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Experimental

Data Collection

A yellow, transparent columnar crystal of $C_{52}H_{62}Si_2Lu_2$ having approximate dimensions of 0.45 x 0.11 x 0.09 mm was mounted using oil, (Paratone-N, Exxon) on a glass fiber. All measurements were made on an Enraf-Nonius CAD4 diffractometer with graphite monochromated Mo-Kα radiation.

Cell constants and an orientation matrix for data collection, obtained from a least-squares refinement using the setting angles of 25 carefully centered reflections in the range $18.3 < 2\theta < 20.3°$ corresponded to a primitive orthorhombic cell with dimensions:

a = 10.536(4) $\AA$
b = 13.340(3) $\AA$
c = 36.820(9) $\AA$
V = 5175(2) $\AA^3$

For Z = 4 and F.W. = 1093.17, the calculated density is 1.40 g/cm^3. The systematic absences of:

h00: h $\neq$ 2n
0k0: k $\neq$ 2n
00l: l $\neq$ 2n

uniquely determine the space group to be:

$P2_12_12_1$ (#19)

The data were collected at a temperature of -120 $\pm$ 1°C using the ω-θ scan technique to a maximum 2θ value of 45.9°. Omega scans of several intense reflections, made prior to data collection, had an average width at half-height of 0.30° with a take-off angle of 2.8°. Scans of (1.00 + 0.35 tan θ)° were made at variable speed from 3.0-16.0°/min (in omega). Moving-crystal moving counter background measurements were made by scanning an additional 25% above and below the scan range. The counter aperture consisted of a variable horizontal slit with a width ranging from 2.0 to 2.5 mm and a vertical slit set to 2.0 mm. The diameter of the incident beam collimator was 0.7 mm and the crystal to detector distance was 21 cm. For intense reflections an attenuator was automatically inserted in front of the detector.

Data Reduction

Of the 4258 reflections which were collected, 4099 were unique (R_{int} = 0.073). The intensities of three representative reflection were measured after every 90 minutes of X-ray exposure time. No decay correction was applied.

The linear absorption coefficient, μ, for Mo-Kα radiation is 38.7 cm^{-1}. An empirical absorption correction using the program DIFABS[1] was applied which resulted in transmission factors ranging from 0.75 to 1.15. The data were corrected for Lorentz and polarization effects.

Structure Solution and Refinement

The structure was solved by and expanded using Fourier techniques[3]. Carbon atoms were refined isotropically, the remaining non-hydrogen atoms were refined anisotropically, Hydrogen atoms were included but not refined. The Cp ring C8-C12 was placed in a rigid group owing to some disorder. The highest peaks left in the final difference map were located close to C23 and indicating the disorder. The final cycle of full-matrix least-squares refinement[4] was based on 2978 observed reflections ($I > 3.00\sigma(I)$) and 232 variable parameters and converged (largest parameter shift was 0.01 times its esd) with unweighted and weighted agreement factors of:

$$R = \Sigma||Fo| - |Fc||/\Sigma|Fo| = 0.061$$

$$R_w = \sqrt{(\Sigma w(|Fo| - |Fc|)^2/\Sigma wFo^2)} = 0.079$$

The enantiomer was refined with unweighted and weighted R factors to be 8.6 and 11.6 respectively indicating the other being the correct enantiomer. The standard deviation of an observation of unit weight[5] was 3.58. The weighting scheme was based on counting statistics and included a factor (p = 0.005) to downweight the intense reflections. Plots of $\Sigma w(|Fo| - |Fc|)^2$ versus $|Fo|$, reflection order in data collection, $\sin\theta/\lambda$ and various classes of indices showed no unusual trends. The maximum and minimum peaks on the final difference Fourier map corresponded to 2.03 and -1.61 $e^-/\AA^3$, respectively.

Neutral atom scattering factors were taken from Cromer and Waber[6] . Anomalous dispersion effects were included in Fcalc[7]; the values for Δf' and Δf" were those of Creagh and McAuley[8]. The values for the mass attenuation coefficients are those of Creagh and Hubbel[9]. All calculations were performed using the teXsan[10] crystallographic software package of Molecular Structure Corporation.

References

(1) DIFABS: Walker, N. & Stuart, Acta Cryst. A39, 158-166 (1983). An empirical absorption correction program.

