

Acta Crystallographica Section E

Structure Reports

Online

ISSN 1600-5368

catena-Poly[[triphenyltin(IV)]- μ -2-(2-picolinoylhydrazono)propanoato- κ^2 O¹:O²]

Jichun Cui, Yanling Qiao, Longhua Ding and Handong Yin*

College of Chemistry and Chemical Engineering, Liaocheng University, Shandong 252059, People's Republic of China

Correspondence e-mail: handongyin@163.com

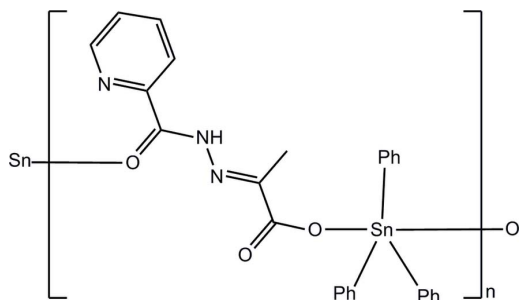
Received 21 September 2009; accepted 1 October 2009

 Key indicators: single-crystal X-ray study; $T = 298$ K; mean $\sigma(\text{C}-\text{C}) = 0.008$ Å; R factor = 0.033; wR factor = 0.068; data-to-parameter ratio = 14.4.

In the title polymeric coordination compound, $[\text{Sn}(\text{C}_6\text{H}_5)_3(\text{C}_9\text{H}_8\text{N}_3\text{O}_3)]_n$, the Sn^{IV} atom is in a distorted trigonal-bipyramidal geometry, being coordinated by two O atoms from two 2-(2-picolinoylhydrazono)propanoate ligands and three phenyl groups. Adjacent Sn atoms are bridged by the 2-(2-picolinoylhydrazono)propanoate ligand through one carbonyl O atom and one carboxylate O atom, forming a chain structure propagating parallel to [100]. An intramolecular $\text{N}-\text{H}\cdots\text{O}$ hydrogen bond is observed.

Related literature

For some organotin(IV) complexes with pyruvic acid isonicotinyldiazone, see: Yin *et al.* (2005).



Experimental

Crystal data

$[\text{Sn}(\text{C}_6\text{H}_5)_3(\text{C}_9\text{H}_8\text{N}_3\text{O}_3)]_n$
 $M_r = 556.17$
 Orthorhombic, $P2_12_12_1$
 $a = 10.2622$ (9) Å

$b = 11.0105$ (12) Å
 $c = 22.344$ (2) Å
 $V = 2524.6$ (4) Å³
 $Z = 4$

Mo $K\alpha$ radiation
 $\mu = 1.04$ mm⁻¹

$T = 298$ K
 $0.33 \times 0.20 \times 0.15$ mm

Data collection

Siemens SMART 1000 CCD diffractometer
 Absorption correction: multi-scan (SADABS; Sheldrick, 1996)
 $T_{\text{min}} = 0.724$, $T_{\text{max}} = 0.859$

10482 measured reflections
 4441 independent reflections
 3863 reflections with $I > 2\sigma(I)$
 $R_{\text{int}} = 0.033$

Refinement

$R[F^2 > 2\sigma(F^2)] = 0.033$
 $wR(F^2) = 0.068$
 $S = 1.00$
 4441 reflections
 308 parameters
 H-atom parameters constrained

$\Delta\rho_{\text{max}} = 0.50$ e Å⁻³
 $\Delta\rho_{\text{min}} = -0.32$ e Å⁻³
 Absolute structure: Flack (1983), 1905 Friedel pairs
 Flack parameter: -0.01 (2)

Table 1

Selected bond lengths (Å).

Sn1—O2 ⁱ	2.123 (3)	Sn1—C16	2.134 (4)
Sn1—O3	2.549 (3)	Sn1—C22	2.129 (4)
Sn1—C10	2.130 (4)		

 Symmetry code: (i) $x + 1, y, z$.

Table 2

Hydrogen-bond geometry (Å, °).

