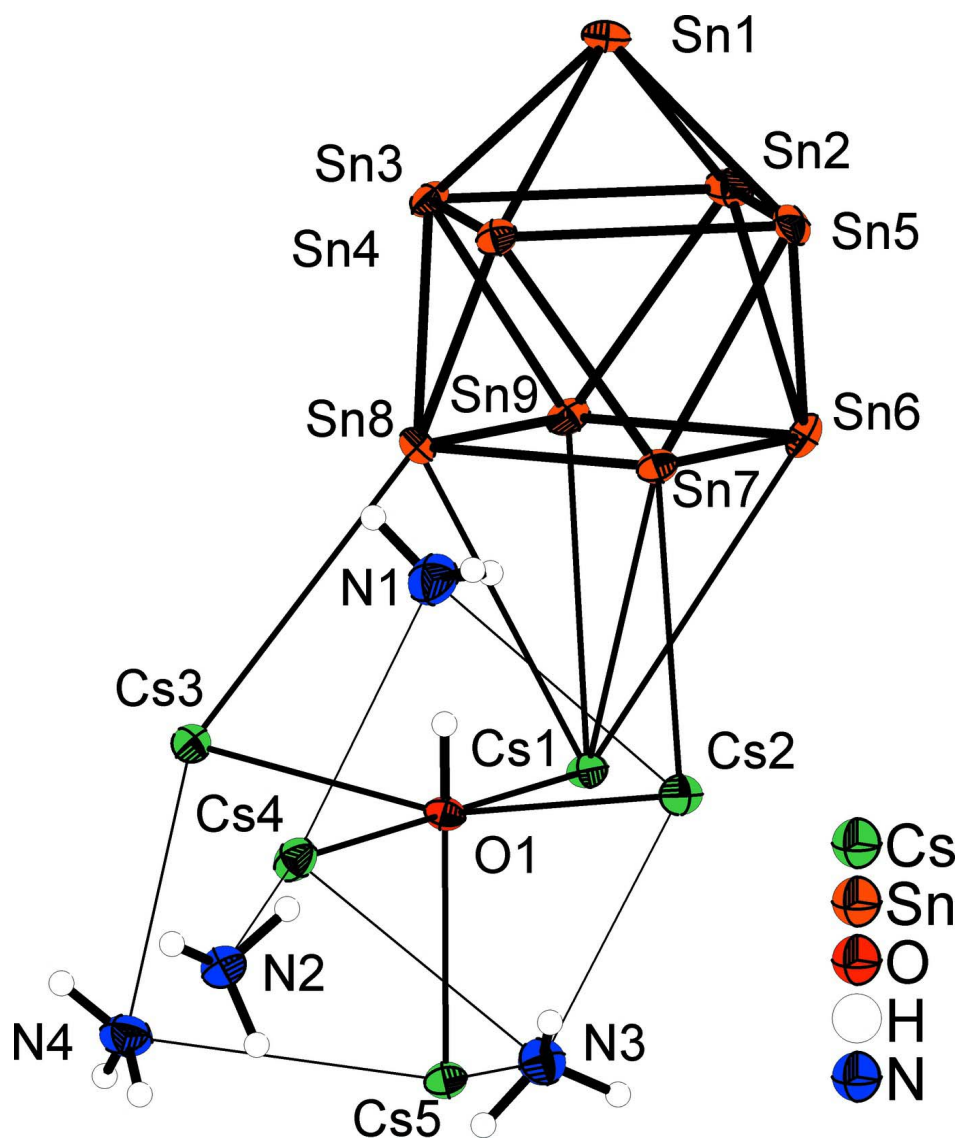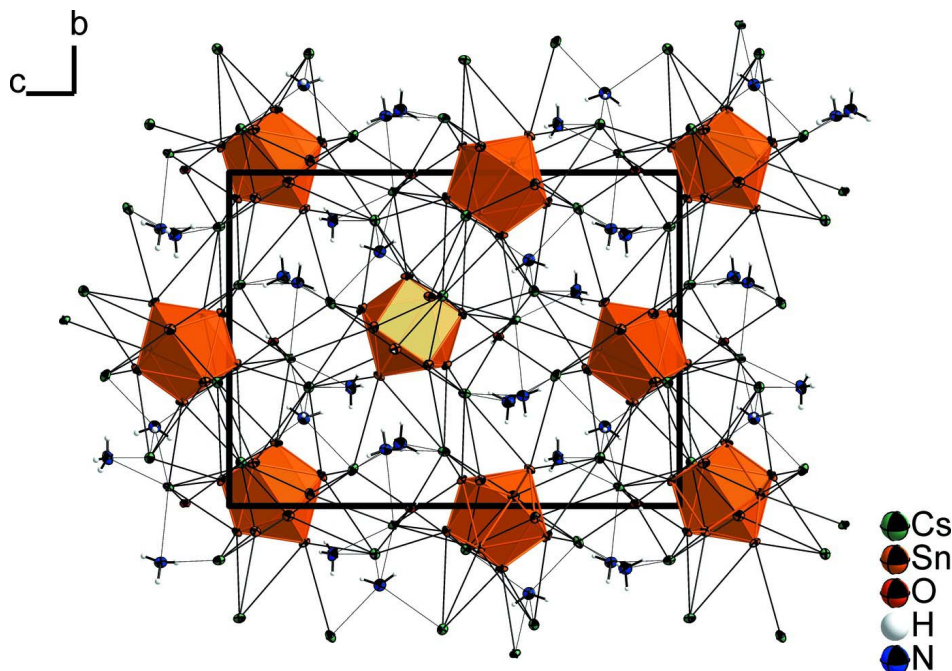
Figure 1

Asymmetric unit of the title compound; displacement ellipsoids drawn at the 50% probability level.

Figure 2
Projection of the unit cell along the crystallographic *a*-axis; displacement ellipsoids drawn at the 50% probability level.