(3) DIRDIF92: Beurskens, P.T., Admiraal, G., Beurskens, G., Bosman, W.P., Garcia-Granda, S., Gould, R.O., Smits, J.M.M. and Smykalla, C. (1992). The DIRDIF program system, Technical Report of the Crystallography Laboratory, University of Nijmegen, The Netherlands.

(4) Least-Squares:

Function minimized: $\Sigma w(|Fo| - |Fc|)^2$

where $w = \frac{1}{\sigma^2(Fo)} = \frac{4Fo^2}{\sigma^2(Fo^2)}$

$\sigma^2(Fo^2) = \frac{S^2(C+R^2B)+(pFo^2)^2}{Lp^2}$

S = Scan rate

C = Total integrated peak count

R = Ratio of scan rime to background counting time

B = Total background count

Lp = Lorentz-polarization factor

p = p-factor

(5) Standard deviation of an observation of unit weight:

$$\sqrt{\Sigma w(|Fo| - |Fc|)^2/(No - Nv)}$$

where: No = number of observations

Nv = number of variables

(6) Cromer, D. T. & Waber, J. T.; "International Tables for X-ray Crystallography", Vol. IV, The Kynoch Press, Birmingham, England, Table 2.2 A (1974).

(7) Ibers, J. A. & Hamilton, W. C.; Acta Crystallogr., 17, 781 (1964).

(8) Creagh, D. C. & McAuley, W.J .; "International Tables for Crystallography", Vol C, (A.J.C. Wilson, ed.), Kluwer Academic Publishers, Boston, Table 4.2.6.8, pages 219-222 (1992).

(9) Creagh, D. C. & Hubbell, J.H..; "International Tables for Crystallography", Vol C, (A.J.C. Wilson, ed.), Kluwer Academic Publishers, Boston, Table 4.2.4.3, pages 200-206 (1992).

(10) teXsan: Crystal Structure Analysis Package, Molecular Structure Corporation (1985 & 1992).

EXPERIMENTAL DETAILS

A. Crystal Data

Empirical Formula	$C_{52}H_{62}Si_2Lu_2$
Formula Weight	1093.17
Crystal Color, Habit	yellow, columnar
Crystal Dimensions	0.45 X 0.11 X 0.09 mm
Crystal System	orthorhombic
Lattice Type	Primitive
No. of Reflections Used for Unit Cell Determination (2θ range)	25 (18.3 - 20.3°)
Omega Scan Peak Width at Half-height	0.30°
Lattice Parameters	a = 10.536(4)Å b = 13.340(3) Å c = 36.820(9) Å V = 5175(2) Å^3
Space Group	$P2_12_12_1$ (#19)
Z value	4
D_{calc}	1.403 g/cm^3
F_{000}	2176.00
μ(MoKα)	38.69 cm^{-1}

B. Intensity Measurements

Diffractometer	CAD4
Radiation	MoKα (λ = 0.71069 Å) graphite monochromated
Attenuator	Zr foil (factor = 22.25)
Take-off Angle	2.8°
Detector Aperture	2.0 - 2.5 mm horizontal 2.0 mm vertical
Crystal to Detector Distance	21 mm
Temperature	-120.0°C
Scan Type	ω-θ
Scan Rate	3.0°/min (in ω) (up to 0 scans)
Scan Width	(1.00 + 0.35 tan θ)°
$2\theta_{max}$	45.9°
No. of Reflections Measured	Total: 4258 Unique: 4099 (R_{int} = 0.073)
Corrections	Lorentz-polarization Absorption (trans. factors: 0.7472 - 1.1479)

C. Structure Solution and Refinement

Structure Solution	Direct Methods
Refinement	Full-matrix least-squares
Function Minimized	$\Sigma w(\|Fo\| - \|Fc\|)^2$
Least Squares Weights	$\frac{1}{\sigma^2(Fo)} = \frac{4Fo^2}{\sigma^2(Fo^2)}$
p-factor	0.005
Anomalous Dispersion	All non-hydrogen atoms
No. Observations (I>3.00σ(I))	2978
No. Variables	232
Reflection/Parameter Ratio	12.84

Residuals: R; Rw	0.061 ; 0.079
Goodness of Fit Indicator	3.58
Max Shift/Error in Final Cycle	0.01
Maximum peak in Final Diff. Map	2.03 $e^-/\AA^3$
Minimum peak in Final Diff. Map	-1.61 $e^-/\AA^3$