$D-\text{H}\cdots A$	$D-\text{H}$	$\text{H}\cdots A$	$D\cdots A$	$D-\text{H}\cdots A$
$\text{N2}-\text{H2}\cdots\text{O1}$	0.86	1.99	2.647 (5)	132

Data collection: SMART (Siemens, 1996); cell refinement: SAINT (Siemens, 1996); data reduction: SAINT; program(s) used to solve structure: SHELXS97 (Sheldrick, 2008); program(s) used to refine structure: SHELXL97 (Sheldrick, 2008); molecular graphics: SHELXTL (Sheldrick, 2008); software used to prepare material for publication: SHELXTL.

We acknowledge the National Natural Foundation of China (grant No. 20771053), the Scientific Research Fund of Liaocheng University (X081006) and the Students Science and Technology Innovation Fund of Liaocheng University (SRT08031HX2).

Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: HY2232).

References

- Flack, H. D. (1983). *Acta Cryst.* **A39**, 876–881.
 Sheldrick, G. M. (1996). SADABS. University of Göttingen, Germany.
 Sheldrick, G. M. (2008). *Acta Cryst.* **A64**, 112–122.
 Siemens (1996). SMART and SAINT. Siemens Analytical X-ray Instruments Inc., Madison, Wisconsin, USA.
 Yin, H., Hong, M., Xu, H., Gao, Z., Li, G. & Wang, D. (2005). *Eur. J. Inorg. Chem.* pp. 4572–4581.

supporting information

Acta Cryst. (2009). E65, m1313 [https://doi.org/10.1107/S1600536809039981]

catena-Poly[[triphenyltin(IV)]- μ -2-(2-picolinoylhydrazono)propanoato- κ^2 O¹:O²]

Jichun Cui, Yanling Qiao, Longhua Ding and Handong Yin

S1. Comment

Recently, we have reported some organotin(IV) complexes with pyruvic acid isonicotinyl hydrazone (Yin *et al.*, 2005). As a part of our ongoing investigations in this field, we have synthesized the title compound and present its crystal structure here.

The title compound (Fig. 1) forms an extended one-dimensional chain structure arising from Sn—O bridges formed by the 2-(2-picolinoylhydrazono)propanoate ligand. The Sn^{IV} atom assumes a distorted trigonal-bipyramidal coordination geometry, with atoms O3 and O2ⁱ in the axial positions [O3—Sn1—O2ⁱ = 175.65 (13)°, symmetry code: (i) x+1, y, z] and the atoms C10, C16 and C22 in the equatorial positions. One of the two Sn—O bond lengths is shorter and the other is longer (Table 1). The complex involves an intramolecular N—H \cdots O hydrogen bond (Table 2).

S2. Experimental

The reaction was carried out under nitrogen atmosphere. 2-(2-Picolinoylhydrazono)propanoic acid (1 mmol) and sodium ethoxide (1.2 mmol) were added to a solution of benzene (30 ml) in a Schlenk flask and stirred for 0.5 h. Triphenyltin chloride (1 mmol) was then added to the reactor and the reaction mixture was stirred for 4 h at 313 K. The resulting clear solution was evaporated under vacuum. The product was crystallized from a mixture of dichloromethane/methanol (v/v 1:1) to yield colorless block crystals of the title compound (yield 78%).

S3. Refinement

H atoms were positioned geometrically and refined as riding atoms, with C—H = 0.93 (aromatic) and 0.96 (methyl) Å, and N—H = 0.86 Å and with $U_{\text{iso}}(\text{H}) = 1.2(1.5 \text{ for methyl})U_{\text{eq}}(\text{C}, \text{N})$.