Pentacaesium nonastannide hydroxide tetraammonia

Crystal data

$Cs_5Sn_9(OH)\cdot 4NH_3$	$D_x = 4.026$ Mg m^{-3}
$M_r = 1817.90$	Mo $K\alpha$ radiation, $\lambda = 0.71073$ Å
Orthorhombic, $P2_12_12_1$	Cell parameters from 21366 reflections
$a = 10.0935\ (1)$ Å	$\theta = 2.9$–$28.8°$
$b = 14.8256\ (2)$ Å	$\mu = 13.34$ mm^{-1}
$c = 20.0419\ (3)$ Å	$T = 123$ K
$V = 2999.11\ (7)$ Å^3	Plate, red
$Z = 4$	$0.32 \times 0.15 \times 0.06$ mm
$F(000) = 3096$	

Data collection

Agilent SuperNova (single source at offset, Eos) diffractometer	34752 measured reflections
	5910 independent reflections
Radiation source: SuperNova (Mo) X-ray Source	5754 reflections with $I > 2\sigma(I)$
Detector resolution: 7.9851 pixels mm^{-1}	$R_{int} = 0.045$
ω scans	$\theta_{max} = 26.0°$, $\theta_{min} = 2.9°$
Absorption correction: multi-scan	$h = -12\rightarrow 12$
(*CrysAlis PRO*; Agilent, 2012)	$k = -18\rightarrow 18$
$T_{min} = 0.263$, $T_{max} = 1.000$	$l = -24\rightarrow 24$

Refinement

Refinement on F^2	$S = 1.05$
Least-squares matrix: full	5910 reflections
$R[F^2 > 2\sigma(F^2)] = 0.020$	191 parameters
$wR(F^2) = 0.037$	0 restraints

Hydrogen site location: inferred from neighbouring sites

H-atom parameters constrained

$w = 1/[\sigma^2(F_o^2) + (0.0119P)^2 + 0.8162P]$ where $P = (F_o^2 + 2F_c^2)/3$

$(\Delta/\sigma)_{max} = 0.002$

$\Delta\rho_{max} = 0.69$ e Å^{-3}

$\Delta\rho_{min} = -0.61$ e Å^{-3}

Absolute structure: Flack x determined using 2458 quotients $[(I^+)-(I^-)]/[(I^+)+(I^-)]$ (Parsons & Flack, 2004)

Absolute structure parameter: 0.037 (17)

Special details

Experimental. crystal mounting in perfluorether

Absorption correction: CrysAlisPro (Agilent Technologies, 2012), Empirical absorption correction using spherical harmonics, implemented in SCALE3 ABSPACK scaling algorithm.

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.

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 $F^2 > \sigma(F^2)$ 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	$U_{iso}*/U_{eq}$
Cs1	0.69651 (4)	0.62993 (3)	0.52616 (3)	0.01745 (12)
Cs5	0.96022 (5)	0.55715 (3)	0.36506 (3)	0.01733 (12)
Cs2	0.77685 (5)	0.33699 (3)	0.47723 (3)	0.01964 (13)
Cs3	0.53343 (5)	0.64420 (3)	0.32331 (3)	0.01897 (12)
Cs4	0.70495 (5)	0.39111 (4)	0.27494 (3)	0.02169 (13)
Sn8	0.32179 (5)	0.57700 (4)	0.48243 (3)	0.01753 (13)
Sn9	0.33484 (5)	0.68860 (4)	0.60507 (3)	0.01726 (14)
Sn6	0.44704 (5)	0.53549 (4)	0.67889 (3)	0.01920 (14)
Sn4	0.15595 (5)	0.42149 (4)	0.51683 (3)	0.01634 (13)
Sn5	0.24692 (5)	0.38957 (4)	0.66732 (3)	0.01944 (14)
Sn3	0.07763 (5)	0.62769 (4)	0.55430 (3)	0.01715 (14)
Sn2	0.17196 (6)	0.59083 (4)	0.70575 (3)	0.02052 (14)
Sn7	0.43672 (5)	0.42314 (4)	0.55797 (3)	0.01669 (13)
Sn1	−0.00956 (5)	0.47064 (4)	0.63144 (3)	0.01970 (14)
O1	0.7008 (5)	0.5080 (3)	0.4020 (3)	0.0160 (13)
H1	0.6133	0.4914	0.4145	0.019*
N4	0.8001 (7)	0.6444 (5)	0.2302 (4)	0.0272 (19)
H4A	0.8659	0.6084	0.2143	0.041*
H4B	0.8275	0.7029	0.2296	0.041*
H4C	0.7269	0.6384	0.2041	0.041*
N3	0.9939 (7)	0.3306 (4)	0.3478 (4)	0.0249 (19)
H3A	1.0352	0.3496	0.3100	0.037*
H3B	0.9629	0.2735	0.3416	0.037*
H3C	1.0524	0.3310	0.3823	0.037*
N2	0.7994 (6)	0.2374 (4)	0.1655 (4)	0.0237 (18)
H2A	0.7623	0.2044	0.1321	0.036*
H2B	0.7658	0.2189	0.2054	0.036*

H2C	0.8888	0.2293	0.1653	0.036*
N1	0.4815 (7)	0.3126 (5)	0.3796 (4)	0.031 (2)
H1A	0.4909	0.2518	0.3834	0.046*
H1B	0.3990	0.3256	0.3640	0.046*
H1C	0.4929	0.3388	0.4202	0.046*

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Cs1	0.0134 (2)	0.0200 (3)	0.0189 (3)	−0.0008 (2)	0.0009 (2)	−0.0020 (2)
Cs5	0.0155 (2)	0.0163 (3)	0.0202 (3)	−0.0019 (2)	−0.0001 (2)	−0.0021 (2)
Cs2	0.0186 (3)	0.0152 (2)	0.0251 (4)	0.0012 (2)	0.0014 (2)	0.0016 (2)
Cs3	0.0175 (2)	0.0210 (3)	0.0185 (3)	0.0007 (2)	−0.0004 (2)	0.0003 (2)
Cs4	0.0192 (3)	0.0264 (3)	0.0194 (3)	0.0021 (2)	−0.0026 (2)	−0.0053 (2)
Sn8	0.0175 (3)	0.0204 (3)	0.0146 (4)	−0.0020 (2)	0.0026 (3)	0.0044 (3)
Sn9	0.0146 (3)	0.0119 (3)	0.0253 (4)	−0.0024 (2)	−0.0030 (3)	−0.0010 (3)
Sn6	0.0169 (3)	0.0215 (3)	0.0192 (4)	0.0014 (2)	−0.0077 (3)	−0.0012 (3)
Sn4	0.0154 (3)	0.0157 (3)	0.0179 (4)	−0.0031 (2)	−0.0020 (3)	−0.0035 (3)
Sn5	0.0221 (3)	0.0161 (3)	0.0201 (4)	0.0003 (2)	0.0027 (3)	0.0078 (3)
Sn3	0.0114 (3)	0.0154 (3)	0.0247 (4)	0.0013 (2)	−0.0036 (3)	0.0026 (3)
Sn2	0.0195 (3)	0.0238 (3)	0.0183 (4)	−0.0012 (2)	0.0058 (3)	−0.0072 (3)
Sn7	0.0129 (3)	0.0178 (3)	0.0194 (4)	0.0031 (2)	0.0017 (2)	−0.0013 (3)
Sn1	0.0141 (3)	0.0207 (3)	0.0243 (4)	−0.0038 (2)	0.0054 (3)	0.0000 (3)
O1	0.015 (3)	0.014 (3)	0.019 (4)	−0.004 (2)	0.001 (2)	0.000 (3)
N4	0.023 (4)	0.033 (4)	0.026 (5)	0.000 (3)	0.006 (4)	−0.004 (4)
N3	0.026 (4)	0.021 (4)	0.027 (5)	−0.001 (3)	0.000 (4)	0.001 (4)
N2	0.020 (4)	0.026 (4)	0.025 (5)	0.002 (3)	0.000 (3)	0.001 (4)
N1	0.029 (4)	0.030 (4)	0.034 (6)	−0.007 (4)	−0.007 (4)	0.001 (4)