Table 1. Atomic coordinates and B_{iso}/B_{eq} S15D

atom	x	y	z	B_{eq}
Lu(1)	0.1729(1)	0.0257(1)	0.12688(4)	1.55(3)
Lu(2)	0.3529(1)	0.2282(1)	0.15500(4)	1.62(3)
Si(1)	-0.1133(8)	-0.0765(7)	0.1135(3)	1.9(2)
Si(2)	0.6191(9)	0.3600(8)	0.1685(3)	2.3(2)
C(1)	-0.161(4)	-0.201(3)	0.0995(9)	3.7(9)
C(2)	-0.251(3)	0.005(3)	0.1205(8)	1.7(6)
C(3)	0.002(3)	-0.016(3)	0.0814(8)	1.2(6)
C(4)	0.113(3)	-0.065(2)	0.0680(8)	1.4(7)
C(5)	0.205(3)	0.003(2)	0.0551(8)	1.5(7)
C(6)	0.148(3)	0.102(2)	0.0598(8)	1.7(6)
C(7)	0.025(3)	0.089(2)	0.0766(8)	1.3(7)
C(8)	0.006(1)	-0.083(2)	0.1533(5)	1.22
C(9)	0.116(2)	-0.143(1)	0.1516(4)	1.22
C(10)	0.199(1)	-0.111(1)	0.1790(5)	1.22
C(11)	0.141(2)	-0.031(1)	0.1975(5)	1.22
C(12)	0.022(2)	-0.014(1)	0.1817(5)	1.22
C(13)	0.330(3)	-0.010(2)	0.0381(7)	1.6(6)
C(14)	0.325(3)	-0.034(2)	-0.0035(7)	1.3(6)
C(15)	0.283(3)	-0.140(2)	-0.0112(8)	1.4(7)
C(16)	0.381(3)	-0.214(3)	0.0082(8)	1.9(7)
C(17)	0.384(4)	-0.194(3)	0.048(1)	4(1)
C(18)	0.415(3)	-0.082(3)	0.0584(8)	1.7(7)
C(19)	0.240(3)	0.042(3)	-0.0239(8)	1.7(7)
C(20)	0.305(4)	0.149(3)	-0.0247(10)	4.1(10)

Table 1. Atomic coordinates and B_{iso}/B_{eq} (continued)

atom	x	y	z	B_{eq}
C(21)	0.228(3)	0.011(3)	-0.0638(9)	3.1(8)
C(22)	0.496(4)	-0.259(3)	0.0682(10)	4.0(9)
C(23)	0.299(3)	-0.175(3)	0.1842(9)	2.5(8)
C(24)	0.404(3)	-0.107(3)	0.2103(10)	3.1(9)
C(25)	0.399(3)	-0.212(2)	0.1550(8)	1.5(6)
C(26)	0.278(5)	-0.261(4)	0.215(1)	8(1)
C(27)	0.644(3)	0.496(2)	0.1793(8)	2.6(7)
C(28)	0.770(3)	0.293(3)	0.1625(9)	2.6(8)
C(29)	0.518(3)	0.346(3)	0.1339(8)	1.9(7)
C(30)	0.388(3)	0.397(2)	0.1253(8)	1.2(6)
C(31)	0.311(3)	0.346(2)	0.1029(8)	2.3(7)
C(32)	0.395(3)	0.269(3)	0.0860(8)	2.0(7)
C(33)	0.511(3)	0.264(3)	0.1010(8)	2.2(7)
C(34)	0.513(3)	0.294(3)	0.2004(9)	2.5(8)
C(35)	0.396(3)	0.333(3)	0.2111(9)	2.2(8)
C(36)	0.313(3)	0.261(3)	0.2294(8)	2.5(7)
C(37)	0.383(3)	0.173(3)	0.2218(9)	2.4(8)
C(38)	0.497(3)	0.193(3)	0.2089(9)	2.7(8)
C(39)	0.185(3)	0.376(2)	0.0863(8)	2.4(7)
C(40)	0.187(3)	0.445(2)	0.0533(8)	2.1(7)
C(41)	0.214(3)	0.553(2)	0.0609(9)	1.9(7)
C(42)	0.105(3)	0.591(3)	0.0866(9)	2.7(8)
C(43)	0.118(4)	0.526(4)	0.126(1)	5(1)
C(44)	0.107(3)	0.415(2)	0.1139(7)	0.7(6)