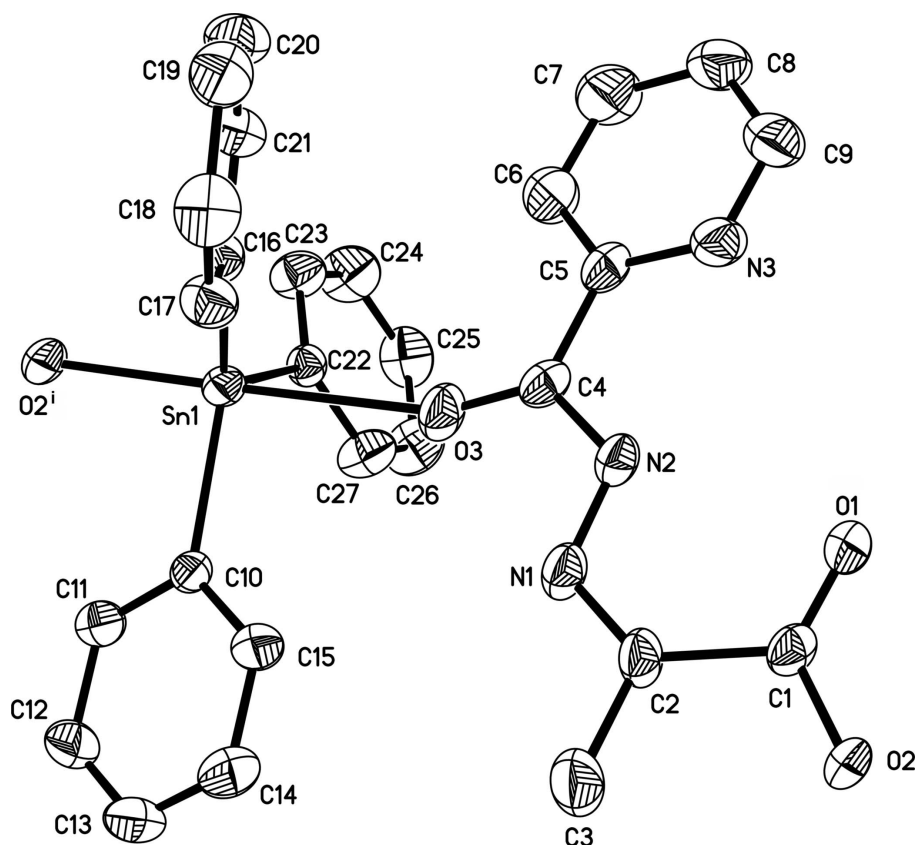


Figure 1

The asymmetric unit of the title compound, showing the 50% probability displacement ellipsoids. H atoms have been omitted for clarity. [Symmetry code: (i) $x+1, y, z$.]

catena-Poly[[triphenyltin(IV)]- μ -2-(2-picolinoylhydrazone)propanoato- κ^2 O¹:O²]

Crystal data

[Sn(C₆H₅)₃(C₉H₈N₃O₃)]

$M_r = 556.17$

Orthorhombic, $P2_12_12_1$

Hall symbol: P 2ac 2ab

$a = 10.2622$ (9) Å

$b = 11.0105$ (12) Å

$c = 22.344$ (2) Å

$V = 2524.6$ (4) Å³

$Z = 4$

$F(000) = 1120$

$D_x = 1.463$ Mg m⁻³

Mo $K\alpha$ radiation, $\lambda = 0.71073$ Å

Cell parameters from 4196 reflections

$\theta = 2.6$ – 23.1°

$\mu = 1.04$ mm⁻¹

$T = 298$ K

Block, colorless

$0.33 \times 0.20 \times 0.15$ mm

Data collection

Siemens SMART 1000 CCD
diffractometer

Radiation source: fine-focus sealed tube

Graphite monochromator

φ and ω scans

Absorption correction: multi-scan

(*SADABS*; Sheldrick, 1996)

$T_{\min} = 0.724$, $T_{\max} = 0.859$

10482 measured reflections

4441 independent reflections

3863 reflections with $I > 2\sigma(I)$

$R_{\text{int}} = 0.033$

$\theta_{\max} = 25.0^\circ$, $\theta_{\min} = 1.8^\circ$

$h = -12 \rightarrow 12$

$k = -13 \rightarrow 11$

$l = -11 \rightarrow 26$

*Refinement*Refinement on F^2

Least-squares matrix: full

 $R[F^2 > 2\sigma(F^2)] = 0.033$ $wR(F^2) = 0.068$ $S = 1.00$

4441 reflections

308 parameters

0 restraints

Primary atom site location: structure-invariant
direct methodsSecondary atom site location: difference Fourier
mapHydrogen site location: inferred from
neighbouring sites