Geometric parameters (Å, º)

Cs1—N2[i]	3.417 (8)	Sn9—Sn6	2.9367 (8)
Cs1—Sn3[ii]	3.8881 (7)	Sn9—Sn2	2.9793 (9)
Cs1—Sn8	3.9609 (7)	Sn9—Cs1[xii]	4.0131 (8)
Cs1—Sn9[iii]	4.0132 (8)	Sn9—Cs5[xii]	4.0210 (7)
Cs1—Sn9	4.0723 (7)	Sn9—Cs3[xii]	4.1787 (8)
Cs1—Sn7	4.0843 (8)	Sn6—Sn7	2.9425 (9)
Cs1—Sn3[iii]	4.1175 (8)	Sn6—Sn2	2.9449 (8)
Cs1—Sn6	4.2037 (9)	Sn6—Sn5	2.9688 (8)
Cs1—Cs5	4.3213 (8)	Sn6—Cs5[i]	4.0847 (9)
Cs1—Sn1[ii]	4.3395 (8)	Sn6—Cs4[i]	4.1507 (8)
Cs5—O1	2.817 (5)	Sn4—Sn1	2.9323 (9)
Cs5—N2[iv]	3.661 (6)	Sn4—Sn7	2.9516 (7)
Cs5—Cs4	3.9951 (7)	Sn4—Sn5	3.1880 (9)
Cs5—Sn9[iii]	4.0210 (7)	Sn4—Sn3	3.2457 (8)
Cs5—Sn6[v]	4.0847 (9)	Sn4—Cs2[vii]	4.0234 (7)
Cs5—Sn3[ii]	4.1089 (9)	Sn4—Cs2[xi]	4.1038 (7)
Cs5—Sn4[ii]	4.1474 (8)	Sn4—Cs5[xi]	4.1473 (8)

Cs5—Sn8ⁱⁱ	4.3519 (8)	Sn5—Sn1	2.9434 (8)
Cs5—Cs2	4.3741 (7)	Sn5—Sn7	2.9530 (9)
Cs2—Sn7	4.0045 (7)	Sn5—Sn2	3.1732 (8)
Cs2—Sn4ᵛⁱ	4.0235 (7)	Sn5—Cs3ˣⁱⁱⁱ	4.2463 (8)
Cs2—Sn4ⁱⁱ	4.1038 (7)	Sn5—Cs4ᵛⁱⁱ	4.3400 (8)
Cs2—Cs4	4.1961 (9)	Sn5—Cs2ᵛⁱⁱ	4.4459 (8)
Cs2—Sn7ᵛⁱ	4.2398 (7)	Sn3—Sn1	2.9301 (8)
Cs2—Sn1ⁱⁱ	4.2575 (9)	Sn3—Sn2	3.2277 (9)
Cs2—Sn5ᵛⁱ	4.4460 (8)	Sn3—Cs1ˣⁱ	3.8882 (7)
Cs2—Cs2ᵛⁱⁱ	5.7408 (5)	Sn3—Cs5ˣⁱ	4.1088 (9)
Cs2—Cs2ᵛⁱ	5.7408 (5)	Sn3—Cs1ˣⁱⁱ	4.1174 (8)
Cs3—N2ᵛⁱⁱⁱ	3.639 (7)	Sn3—Cs3ˣⁱⁱ	4.2017 (8)
Cs3—Sn8	3.9656 (8)	Sn2—Sn1	2.9581 (9)
Cs3—Sn9ⁱⁱⁱ	4.1786 (8)	Sn2—Cs4ˣⁱⁱⁱ	4.0580 (8)
Cs3—Sn3ⁱⁱⁱ	4.2016 (8)	Sn2—Cs3ˣⁱⁱ	4.2103 (7)
Cs3—Sn2ⁱⁱⁱ	4.2102 (7)	Sn7—Cs2ᵛⁱⁱ	4.2398 (7)
Cs3—Sn1ⁱˣ	4.2123 (9)	Sn1—Cs4ˣⁱⁱⁱ	4.0449 (9)
Cs3—Cs4	4.2445 (7)	Sn1—Cs3ˣⁱⁱⁱ	4.2122 (9)
Cs3—Sn5ⁱˣ	4.2463 (8)	Sn1—Cs2ˣⁱ	4.2576 (9)
Cs3—Cs4ᵛⁱⁱⁱ	4.8028 (7)	Sn1—Cs1ˣⁱ	4.3396 (8)
Cs4—N1	3.292 (8)	O1—H1	0.9500
Cs4—Sn1ⁱˣ	4.0449 (9)	N4—H4A	0.9100
Cs4—Sn2ⁱˣ	4.0579 (8)	N4—H4B	0.9100
Cs4—Sn6ᵛ	4.1507 (8)	N4—H4C	0.9100
Cs4—Sn5ᵛⁱ	4.3399 (8)	N3—H3A	0.9100
Cs4—Cs3ˣ	4.8027 (7)	N3—H3B	0.9100
Sn8—Sn4	2.9314 (8)	N3—H3C	0.9100
Sn8—Sn3	2.9518 (8)	N2—H2A	0.9100
Sn8—Sn9	2.9658 (9)	N2—H2B	0.9100
Sn8—Sn7	2.9735 (8)	N2—H2C	0.9100
Sn8—Cs5ˣⁱ	4.3518 (8)	N1—H1A	0.9100
Sn8—Cs1ˣⁱⁱ	4.5284 (7)	N1—H1B	0.9100
Sn9—Sn3	2.9310 (8)	N1—H1C	0.9100
N2ⁱ—Cs1—Sn3ⁱⁱ	82.78 (11)	Sn4—Sn8—Cs3	133.97 (2)
N2ⁱ—Cs1—Sn8	107.85 (11)	Sn3—Sn8—Cs3	141.10 (2)
Sn3ⁱⁱ—Cs1—Sn8	167.198 (19)	Sn9—Sn8—Cs3	120.16 (2)
N2ⁱ—Cs1—Sn9ⁱⁱⁱ	98.37 (12)	Sn7—Sn8—Cs3	113.08 (2)
Sn3ⁱⁱ—Cs1—Sn9ⁱⁱⁱ	75.913 (15)	Cs1—Sn8—Cs3	67.283 (14)
Sn8—Cs1—Sn9ⁱⁱⁱ	108.664 (18)	Sn4—Sn8—Cs5ˣⁱ	66.113 (17)
N2ⁱ—Cs1—Sn9	64.56 (11)	Sn3—Sn8—Cs5ˣⁱ	65.218 (18)
Sn3ⁱⁱ—Cs1—Sn9	146.35 (2)	Sn9—Sn8—Cs5ˣⁱ	121.53 (2)
Sn8—Cs1—Sn9	43.304 (13)	Sn7—Sn8—Cs5ˣⁱ	123.40 (2)
Sn9ⁱⁱⁱ—Cs1—Sn9	115.038 (15)	Cs1—Sn8—Cs5ˣⁱ	159.03 (2)
N2ⁱ—Cs1—Sn7	108.20 (12)	Cs3—Sn8—Cs5ˣⁱ	91.952 (17)
Sn3ⁱⁱ—Cs1—Sn7	127.309 (17)	Sn4—Sn8—Cs1ˣⁱⁱ	127.17 (2)
Sn8—Cs1—Sn7	43.347 (12)	Sn3—Sn8—Cs1ˣⁱⁱ	62.688 (16)
Sn9ⁱⁱⁱ—Cs1—Sn7	145.99 (2)	Sn9—Sn8—Cs1ˣⁱⁱ	60.572 (16)