Table 1. Atomic coordinates and B_{iso}/B_{eq} (continued)

atom	x	y	z	B_{eq}
C(45)	0.264(3)	0.404(3)	0.0225(9)	2.0(7)
C(46)	0.410(3)	0.439(2)	0.0186(8)	1.7(7)
C(47)	0.205(3)	0.441(3)	-0.0157(9)	2.8(8)
C(48)	0.017(3)	0.563(3)	0.1480(9)	2.2(7)
C(49)	0.196(3)	0.285(3)	0.2480(9)	2.6(8)
C(50)	0.113(5)	0.366(4)	0.227(1)	7(1)
C(51)	0.224(4)	0.306(3)	0.288(1)	5(1)
C(52)	0.109(4)	0.185(4)	0.247(1)	6(1)
H(1)	-0.21	-0.23	0.12	4.50
H(2)	-0.21	-0.20	0.08	4.50
H(3)	-0.09	-0.24	0.10	4.50
H(4)	-0.22	0.07	0.13	2.07
H(5)	-0.30	0.01	0.10	2.07
H(6)	-0.30	-0.02	0.14	2.07
H(7)	0.12	-0.14	0.07	1.70
H(8)	0.19	0.16	0.05	2.00
H(9)	-0.03	0.14	0.08	1.61
H(10)	0.37	0.05	0.04	1.97
H(11)	0.41	-0.03	-0.01	1.55
H(12)	0.20	-0.15	0.00	1.72
H(13)	0.28	-0.15	-0.04	1.72
H(14)	0.35	-0.28	0.00	2.25
H(15)	0.46	-0.20	0.00	2.25
H(16)	0.30	-0.21	0.06	5.01

Table 1. Atomic coordinates and B_{iso}/B_{eq} (continued)

atom	x	y	z	B_{eq}
H(17)	0.50	-0.07	0.05	2.01
H(18)	0.40	-0.07	0.08	2.01
H(19)	0.38	0.14	-0.04	4.88
H(20)	0.25	0.19	-0.04	4.88
H(21)	0.32	0.17	0.00	4.88
H(22)	0.19	-0.05	-0.07	3.69
H(23)	0.18	0.06	-0.08	3.69
H(24)	0.31	0.01	-0.07	3.69
H(25)	0.48	-0.33	0.06	4.86
H(26)	0.58	-0.24	0.06	4.86
H(27)	0.49	-0.25	0.09	4.86
H(28)	0.47	-0.15	0.22	3.67
H(29)	0.43	-0.05	0.20	3.67
H(30)	0.36	-0.09	0.23	3.67
H(31)	0.46	-0.25	0.17	1.83
H(32)	0.36	-0.25	0.14	1.83
H(33)	0.44	-0.16	0.14	1.83
H(34)	0.24	-0.23	0.24	10.46
H(35)	0.22	-0.31	0.21	10.46
H(36)	0.36	-0.29	0.22	10.46
H(37)	0.70	0.50	0.20	3.09
H(38)	0.68	0.53	0.16	3.09
H(39)	0.57	0.53	0.19	3.09
H(40)	0.75	0.22	0.16	3.17

Table 1. Atomic coordinates and B_{iso}/B_{eq} (continued)

atom	x	y	z	B_{eq}
H(41)	0.81	0.32	0.14	3.17
H(42)	0.82	0.30	0.18	3.17
H(43)	0.36	0.46	0.14	1.48
H(44)	0.37	0.23	0.07	2.46
H(45)	0.58	0.22	0.09	2.65
H(46)	0.37	0.40	0.21	2.68
H(47)	0.35	0.11	0.23	2.89
H(48)	0.56	0.14	0.21	3.28
H(49)	0.15	0.32	0.08	2.83
H(50)	0.10	0.44	0.04	2.48
H(51)	0.29	0.56	0.07	2.31
H(52)	0.21	0.59	0.04	2.31
H(53)	0.11	0.66	0.09	3.21
H(54)	0.02	0.58	0.08	3.21
H(55)	0.20	0.54	0.14	6.17
H(56)	0.02	0.41	0.11	0.80
H(57)	0.12	0.38	0.13	0.80
H(58)	0.46	0.42	0.04	2.05
H(59)	0.45	0.41	0.00	2.05
H(60)	0.41	0.51	0.02	2.05
H(61)	0.21	0.51	-0.02	3.32
H(62)	0.25	0.41	-0.04	3.32
H(63)	0.12	0.42	-0.02	3.32
H(64)	0.03	0.63	0.15	2.60