H-atom parameters constrained

 $w = 1/[\sigma^2(F_o^2) + (0.0302P)^2 + 0.4754P]$ where $P = (F_o^2 + 2F_c^2)/3$ $(\Delta/\sigma)_{\max} = 0.001$ $\Delta\rho_{\max} = 0.50 \text{ e } \text{\AA}^{-3}$ $\Delta\rho_{\min} = -0.32 \text{ e } \text{\AA}^{-3}$ Absolute structure: Flack (1983), 1905 Friedel
pairsAbsolute structure parameter: -0.01 (2)*Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (\AA^2)*

	<i>x</i>	<i>y</i>	<i>z</i>	$U_{\text{iso}}^*/U_{\text{eq}}$
Sn1	0.44055 (3)	0.91214 (3)	0.881010 (13)	0.04040 (9)
N1	-0.0246 (3)	0.8712 (3)	0.86140 (18)	0.0525 (11)
N2	-0.0091 (4)	0.9927 (4)	0.84881 (17)	0.0500 (11)
H2	-0.0749	1.0367	0.8389	0.060*
N3	0.0110 (4)	1.2185 (4)	0.8083 (2)	0.0679 (13)
O1	-0.2663 (3)	1.0095 (3)	0.84524 (16)	0.0615 (10)
O2	-0.3655 (3)	0.8450 (3)	0.88128 (16)	0.0525 (8)
O3	0.2059 (3)	0.9861 (3)	0.87271 (16)	0.0609 (9)
C1	-0.2661 (4)	0.9054 (5)	0.86320 (18)	0.0470 (11)
C2	-0.1409 (4)	0.8298 (4)	0.8660 (2)	0.0536 (14)
C3	-0.1536 (5)	0.6967 (4)	0.8767 (4)	0.095 (2)
H3A	-0.0689	0.6597	0.8753	0.143*
H3B	-0.2081	0.6617	0.8464	0.143*
H3C	-0.1918	0.6831	0.9153	0.143*
C4	0.1115 (5)	1.0416 (5)	0.8524 (2)	0.0490 (13)
C5	0.1188 (5)	1.1707 (5)	0.8323 (2)	0.0524 (13)
C6	0.2312 (6)	1.2354 (5)	0.8391 (3)	0.0771 (17)
H6	0.3048	1.1992	0.8556	0.092*
C7	0.2344 (7)	1.3558 (6)	0.8210 (3)	0.093 (2)
H7	0.3099	1.4016	0.8256	0.111*
C8	0.1258 (6)	1.4063 (6)	0.7964 (3)	0.0855 (18)
H8	0.1258	1.4865	0.7833	0.103*
C9	0.0156 (6)	1.3348 (6)	0.7914 (3)	0.084 (2)
H9	-0.0593	1.3696	0.7755	0.101*
C10	0.3724 (4)	0.7494 (4)	0.92196 (19)	0.0416 (11)
C11	0.4586 (6)	0.6846 (4)	0.9577 (2)	0.0563 (13)
H11	0.5426	0.7141	0.9633	0.068*
C12	0.4220 (6)	0.5767 (5)	0.9851 (2)	0.0695 (14)
H12	0.4816	0.5342	1.0084	0.083*
C13	0.2987 (7)	0.5332 (5)	0.9778 (3)	0.0774 (18)
H13	0.2736	0.4610	0.9960	0.093*
C14	0.2120 (6)	0.5972 (6)	0.9432 (3)	0.0807 (17)