Sn9—Cs1—Sn7	61.588 (12)	Sn7—Sn8—Cs1ˣⁱⁱ	149.81 (2)
N2ⁱ—Cs1—Sn3ⁱⁱⁱ	79.70 (12)	Cs1—Sn8—Cs1ˣⁱⁱ	94.875 (13)
Sn3ⁱⁱ—Cs1—Sn3ⁱⁱⁱ	110.648 (15)	Cs3—Sn8—Cs1ˣⁱⁱ	83.040 (14)
Sn8—Cs1—Sn3ⁱⁱⁱ	78.928 (14)	Cs5ˣⁱ—Sn8—Cs1ˣⁱⁱ	79.056 (13)
Sn9ⁱⁱⁱ—Cs1—Sn3ⁱⁱⁱ	42.236 (12)	Sn3—Sn9—Sn6	106.16 (2)
Sn9—Cs1—Sn3ⁱⁱⁱ	72.811 (14)	Sn3—Sn9—Sn8	60.07 (2)
Sn7—Cs1—Sn3ⁱⁱⁱ	121.949 (15)	Sn6—Sn9—Sn8	90.20 (2)
N2ⁱ—Cs1—Sn6	66.66 (12)	Sn3—Sn9—Sn2	66.20 (2)
Sn3ⁱⁱ—Cs1—Sn6	118.956 (19)	Sn6—Sn9—Sn2	59.70 (2)
Sn8—Cs1—Sn6	61.522 (14)	Sn8—Sn9—Sn2	105.39 (2)
Sn9ⁱⁱⁱ—Cs1—Sn6	155.360 (17)	Sn3—Sn9—Cs1ˣⁱⁱ	70.784 (18)
Sn9—Cs1—Sn6	41.531 (12)	Sn6—Sn9—Cs1ˣⁱⁱ	169.28 (3)
Sn7—Cs1—Sn6	41.560 (13)	Sn8—Sn9—Cs1ˣⁱⁱ	79.36 (2)
Sn3ⁱⁱⁱ—Cs1—Sn6	113.663 (16)	Sn2—Sn9—Cs1ˣⁱⁱ	125.31 (2)
N2ⁱ—Cs1—Cs5	138.34 (11)	Sn3—Sn9—Cs5ˣⁱⁱ	128.26 (2)
Sn3ⁱⁱ—Cs1—Cs5	59.790 (14)	Sn6—Sn9—Cs5ˣⁱⁱ	121.89 (2)
Sn8—Cs1—Cs5	111.923 (17)	Sn8—Sn9—Cs5ˣⁱⁱ	131.32 (2)
Sn9ⁱⁱⁱ—Cs1—Cs5	57.548 (12)	Sn2—Sn9—Cs5ˣⁱⁱ	121.93 (2)
Sn9—Cs1—Cs5	153.592 (18)	Cs1ˣⁱⁱ—Sn9—Cs5ˣⁱⁱ	65.078 (14)
Sn7—Cs1—Cs5	108.945 (16)	Sn3—Sn9—Cs1	126.40 (2)
Sn3ⁱⁱⁱ—Cs1—Cs5	96.014 (16)	Sn6—Sn9—Cs1	71.633 (18)
Sn6—Cs1—Cs5	146.084 (16)	Sn8—Sn9—Cs1	66.348 (17)
N2ⁱ—Cs1—Sn1ⁱⁱ	84.70 (11)	Sn2—Sn9—Cs1	130.83 (2)
Sn3ⁱⁱ—Cs1—Sn1ⁱⁱ	41.268 (12)	Cs1ˣⁱⁱ—Sn9—Cs1	101.571 (16)
Sn8—Cs1—Sn1ⁱⁱ	130.739 (17)	Cs5ˣⁱⁱ—Sn9—Cs1	88.619 (15)
Sn9ⁱⁱⁱ—Cs1—Sn1ⁱⁱ	116.464 (15)	Sn3—Sn9—Cs3ˣⁱⁱ	69.949 (18)
Sn9—Cs1—Sn1ⁱⁱ	122.702 (19)	Sn6—Sn9—Cs3ˣⁱⁱ	124.49 (3)
Sn7—Cs1—Sn1ⁱⁱ	87.394 (15)	Sn8—Sn9—Cs3ˣⁱⁱ	125.68 (2)
Sn3ⁱⁱⁱ—Cs1—Sn1ⁱⁱ	149.840 (16)	Sn2—Sn9—Cs3ˣⁱⁱ	69.766 (18)
Sn6—Cs1—Sn1ⁱⁱ	82.772 (15)	Cs1ˣⁱⁱ—Sn9—Cs3ˣⁱⁱ	64.795 (14)
Cs5—Cs1—Sn1ⁱⁱ	78.830 (14)	Cs5ˣⁱⁱ—Sn9—Cs3ˣⁱⁱ	67.783 (13)
O1—Cs5—N2ⁱᵛ	148.09 (15)	Cs1—Sn9—Cs3ˣⁱⁱ	155.890 (17)
O1—Cs5—Cs4	50.21 (11)	Sn9—Sn6—Sn7	90.51 (2)
N2ⁱᵛ—Cs5—Cs4	143.27 (13)	Sn9—Sn6—Sn2	60.87 (2)
O1—Cs5—Sn9ⁱⁱⁱ	84.88 (10)	Sn7—Sn6—Sn2	105.96 (2)
N2ⁱᵛ—Cs5—Sn9ⁱⁱⁱ	63.22 (10)	Sn9—Sn6—Sn5	105.16 (2)
Cs4—Cs5—Sn9ⁱⁱⁱ	116.228 (16)	Sn7—Sn6—Sn5	59.94 (2)
O1—Cs5—Sn6ᵛ	111.48 (12)	Sn2—Sn6—Sn5	64.902 (19)
N2ⁱᵛ—Cs5—Sn6ᵛ	86.59 (13)	Sn9—Sn6—Cs5ⁱ	143.95 (3)
Cs4—Cs5—Sn6ᵛ	61.811 (14)	Sn7—Sn6—Cs5ⁱ	124.76 (2)
Sn9ⁱⁱⁱ—Cs5—Sn6ᵛ	121.556 (19)	Sn2—Sn6—Cs5ⁱ	98.21 (2)
O1—Cs5—Sn3ⁱⁱ	95.23 (12)	Sn5—Sn6—Cs5ⁱ	88.99 (2)
N2ⁱᵛ—Cs5—Sn3ⁱⁱ	77.16 (13)	Sn9—Sn6—Cs4ⁱ	110.94 (2)
Cs4—Cs5—Sn3ⁱⁱ	139.478 (18)	Sn7—Sn6—Cs4ⁱ	124.08 (2)
Sn9ⁱⁱⁱ—Cs5—Sn3ⁱⁱ	73.429 (15)	Sn2—Sn6—Cs4ⁱ	129.80 (2)
Sn6ᵛ—Cs5—Sn3ⁱⁱ	149.616 (17)	Sn5—Sn6—Cs4ⁱ	143.42 (2)
O1—Cs5—Sn4ⁱⁱ	97.15 (11)	Cs5ⁱ—Sn6—Cs4ⁱ	58.034 (13)
N2ⁱᵛ—Cs5—Sn4ⁱⁱ	99.27 (12)	Sn9—Sn6—Cs1	66.836 (19)