Table 1. Atomic coordinates and B_{iso}/B_{eq} (continued)

atom	x	y	z	B_{eq}
H(65)	-0.06	0.56	0.13	2.60
H(66)	0.01	0.52	0.17	2.60
H(67)	0.16	0.43	0.23	9.01
H(68)	0.10	0.34	0.20	9.01
H(69)	0.03	0.37	0.24	9.01
H(70)	0.26	0.25	0.30	6.59
H(71)	0.28	0.36	0.29	6.59
H(72)	0.15	0.32	0.30	6.59
H(73)	0.03	0.20	0.26	7.92
H(74)	0.09	0.17	0.22	7.92
H(75)	0.15	0.13	0.26	7.92

$$B_{eq} = \frac{8}{3}\pi^2(U_{11}(aa^*)^2 + U_{22}(bb^*)^2 + U_{33}(cc^*)^2 + 2U_{12}aa^*bb^*\cos\gamma + 2U_{13}aa^*cc^*\cos\beta + 2U_{23}bb^*cc^*\cos\alpha)$$

Table 2. Anisotropic Displacement Parameters S15D

atom	U_{11}	U_{22}	U_{33}	U_{12}	U_{13}	U_{23}
Lu(1)	0.0209(7)	0.0177(8)	0.0204(8)	-0.0017(8)	-0.0031(7)	-0.0012(8)
Lu(2)	0.0191(7)	0.0212(8)	0.0212(8)	-0.0041(8)	-0.0002(8)	-0.0033(7)
Si(1)	0.016(5)	0.022(6)	0.033(6)	-0.004(5)	-0.002(4)	-0.001(5)
Si(2)	0.020(6)	0.036(7)	0.032(6)	-0.006(5)	-0.012(4)	-0.007(5)

The general temperature factor expression:

$$\exp(-2\pi^2(a^{*2}U_{11}h^2 + b^{*2}U_{22}k^2 + c^{*2}U_{33}l^2 + 2a^*b^*U_{12}hk + 2a^*c^*U_{13}hl + 2b^*c^*U_{23}kl))$$

Table 3. Bond Lengths(Å)

atom	atom	distance	atom	atom	distance S15D
Lu(1)	Lu(2)	3.459(2)	Lu(1)	C(3)	2.53(3)
Lu(1)	C(4)	2.56(3)	Lu(1)	C(5)	2.68(3)
Lu(1)	C(6)	2.68(3)	Lu(1)	C(7)	2.56(3)
Lu(1)	C(9)	2.50(2)	Lu(1)	C(10)	2.66(2)
Lu(1)	C(11)	2.73(2)	Lu(1)	C(12)	2.62(2)
Lu(1)	C(8)	2.47(2)	Lu(2)	C(29)	2.46(3)
Lu(2)	C(30)	2.53(3)	Lu(2)	C(31)	2.52(3)
Lu(2)	C(32)	2.64(3)	Lu(2)	C(33)	2.64(3)
Lu(2)	C(34)	2.53(3)	Lu(2)	C(35)	2.53(3)
Lu(2)	C(37)	2.59(3)	Lu(2)	C(38)	2.54(3)
Si(1)	C(1)	1.81(4)	Si(1)	C(2)	1.83(3)
Si(1)	C(3)	1.87(3)	Si(1)	C(8)	1.93(2)
Si(2)	C(27)	1.88(3)	Si(2)	C(28)	1.83(3)
Si(2)	C(29)	1.67(3)	Si(2)	C(34)	1.84(4)
C(3)	C(4)	1.43(4)	C(3)	C(7)	1.43(5)
C(4)	C(5)	1.41(4)	C(5)	C(6)	1.45(4)
C(5)	C(13)	1.47(4)	C(6)	C(7)	1.45(5)
C(13)	C(14)	1.57(4)	C(13)	C(18)	1.52(4)
C(14)	C(15)	1.51(4)	C(14)	C(19)	1.55(4)
C(15)	C(16)	1.60(4)	C(16)	C(17)	1.50(5)
C(17)	C(18)	1.58(5)	C(17)	C(22)	1.64(5)
C(19)	C(20)	1.58(5)	C(19)	C(21)	1.53(5)
C(23)	C(24)	1.72(5)	C(23)	C(25)	1.58(4)
C(23)	C(26)	1.61(6)	C(23)	C(10)	1.38(4)