H14	0.1276	0.5679	0.9383	0.097*
C15	0.2481 (5)	0.7040 (5)	0.9156 (2)	0.0613 (15)
H15	0.1878	0.7460	0.8923	0.074*
C16	0.4224 (4)	0.9300 (4)	0.78627 (17)	0.0401 (10)
C17	0.3600 (5)	0.8390 (4)	0.7544 (2)	0.0567 (13)
H17	0.3265	0.7719	0.7745	0.068*
C18	0.3471 (6)	0.8474 (6)	0.6925 (3)	0.0701 (16)
H18	0.3047	0.7861	0.6715	0.084*
C19	0.3964 (5)	0.9455 (6)	0.6623 (2)	0.0710 (17)
H19	0.3889	0.9502	0.6209	0.085*
C20	0.4566 (6)	1.0359 (5)	0.6933 (2)	0.0681 (15)
H20	0.4886	1.1033	0.6730	0.082*
C21	0.4705 (5)	1.0281 (4)	0.7553 (2)	0.0564 (13)
H21	0.5127	1.0901	0.7759	0.068*
C22	0.4531 (5)	1.0551 (4)	0.94492 (18)	0.0418 (10)
C23	0.5361 (6)	1.1514 (4)	0.9415 (2)	0.0656 (15)
H23	0.5927	1.1580	0.9091	0.079*
C24	0.5371 (7)	1.2402 (5)	0.9860 (3)	0.0850 (19)
H24	0.5938	1.3058	0.9826	0.102*
C25	0.4572 (7)	1.2324 (5)	1.0339 (3)	0.0777 (17)
H25	0.4569	1.2930	1.0629	0.093*
C26	0.3775 (7)	1.1350 (6)	1.0388 (3)	0.085 (2)
H26	0.3244	1.1269	1.0723	0.102*
C27	0.3745 (5)	1.0475 (5)	0.9946 (2)	0.0698 (16)
H27	0.3179	0.9820	0.9986	0.084*

Atomic displacement parameters (\AA^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Sn1	0.03474 (14)	0.04058 (15)	0.04589 (15)	-0.00566 (16)	0.00029 (17)	0.00224 (16)
N1	0.032 (2)	0.054 (2)	0.071 (3)	-0.0004 (16)	-0.0010 (18)	-0.0072 (19)
N2	0.030 (2)	0.060 (3)	0.060 (2)	-0.0003 (18)	-0.0007 (18)	0.001 (2)
N3	0.049 (3)	0.084 (3)	0.070 (3)	-0.009 (2)	-0.006 (2)	0.027 (3)
O1	0.0360 (19)	0.061 (2)	0.088 (3)	0.0008 (16)	0.0023 (18)	0.016 (2)
O2	0.0291 (15)	0.0616 (18)	0.067 (2)	-0.0036 (14)	0.0045 (18)	0.008 (2)
O3	0.0346 (18)	0.068 (2)	0.080 (3)	-0.0012 (16)	-0.002 (2)	-0.004 (2)
C1	0.031 (2)	0.061 (3)	0.048 (3)	-0.008 (3)	-0.0073 (19)	0.002 (3)
C2	0.033 (3)	0.050 (3)	0.077 (4)	0.003 (2)	-0.011 (2)	-0.003 (3)
C3	0.050 (3)	0.057 (3)	0.179 (7)	0.002 (3)	-0.005 (5)	0.012 (4)
C4	0.037 (3)	0.064 (3)	0.047 (3)	-0.011 (2)	0.002 (2)	0.000 (3)
C5	0.036 (3)	0.067 (3)	0.054 (3)	-0.008 (3)	0.002 (2)	-0.002 (3)
C6	0.056 (4)	0.076 (4)	0.100 (5)	-0.008 (3)	-0.005 (3)	0.013 (4)
C7	0.071 (5)	0.091 (5)	0.117 (6)	-0.025 (4)	-0.009 (4)	0.014 (4)
C8	0.077 (4)	0.080 (4)	0.099 (5)	-0.017 (4)	0.001 (4)	0.029 (4)
C9	0.073 (5)	0.089 (5)	0.091 (5)	-0.002 (4)	-0.010 (3)	0.037 (4)
C10	0.040 (3)	0.036 (2)	0.049 (3)	-0.002 (2)	0.009 (2)	-0.003 (2)
C11	0.053 (3)	0.058 (3)	0.058 (3)	-0.002 (3)	0.005 (3)	0.009 (2)
C12	0.081 (4)	0.061 (3)	0.066 (3)	0.010 (4)	0.011 (3)	0.021 (3)