Cs4—Cs5—Sn4ii	109.876 (16)	Sn7—Sn6—Cs1	67.046 (18)
Sn9iii—Cs5—Sn4ii	119.695 (19)	Sn2—Sn6—Cs1	127.23 (2)
Sn6v—Cs5—Sn4ii	113.434 (16)	Sn5—Sn6—Cs1	126.39 (2)
Sn3ii—Cs5—Sn4ii	46.295 (12)	Cs5i—Sn6—Cs1	129.785 (16)
O1—Cs5—Cs1	45.22 (11)	Cs4i—Sn6—Cs1	75.135 (14)
N2iv—Cs5—Cs1	110.56 (12)	Sn8—Sn4—Sn1	108.31 (2)
Cs4—Cs5—Cs1	95.417 (14)	Sn8—Sn4—Sn7	60.719 (19)
Sn9iii—Cs5—Cs1	57.374 (13)	Sn1—Sn4—Sn7	109.03 (3)
Sn6v—Cs5—Cs1	155.179 (17)	Sn8—Sn4—Sn5	100.07 (2)
Sn3ii—Cs5—Cs1	54.861 (13)	Sn1—Sn4—Sn5	57.31 (2)
Sn4ii—Cs5—Cs1	82.331 (15)	Sn7—Sn4—Sn5	57.344 (19)
O1—Cs5—Sn8ii	130.91 (12)	Sn8—Sn4—Sn3	56.818 (17)
N2iv—Cs5—Sn8ii	59.02 (12)	Sn1—Sn4—Sn3	56.350 (19)
Cs4—Cs5—Sn8ii	145.780 (16)	Sn7—Sn4—Sn3	99.29 (2)
Sn9iii—Cs5—Sn8ii	96.897 (15)	Sn5—Sn4—Sn3	89.49 (2)
Sn6v—Cs5—Sn8ii	108.922 (16)	Sn8—Sn4—Cs2vii	125.66 (2)
Sn3ii—Cs5—Sn8ii	40.711 (12)	Sn1—Sn4—Cs2vii	112.72 (2)
Sn4ii—Cs5—Sn8ii	40.262 (11)	Sn7—Sn4—Cs2vii	73.050 (17)
Cs1—Cs5—Sn8ii	95.499 (16)	Sn5—Sn4—Cs2vii	75.125 (17)
O1—Cs5—Cs2	43.82 (10)	Sn3—Sn4—Cs2vii	164.60 (3)
N2iv—Cs5—Cs2	155.66 (13)	Sn8—Sn4—Cs2xi	136.64 (2)
Cs4—Cs5—Cs2	59.978 (14)	Sn1—Sn4—Cs2xi	72.311 (18)
Sn9iii—Cs5—Cs2	119.331 (17)	Sn7—Sn4—Cs2xi	162.15 (2)
Sn6v—Cs5—Cs2	108.391 (15)	Sn5—Sn4—Cs2xi	113.97 (2)
Sn3ii—Cs5—Cs2	80.651 (15)	Sn3—Sn4—Cs2xi	96.036 (17)
Sn4ii—Cs5—Cs2	57.504 (12)	Cs2vii—Sn4—Cs2xi	89.873 (12)
Cs1—Cs5—Cs2	62.723 (12)	Sn8—Sn4—Cs5xi	73.625 (18)
Sn8ii—Cs5—Cs2	97.327 (15)	Sn1—Sn4—Cs5xi	100.52 (2)
Sn7—Cs2—Sn4vi	91.823 (15)	Sn7—Sn4—Cs5xi	131.17 (2)
Sn7—Cs2—Sn4ii	128.598 (19)	Sn5—Sn4—Cs5xi	154.56 (2)
Sn4vi—Cs2—Sn4ii	124.596 (16)	Sn3—Sn4—Cs5xi	66.228 (17)
Sn7—Cs2—Cs4	100.440 (16)	Cs2vii—Sn4—Cs5xi	128.909 (19)
Sn4vi—Cs2—Cs4	99.106 (17)	Cs2xi—Sn4—Cs5xi	64.025 (13)
Sn4ii—Cs2—Cs4	106.844 (17)	Sn1—Sn5—Sn7	108.69 (3)
Sn7—Cs2—Sn7vi	133.131 (16)	Sn1—Sn5—Sn6	108.66 (2)
Sn4vi—Cs2—Sn7vi	41.753 (11)	Sn7—Sn5—Sn6	59.59 (2)
Sn4ii—Cs2—Sn7vi	87.418 (14)	Sn1—Sn5—Sn2	57.697 (19)
Cs4—Cs2—Sn7vi	94.530 (17)	Sn7—Sn5—Sn2	100.16 (2)
Sn7—Cs2—Sn1ii	89.560 (17)	Sn6—Sn5—Sn2	57.184 (18)
Sn4vi—Cs2—Sn1ii	125.124 (19)	Sn1—Sn5—Sn4	56.97 (2)
Sn4ii—Cs2—Sn1ii	41.007 (13)	Sn7—Sn5—Sn4	57.300 (19)
Cs4—Cs2—Sn1ii	134.426 (17)	Sn6—Sn5—Sn4	99.31 (2)
Sn7vi—Cs2—Sn1ii	110.573 (16)	Sn2—Sn5—Sn4	91.23 (2)
Sn7—Cs2—Cs5	109.417 (15)	Sn1—Sn5—Cs3xiii	69.015 (19)
Sn4vi—Cs2—Cs5	148.679 (19)	Sn7—Sn5—Cs3xiii	176.91 (2)
Sn4ii—Cs2—Cs5	58.471 (13)	Sn6—Sn5—Cs3xiii	118.80 (2)
Cs4—Cs2—Cs5	55.525 (13)	Sn2—Sn5—Cs3xiii	76.893 (18)
Sn7vi—Cs2—Cs5	115.608 (16)	Sn4—Sn5—Cs3xiii	121.47 (2)