Table 3. Bond Lengths($\AA$) (continued)

atom	atom	distance	atom	atom	distance
C(29)	C(30)	1.57(4)	C(29)	C(33)	1.63(5)
C(30)	C(31)	1.34(4)	C(31)	C(32)	1.50(5)
C(31)	C(39)	1.51(5)	C(32)	C(33)	1.34(4)
C(34)	C(35)	1.39(5)	C(34)	C(38)	1.40(5)
C(35)	C(36)	1.46(5)	C(36)	C(37)	1.42(5)
C(36)	C(49)	1.44(5)	C(37)	C(38)	1.32(5)
C(39)	C(40)	1.52(4)	C(39)	C(44)	1.40(4)
C(40)	C(41)	1.49(5)	C(40)	C(45)	1.50(5)
C(41)	C(42)	1.58(5)	C(42)	C(43)	1.70(6)
C(43)	C(44)	1.54(6)	C(43)	C(48)	1.43(5)
C(45)	C(46)	1.62(5)	C(45)	C(47)	1.61(5)
C(49)	C(50)	1.58(6)	C(49)	C(51)	1.54(5)
C(49)	C(52)	1.62(6)	C(9)	C(10)	1.40(2)
C(9)	C(8)	1.40(2)	C(10)	C(11)	1.40(3)
C(11)	C(12)	1.40(3)	C(12)	C(8)	1.40(3)

Table 4. Bond Lengths($\AA$)

atom	atom	distance	atom	atom	distance S15D
C(1)	H(1)	0.95	C(1)	H(2)	0.95
C(1)	H(3)	0.95	C(2)	H(4)	0.95
C(2)	H(5)	0.95	C(2)	H(6)	0.95
C(4)	H(7)	0.95	C(6)	H(8)	0.95
C(7)	H(9)	0.95	C(13)	H(10)	0.95
C(14)	H(11)	0.95	C(15)	H(12)	0.95
C(15)	H(13)	0.95	C(16)	H(14)	0.95
C(16)	H(15)	0.95	C(17)	H(16)	0.95
C(18)	H(17)	0.95	C(18)	H(18)	0.95
C(20)	H(19)	0.95	C(20)	H(20)	0.95
C(20)	H(21)	0.95	C(21)	H(22)	0.95
C(21)	H(23)	0.95	C(21)	H(24)	0.95
C(22)	H(25)	0.95	C(22)	H(26)	0.95
C(22)	H(27)	0.95	C(24)	H(28)	0.95
C(24)	H(29)	0.95	C(24)	H(30)	0.95
C(25)	H(31)	0.95	C(25)	H(32)	0.95
C(25)	H(33)	0.95	C(26)	H(34)	0.94
C(26)	H(35)	0.95	C(26)	H(36)	0.95
C(27)	H(37)	0.95	C(27)	H(38)	0.95
C(27)	H(39)	0.95	C(28)	H(40)	0.95
C(28)	H(41)	0.95	C(28)	H(42)	0.95
C(30)	H(43)	0.95	C(32)	H(44)	0.95
C(33)	H(45)	0.95	C(35)	H(46)	0.95
C(37)	H(47)	0.95	C(38)	H(48)	0.95

Table 4. Bond Lengths($\AA$) (continued)

atom	atom	distance	atom	atom	distance
C(39)	H(49)	0.95	C(40)	H(50)	0.95
C(41)	H(51)	0.95	C(41)	H(52)	0.95
C(42)	H(53)	0.95	C(42)	H(54)	0.95
C(43)	H(55)	0.95	C(44)	H(56)	0.95
C(44)	H(57)	0.95	C(46)	H(58)	0.95
C(46)	H(59)	0.95	C(46)	H(60)	0.95
C(47)	H(61)	0.95	C(47)	H(62)	0.95
C(47)	H(63)	0.95	C(48)	H(64)	0.95
C(48)	H(65)	0.95	C(48)	H(66)	0.95
C(50)	H(67)	0.95	C(50)	H(68)	0.95
C(50)	H(69)	0.95	C(51)	H(70)	0.95
C(51)	H(71)	0.95	C(51)	H(72)	0.95
C(52)	H(73)	0.95	C(52)	H(74)	0.95
C(52)	H(75)	0.95			