C13	0.087 (5)	0.054 (3)	0.091 (4)	-0.009 (3)	0.021 (4)	0.016 (3)
C14	0.059 (4)	0.070 (4)	0.113 (5)	-0.017 (4)	0.015 (3)	0.009 (4)
C15	0.049 (3)	0.052 (3)	0.083 (4)	-0.006 (3)	0.006 (3)	0.012 (3)
C16	0.031 (2)	0.045 (2)	0.044 (2)	0.004 (2)	-0.0019 (19)	0.000 (2)
C17	0.065 (3)	0.051 (3)	0.054 (3)	-0.002 (3)	0.001 (3)	0.001 (3)
C18	0.071 (4)	0.079 (4)	0.061 (4)	-0.002 (3)	-0.015 (3)	-0.018 (3)
C19	0.068 (4)	0.095 (5)	0.051 (3)	0.010 (3)	-0.009 (3)	0.004 (3)
C20	0.070 (4)	0.074 (4)	0.061 (3)	-0.007 (3)	-0.006 (3)	0.019 (3)
C21	0.059 (4)	0.053 (3)	0.056 (3)	-0.007 (3)	-0.007 (3)	0.007 (2)
C22	0.038 (2)	0.043 (3)	0.045 (2)	0.001 (2)	-0.002 (2)	-0.0001 (18)
C23	0.074 (4)	0.056 (3)	0.067 (3)	-0.017 (3)	0.010 (3)	-0.010 (3)
C24	0.097 (5)	0.062 (4)	0.096 (5)	-0.023 (4)	0.006 (4)	-0.024 (3)
C25	0.090 (5)	0.067 (4)	0.076 (4)	0.002 (4)	-0.011 (4)	-0.030 (3)
C26	0.097 (5)	0.102 (5)	0.055 (3)	-0.003 (4)	0.016 (3)	-0.021 (4)
C27	0.074 (4)	0.074 (4)	0.062 (3)	-0.018 (3)	0.016 (3)	-0.008 (3)

Geometric parameters (Å, °)

Sn1—O2 ⁱ	2.123 (3)	C11—C12	1.388 (7)
Sn1—O3	2.549 (3)	C11—H11	0.9300
Sn1—C10	2.130 (4)	C12—C13	1.363 (8)
Sn1—C16	2.134 (4)	C12—H12	0.9300
Sn1—C22	2.129 (4)	C13—C14	1.373 (8)
N1—C2	1.281 (6)	C13—H13	0.9300
N1—N2	1.377 (5)	C14—C15	1.380 (7)
N2—C4	1.352 (5)	C14—H14	0.9300
N2—H2	0.8600	C15—H15	0.9300
N3—C9	1.336 (7)	C16—C21	1.375 (6)
N3—C5	1.337 (6)	C16—C17	1.387 (6)
O1—C1	1.215 (6)	C17—C18	1.393 (7)
O2—C1	1.283 (5)	C17—H17	0.9300
O2—Sn1 ⁱⁱ	2.123 (3)	C18—C19	1.370 (8)
O3—C4	1.232 (5)	C18—H18	0.9300
C1—C2	1.532 (6)	C19—C20	1.360 (7)
C2—C3	1.490 (7)	C19—H19	0.9300
C3—H3A	0.9600	C20—C21	1.395 (6)
C3—H3B	0.9600	C20—H20	0.9300
C3—H3C	0.9600	C21—H21	0.9300
C4—C5	1.492 (7)	C22—C23	1.363 (6)
C5—C6	1.365 (7)	C22—C27	1.376 (6)
C6—C7	1.387 (8)	C23—C24	1.394 (7)
C6—H6	0.9300	C23—H23	0.9300
C7—C8	1.360 (8)	C24—C25	1.351 (8)
C7—H7	0.9300	C24—H24	0.9300
C8—C9	1.382 (8)	C25—C26	1.353 (8)
C8—H8	0.9300	C25—H25	0.9300
C9—H9	0.9300	C26—C27	1.380 (7)
C10—C15	1.378 (7)	C26—H26	0.9300