Sn1ii—Cs2—Cs5	79.136 (14)	Sn1—Sn5—Cs4vii	111.766 (19)
Sn7—Cs2—Sn5vi	116.490 (16)	Sn7—Sn5—Cs4vii	115.01 (2)
Sn4vi—Cs2—Sn5vi	43.871 (13)	Sn6—Sn5—Cs4vii	138.10 (2)
Sn4ii—Cs2—Sn5vi	114.834 (16)	Sn2—Sn5—Cs4vii	144.45 (2)
Cs4—Cs2—Sn5vi	60.207 (13)	Sn4—Sn5—Cs4vii	111.50 (2)
Sn7vi—Cs2—Sn5vi	39.663 (12)	Cs3xiii—Sn5—Cs4vii	68.012 (13)
Sn1ii—Cs2—Sn5vi	149.209 (16)	Sn1—Sn5—Cs2vii	102.07 (2)
Cs5—Cs2—Sn5vi	104.930 (17)	Sn7—Sn5—Cs2vii	66.404 (18)
Sn7—Cs2—Cs1	56.821 (12)	Sn6—Sn5—Cs2vii	123.73 (2)
Sn4vi—Cs2—Cs1	148.568 (16)	Sn2—Sn5—Cs2vii	152.23 (2)
Sn4ii—Cs2—Cs1	80.342 (13)	Sn4—Sn5—Cs2vii	61.004 (16)
Cs4—Cs2—Cs1	89.708 (14)	Cs3xiii—Sn5—Cs2vii	115.845 (16)
Sn7vi—Cs2—Cs1	167.741 (16)	Cs4vii—Sn5—Cs2vii	57.042 (13)
Sn1ii—Cs2—Cs1	59.123 (12)	Sn1—Sn3—Sn9	109.13 (3)
Cs5—Cs2—Cs1	58.068 (11)	Sn1—Sn3—Sn8	107.82 (2)
Sn5vi—Cs2—Cs1	148.656 (18)	Sn9—Sn3—Sn8	60.55 (2)
Sn7—Cs2—Cs2vii	47.576 (10)	Sn1—Sn3—Sn2	57.17 (2)
Sn4vi—Cs2—Cs2vii	45.631 (12)	Sn9—Sn3—Sn2	57.62 (2)
Sn4ii—Cs2—Cs2vii	157.83 (2)	Sn8—Sn3—Sn2	99.76 (2)
Cs4—Cs2—Cs2vii	95.020 (15)	Sn1—Sn3—Sn4	56.415 (19)
Sn7vi—Cs2—Cs2vii	87.268 (15)	Sn9—Sn3—Sn4	98.90 (2)
Sn1ii—Cs2—Cs2vii	122.60 (2)	Sn8—Sn3—Sn4	56.218 (17)
Cs5—Cs2—Cs2vii	142.091 (16)	Sn2—Sn3—Sn4	89.22 (2)
Sn5vi—Cs2—Cs2vii	72.807 (14)	Sn1—Sn3—Cs1xi	77.654 (18)
Cs1—Cs2—Cs2vii	103.840 (12)	Sn9—Sn3—Cs1xi	157.53 (2)
Sn7—Cs2—Cs2vi	146.38 (2)	Sn8—Sn3—Cs1xi	139.24 (3)
Sn4vi—Cs2—Cs2vi	80.443 (14)	Sn2—Sn3—Cs1xi	115.45 (2)
Sn4ii—Cs2—Cs2vi	44.495 (8)	Sn4—Sn3—Cs1xi	102.444 (18)
Cs4—Cs2—Cs2vi	113.053 (17)	Sn1—Sn3—Cs5xi	101.43 (2)
Sn7vi—Cs2—Cs2vi	44.205 (11)	Sn9—Sn3—Cs5xi	130.87 (2)
Sn1ii—Cs2—Cs2vi	69.422 (13)	Sn8—Sn3—Cs5xi	74.07 (2)
Cs5—Cs2—Cs2vi	92.580 (11)	Sn2—Sn3—Cs5xi	155.51 (2)
Sn5vi—Cs2—Cs2vi	79.856 (14)	Sn4—Sn3—Cs5xi	67.477 (17)
Cs1—Cs2—Cs2vi	123.659 (15)	Cs1xi—Sn3—Cs5xi	65.349 (14)
Cs2vii—Cs2—Cs2vi	123.070 (17)	Sn1—Sn3—Cs1xii	170.99 (3)
N2viii—Cs3—Sn8	63.17 (13)	Sn9—Sn3—Cs1xii	66.980 (17)
N2viii—Cs3—Sn9iii	115.20 (10)	Sn8—Sn3—Cs1xii	77.744 (18)
Sn8—Cs3—Sn9iii	105.364 (18)	Sn2—Sn3—Cs1xii	115.47 (2)
N2viii—Cs3—Sn3iii	75.92 (11)	Sn4—Sn3—Cs1xii	131.33 (2)
Sn8—Cs3—Sn3iii	77.873 (16)	Cs1xi—Sn3—Cs1xii	102.944 (15)
Sn9iii—Cs3—Sn3iii	40.943 (12)	Cs5xi—Sn3—Cs1xii	86.825 (17)
N2viii—Cs3—Sn2iii	87.77 (10)	Sn1—Sn3—Cs3xii	107.44 (2)
Sn8—Cs3—Sn2iii	121.638 (18)	Sn9—Sn3—Cs3xii	69.109 (18)
Sn9iii—Cs3—Sn2iii	41.602 (12)	Sn8—Sn3—Cs3xii	125.34 (2)
Sn3iii—Cs3—Sn2iii	45.128 (14)	Sn2—Sn3—Cs3xii	67.578 (17)
N2viii—Cs3—Sn1ix	99.02 (13)	Sn4—Sn3—Cs3xii	156.79 (2)
Sn8—Cs3—Sn1ix	126.998 (17)	Cs1xi—Sn3—Cs3xii	88.437 (15)
Sn9iii—Cs3—Sn1ix	126.514 (18)	Cs5xi—Sn3—Cs3xii	135.489 (17)