Table 5. Bond Angles(°)

atom	atom	atom	angle	atom	atom	atom	angle S15D
Lu(2)	Lu(1)	C(3)	139.8(8)	Lu(2)	Lu(1)	C(4)	139.2(7)
Lu(2)	Lu(1)	C(5)	108.3(7)	Lu(2)	Lu(1)	C(6)	92.0(7)
Lu(2)	Lu(1)	C(7)	107.1(7)	Lu(2)	Lu(1)	C(9)	136.5(4)
Lu(2)	Lu(1)	C(10)	105.2(4)	Lu(2)	Lu(1)	C(11)	90.0(4)
Lu(2)	Lu(1)	C(12)	105.1(4)	Lu(2)	Lu(1)	C(8)	136.7(4)
C(3)	Lu(1)	C(4)	32.6(10)	C(3)	Lu(1)	C(5)	53.9(9)
C(3)	Lu(1)	C(6)	53.3(10)	C(3)	Lu(1)	C(7)	32(1)
C(3)	Lu(1)	C(9)	82.5(8)	C(3)	Lu(1)	C(10)	113.6(8)
C(3)	Lu(1)	C(11)	118.8(8)	C(3)	Lu(1)	C(12)	91.8(8)
C(3)	Lu(1)	C(8)	67.9(8)	C(4)	Lu(1)	C(5)	31.1(9)
C(4)	Lu(1)	C(6)	51.4(10)	C(4)	Lu(1)	C(7)	52.7(10)
C(4)	Lu(1)	C(9)	79.9(8)	C(4)	Lu(1)	C(10)	108.2(8)
C(4)	Lu(1)	C(11)	130.1(8)	C(4)	Lu(1)	C(12)	113.9(8)
C(4)	Lu(1)	C(8)	83.2(8)	C(5)	Lu(1)	C(6)	31.5(9)
C(5)	Lu(1)	C(7)	53.2(9)	C(5)	Lu(1)	C(9)	106.8(8)
C(5)	Lu(1)	C(10)	128.5(8)	C(5)	Lu(1)	C(11)	157.4(8)
C(5)	Lu(1)	C(12)	144.2(8)	C(5)	Lu(1)	C(8)	114.2(8)
C(6)	Lu(1)	C(7)	31.9(10)	C(6)	Lu(1)	C(9)	130.7(8)
C(6)	Lu(1)	C(10)	158.9(8)	C(6)	Lu(1)	C(11)	165.9(8)
C(6)	Lu(1)	C(12)	136.5(8)	C(6)	Lu(1)	C(8)	120.9(8)
C(7)	Lu(1)	C(9)	114.3(8)	C(7)	Lu(1)	C(10)	143.9(8)
C(7)	Lu(1)	C(11)	134.7(8)	C(7)	Lu(1)	C(12)	104.7(8)
C(7)	Lu(1)	C(8)	92.6(8)	C(9)	Lu(1)	C(10)	31.3(5)
C(9)	Lu(1)	C(11)	51.1(6)	C(9)	Lu(1)	C(12)	52.5(5)

Table 5. Bond Angles(°) (continued)