C10—C11	1.388 (6)	C27—H27	0.9300
O2 ⁱ —Sn1—C22	101.46 (16)	C12—C11—H11	119.3
O2 ⁱ —Sn1—C10	90.77 (14)	C10—C11—H11	119.3
C22—Sn1—C10	110.71 (16)	C13—C12—C11	119.9 (5)
O2 ⁱ —Sn1—C16	96.70 (14)	C13—C12—H12	120.1
C22—Sn1—C16	127.04 (15)	C11—C12—H12	120.1
C10—Sn1—C16	118.37 (16)	C12—C13—C14	119.3 (5)
O2 ⁱ —Sn1—O3	175.65 (13)	C12—C13—H13	120.3
C22—Sn1—O3	82.52 (15)	C14—C13—H13	120.3
C10—Sn1—O3	89.43 (14)	C13—C14—C15	121.0 (6)
C16—Sn1—O3	79.40 (13)	C13—C14—H14	119.5
C2—N1—N2	118.0 (4)	C15—C14—H14	119.5
C4—N2—N1	118.7 (4)	C10—C15—C14	120.7 (5)
C4—N2—H2	120.6	C10—C15—H15	119.6
N1—N2—H2	120.6	C14—C15—H15	119.6
C9—N3—C5	117.5 (5)	C21—C16—C17	118.4 (4)
C1—O2—Sn1 ⁱⁱ	124.3 (3)	C21—C16—Sn1	122.8 (3)
C4—O3—Sn1	158.1 (3)	C17—C16—Sn1	118.9 (3)
O1—C1—O2	126.3 (4)	C16—C17—C18	120.4 (5)
O1—C1—C2	121.8 (4)	C16—C17—H17	119.8
O2—C1—C2	111.9 (4)	C18—C17—H17	119.8
N1—C2—C3	116.3 (4)	C19—C18—C17	120.4 (5)
N1—C2—C1	125.8 (4)	C19—C18—H18	119.8
C3—C2—C1	117.9 (4)	C17—C18—H18	119.8
C2—C3—H3A	109.5	C20—C19—C18	119.7 (5)
C2—C3—H3B	109.5	C20—C19—H19	120.2
H3A—C3—H3B	109.5	C18—C19—H19	120.2
C2—C3—H3C	109.5	C19—C20—C21	120.4 (5)
H3A—C3—H3C	109.5	C19—C20—H20	119.8
H3B—C3—H3C	109.5	C21—C20—H20	119.8
O3—C4—N2	123.0 (5)	C16—C21—C20	120.8 (5)
O3—C4—C5	122.9 (4)	C16—C21—H21	119.6
N2—C4—C5	114.0 (5)	C20—C21—H21	119.6
N3—C5—C6	122.6 (5)	C23—C22—C27	117.3 (4)
N3—C5—C4	117.0 (5)	C23—C22—Sn1	125.1 (3)
C6—C5—C4	120.4 (5)	C27—C22—Sn1	117.5 (3)
C5—C6—C7	119.1 (6)	C22—C23—C24	120.7 (5)
C5—C6—H6	120.4	C22—C23—H23	119.7
C7—C6—H6	120.4	C24—C23—H23	119.7
C8—C7—C6	119.3 (6)	C25—C24—C23	121.1 (6)
C8—C7—H7	120.4	C25—C24—H24	119.5
C6—C7—H7	120.4	C23—C24—H24	119.5
C7—C8—C9	118.0 (6)	C24—C25—C26	118.8 (5)
C7—C8—H8	121.0	C24—C25—H25	120.6
C9—C8—H8	121.0	C26—C25—H25	120.6
N3—C9—C8	123.5 (6)	C25—C26—C27	120.6 (6)
N3—C9—H9	118.2	C25—C26—H26	119.7

C8—C9—H9	118.2	C27—C26—H26	119.7
C15—C10—C11	117.6 (5)	C22—C27—C26	121.5 (5)
C15—C10—Sn1	124.4 (4)	C22—C27—H27	119.3
C11—C10—Sn1	118.1 (3)	C26—C27—H27	119.3
C12—C11—C10	121.4 (5)		

Symmetry codes: (i) $x+1, y, z$; (ii) $x-1, y, z$.

Hydrogen-bond geometry (Å, °)

<i>D—H...A</i>	<i>D—H</i>	<i>H...A</i>	<i>D...A</i>	<i>D—H...A</i>
N2—H2...O1	0.86	1.99	2.647 (5)	132