Sn3iii—Cs3—Sn1ix	149.810 (19)	Cs1xii—Sn3—Cs3xii	63.713 (14)
Sn2iii—Cs3—Sn1ix	105.654 (18)	Sn6—Sn2—Sn1	108.91 (2)
N2viii—Cs3—Cs4	136.56 (10)	Sn6—Sn2—Sn9	59.43 (2)
Sn8—Cs3—Cs4	100.445 (16)	Sn1—Sn2—Sn9	107.09 (3)
Sn9iii—Cs3—Cs4	107.813 (15)	Sn6—Sn2—Sn5	57.914 (18)
Sn3iii—Cs3—Cs4	143.281 (17)	Sn1—Sn2—Sn5	57.249 (18)
Sn2iii—Cs3—Cs4	131.129 (17)	Sn9—Sn2—Sn5	99.29 (2)
Sn1ix—Cs3—Cs4	57.148 (13)	Sn6—Sn2—Sn3	98.82 (2)
N2viii—Cs3—Sn5ix	58.32 (13)	Sn1—Sn2—Sn3	56.34 (2)
Sn8—Cs3—Sn5ix	101.741 (16)	Sn9—Sn2—Sn3	56.183 (19)
Sn9iii—Cs3—Sn5ix	143.904 (18)	Sn5—Sn2—Sn3	90.07 (2)
Sn3iii—Cs3—Sn5ix	126.547 (16)	Sn6—Sn2—Cs4xiii	164.74 (3)
Sn2iii—Cs3—Sn5ix	103.266 (17)	Sn1—Sn2—Cs4xiii	68.353 (18)
Sn1ix—Cs3—Sn5ix	40.724 (12)	Sn9—Sn2—Cs4xiii	135.78 (2)
Cs4—Cs3—Sn5ix	89.967 (15)	Sn5—Sn2—Cs4xiii	111.62 (2)
N2viii—Cs3—Cs1	107.90 (13)	Sn3—Sn2—Cs4xiii	91.928 (19)
Sn8—Cs3—Cs1	56.307 (13)	Sn6—Sn2—Cs3xii	123.22 (2)
Sn9iii—Cs3—Cs1	55.779 (13)	Sn1—Sn2—Cs3xii	106.66 (2)
Sn3iii—Cs3—Cs1	57.211 (13)	Sn9—Sn2—Cs3xii	68.632 (17)
Sn2iii—Cs3—Cs1	92.782 (15)	Sn5—Sn2—Cs3xii	157.36 (3)
Sn1ix—Cs3—Cs1	147.903 (16)	Sn3—Sn2—Cs3xii	67.296 (17)
Cs4—Cs3—Cs1	90.915 (15)	Cs4xiii—Sn2—Cs3xii	70.996 (14)
Sn5ix—Cs3—Cs1	157.780 (18)	Sn6—Sn7—Sn4	105.59 (2)
N2viii—Cs3—Cs5	164.84 (13)	Sn6—Sn7—Sn5	60.47 (2)
Sn8—Cs3—Cs5	106.815 (17)	Sn4—Sn7—Sn5	65.36 (2)
Sn9iii—Cs3—Cs5	54.469 (11)	Sn6—Sn7—Sn8	89.94 (2)
Sn3iii—Cs3—Cs5	91.162 (14)	Sn4—Sn7—Sn8	59.306 (18)
Sn2iii—Cs3—Cs5	88.612 (13)	Sn5—Sn7—Sn8	104.72 (2)
Sn1ix—Cs3—Cs5	96.134 (15)	Sn6—Sn7—Cs2	118.88 (2)
Cs4—Cs3—Cs5	53.719 (11)	Sn4—Sn7—Cs2	135.04 (2)
Sn5ix—Cs3—Cs5	136.804 (17)	Sn5—Sn7—Cs2	143.35 (2)
Cs1—Cs3—Cs5	57.588 (12)	Sn8—Sn7—Cs2	111.92 (2)
N2viii—Cs3—Cs4viii	43.41 (12)	Sn6—Sn7—Cs1	71.394 (18)
Sn8—Cs3—Cs4viii	104.556 (15)	Sn4—Sn7—Cs1	125.38 (2)
Sn9iii—Cs3—Cs4viii	93.062 (13)	Sn5—Sn7—Cs1	131.21 (2)
Sn3iii—Cs3—Cs4viii	71.279 (13)	Sn8—Sn7—Cs1	66.117 (17)
Sn2iii—Cs3—Cs4viii	53.023 (12)	Cs2—Sn7—Cs1	68.033 (13)
Sn1ix—Cs3—Cs4viii	84.558 (15)	Sn6—Sn7—Cs2vii	131.71 (2)
Cs4—Cs3—Cs4viii	141.674 (15)	Sn4—Sn7—Cs2vii	65.197 (16)
Sn5ix—Cs3—Cs4viii	56.920 (12)	Sn5—Sn7—Cs2vii	73.933 (18)
Cs1—Cs3—Cs4viii	127.162 (15)	Sn8—Sn7—Cs2vii	117.69 (2)
Cs5—Cs3—Cs4viii	139.627 (15)	Cs2—Sn7—Cs2vii	88.220 (12)
N1—Cs4—Cs5	111.82 (14)	Cs1—Sn7—Cs2vii	154.315 (19)
N1—Cs4—Sn1ix	107.34 (13)	Sn3—Sn1—Sn4	67.23 (2)
Cs5—Cs4—Sn1ix	108.886 (17)	Sn3—Sn1—Sn5	100.91 (2)
N1—Cs4—Sn2ix	66.34 (14)	Sn4—Sn1—Sn5	65.72 (2)
Cs5—Cs4—Sn2ix	135.927 (17)	Sn3—Sn1—Sn2	66.48 (2)
Sn1ix—Cs4—Sn2ix	42.824 (13)	Sn4—Sn1—Sn2	101.03 (2)

N1—Cs4—Sn6^v	165.43 (14)	Sn5—Sn1—Sn2	65.05 (2)
Cs5—Cs4—Sn6^v	60.155 (14)	Sn3—Sn1—Cs4^{xiii}	96.83 (2)
Sn1^{ix}—Cs4—Sn6^v	87.136 (17)	Sn4—Sn1—Cs4^{xiii}	163.88 (2)
Sn2^{ix}—Cs4—Sn6^v	128.14 (2)	Sn5—Sn1—Cs4^{xiii}	117.52 (3)
N1—Cs4—Cs2	55.63 (14)	Sn2—Sn1—Cs4^{xiii}	68.824 (19)
Cs5—Cs4—Cs2	64.497 (14)	Sn3—Sn1—Cs3^{xiii}	145.08 (2)
Sn1^{ix}—Cs4—Cs2	150.248 (18)	Sn4—Sn1—Cs3^{xiii}	130.33 (2)
Sn2^{ix}—Cs4—Cs2	120.324 (18)	Sn5—Sn1—Cs3^{xiii}	70.26 (2)
Sn6^v—Cs4—Cs2	110.600 (16)	Sn2—Sn1—Cs3^{xiii}	79.59 (2)
N1—Cs4—Cs3	83.55 (13)	Cs4^{xiii}—Sn1—Cs3^{xiii}	61.826 (14)
Cs5—Cs4—Cs3	67.362 (13)	Sn3—Sn1—Cs2^{xi}	97.98 (2)
Sn1^{ix}—Cs4—Cs3	61.026 (14)	Sn4—Sn1—Cs2^{xi}	66.681 (18)
Sn2^{ix}—Cs4—Cs3	68.737 (13)	Sn5—Sn1—Cs2^{xi}	115.64 (2)
Sn6^v—Cs4—Cs3	102.670 (15)	Sn2—Sn1—Cs2^{xi}	163.63 (3)
Cs2—Cs4—Cs3	91.084 (16)	Cs4^{xiii}—Sn1—Cs2^{xi}	120.338 (17)
N1—Cs4—Sn5^{vi}	63.77 (13)	Cs3^{xiii}—Sn1—Cs2^{xi}	116.465 (16)
Cs5—Cs4—Sn5^{vi}	114.035 (17)	Sn3—Sn1—Cs1^{xi}	61.077 (16)
Sn1^{ix}—Cs4—Sn5^{vi}	136.305 (18)	Sn4—Sn1—Cs1^{xi}	98.27 (2)
Sn2^{ix}—Cs4—Sn5^{vi}	104.233 (16)	Sn5—Sn1—Cs1^{xi}	160.44 (2)
Sn6^v—Cs4—Sn5^{vi}	107.003 (15)	Sn2—Sn1—Cs1^{xi}	109.90 (2)
Cs2—Cs4—Sn5^{vi}	62.751 (14)	Cs4^{xiii}—Sn1—Cs1^{xi}	74.730 (14)
Cs3—Cs4—Sn5^{vi}	145.75 (2)	Cs3^{xiii}—Sn1—Cs1^{xi}	128.664 (17)
N1—Cs4—Cs3^x	69.42 (14)	Cs2^{xi}—Sn1—Cs1^{xi}	63.520 (13)
Cs5—Cs4—Cs3^x	167.984 (17)	Cs5—O1—H1	180.0
Sn1^{ix}—Cs4—Cs3^x	81.400 (14)	H4A—N4—H4B	109.5
Sn2^{ix}—Cs4—Cs3^x	55.981 (12)	H4A—N4—H4C	109.5
Sn6^v—Cs4—Cs3^x	115.700 (17)	H4B—N4—H4C	109.5
Cs2—Cs4—Cs3^x	109.695 (15)	H3A—N3—H3B	109.5
Cs3—Cs4—Cs3^x	124.270 (12)	H3A—N3—H3C	109.5
Sn5^{vi}—Cs4—Cs3^x	55.068 (12)	H3B—N3—H3C	109.5
Sn4—Sn8—Sn3	66.964 (19)	H2A—N2—H2B	109.5
Sn4—Sn8—Sn9	105.62 (2)	H2A—N2—H2C	109.5
Sn3—Sn8—Sn9	59.38 (2)	H2B—N2—H2C	109.5
Sn4—Sn8—Sn7	59.975 (18)	Cs4—N1—H1A	109.5
Sn3—Sn8—Sn7	105.81 (2)	Cs4—N1—H1B	109.5
Sn9—Sn8—Sn7	89.35 (2)	H1A—N1—H1B	109.5
Sn4—Sn8—Cs1	130.47 (2)	Cs4—N1—H1C	109.5
Sn3—Sn8—Cs1	129.70 (2)	H1A—N1—H1C	109.5
Sn9—Sn8—Cs1	70.347 (17)	H1B—N1—H1C	109.5
Sn7—Sn8—Cs1	70.536 (17)		

Symmetry codes: (i) −*x*+3/2, −*y*+1, *z*+1/2; (ii) *x*+1, *y*, *z*; (iii) *x*+1/2, −*y*+3/2, −*z*+1; (iv) −*x*+2, *y*+1/2, −*z*+1/2; (v) −*x*+3/2, −*y*+1, *z*−1/2; (vi) *x*+1/2, −*y*+1/2, −*z*+1; (vii) *x*−1/2, −*y*+1/2, −*z*+1; (viii) −*x*+1, *y*+1/2, −*z*+1/2; (ix) −*x*+1/2, −*y*+1, *z*−1/2; (x) −*x*+1, *y*−1/2, −*z*+1/2; (xi) *x*−1, *y*, *z*; (xii) *x*−1/2, −*y*+3/2, −*z*+1; (xiii) −*x*+1/2, −*y*+1, *z*+1/2.