atom	atom	atom	angle	atom	atom	atom	angle
C(9)	Lu(1)	C(8)	32.7(6)	C(10)	Lu(1)	C(11)	30.1(6)
C(10)	Lu(1)	C(12)	50.8(5)	C(10)	Lu(1)	C(8)	52.2(5)
C(11)	Lu(1)	C(12)	30.2(6)	C(11)	Lu(1)	C(8)	51.3(6)
C(12)	Lu(1)	C(8)	31.7(6)	Lu(1)	Lu(2)	C(29)	142.1(7)
Lu(1)	Lu(2)	C(30)	130.2(7)	Lu(1)	Lu(2)	C(31)	99.4(8)
Lu(1)	Lu(2)	C(32)	88.0(7)	Lu(1)	Lu(2)	C(33)	105.2(7)
Lu(1)	Lu(2)	C(34)	146.5(8)	Lu(1)	Lu(2)	C(35)	140.6(8)
Lu(1)	Lu(2)	C(37)	97.3(8)	Lu(1)	Lu(2)	C(38)	114.7(8)
C(29)	Lu(2)	C(30)	36.5(10)	C(29)	Lu(2)	C(31)	59(1)
C(29)	Lu(2)	C(32)	56(1)	C(29)	Lu(2)	C(33)	37(1)
C(29)	Lu(2)	C(34)	61(1)	C(29)	Lu(2)	C(35)	77(1)
C(29)	Lu(2)	C(37)	113(1)	C(29)	Lu(2)	C(38)	86(1)
C(30)	Lu(2)	C(31)	30(1)	C(30)	Lu(2)	C(32)	51(1)
C(30)	Lu(2)	C(33)	54(1)	C(30)	Lu(2)	C(34)	83(1)
C(30)	Lu(2)	C(35)	80(1)	C(30)	Lu(2)	C(37)	130(1)
C(30)	Lu(2)	C(38)	114(1)	C(31)	Lu(2)	C(32)	33(1)
C(31)	Lu(2)	C(33)	54(1)	C(31)	Lu(2)	C(34)	113(1)
C(31)	Lu(2)	C(35)	107(1)	C(31)	Lu(2)	C(37)	157(1)
C(31)	Lu(2)	C(38)	144(1)	C(32)	Lu(2)	C(33)	29.5(9)
C(32)	Lu(2)	C(34)	116(1)	C(32)	Lu(2)	C(35)	129(1)
C(32)	Lu(2)	C(37)	162(1)	C(32)	Lu(2)	C(38)	133(1)
C(33)	Lu(2)	C(34)	90(1)	C(33)	Lu(2)	C(35)	113(1)
C(33)	Lu(2)	C(37)	133(1)	C(33)	Lu(2)	C(38)	104(1)
C(34)	Lu(2)	C(35)	31(1)	C(34)	Lu(2)	C(37)	52(1)

Table 5. Bond Angles(°) (continued)

atom	atom	atom	angle	atom	atom	atom	angle
C(34)	Lu(2)	C(38)	31(1)	C(35)	Lu(2)	C(37)	50(1)
C(35)	Lu(2)	C(38)	50(1)	C(37)	Lu(2)	C(38)	29(1)
C(1)	Si(1)	C(2)	111(1)	C(1)	Si(1)	C(3)	113(1)
C(1)	Si(1)	C(8)	110(1)	C(2)	Si(1)	C(3)	110(1)
C(2)	Si(1)	C(8)	115(1)	C(3)	Si(1)	C(8)	94(1)
C(27)	Si(2)	C(28)	111(1)	C(27)	Si(2)	C(29)	111(1)
C(27)	Si(2)	C(34)	114(1)	C(28)	Si(2)	C(29)	114(1)
C(28)	Si(2)	C(34)	111(1)	C(29)	Si(2)	C(34)	92(1)
Lu(1)	C(3)	Si(1)	97(1)	Lu(1)	C(3)	C(4)	75(1)
Lu(1)	C(3)	C(7)	75(1)	Si(1)	C(3)	C(4)	123(2)
Si(1)	C(3)	C(7)	127(2)	C(4)	C(3)	C(7)	105(2)
Lu(1)	C(4)	C(3)	72(1)	Lu(1)	C(4)	C(5)	79(1)
C(3)	C(4)	C(5)	112(2)	Lu(1)	C(5)	C(4)	69(1)
Lu(1)	C(5)	C(6)	74(1)	Lu(1)	C(5)	C(13)	123(1)
C(4)	C(5)	C(6)	105(2)	C(4)	C(5)	C(13)	133(2)
C(6)	C(5)	C(13)	121(2)	Lu(1)	C(6)	C(5)	74(1)
Lu(1)	C(6)	C(7)	69(1)	C(5)	C(6)	C(7)	108(2)
Lu(1)	C(7)	C(3)	72(1)	Lu(1)	C(7)	C(6)	78(1)
C(3)	C(7)	C(6)	108(2)	C(5)	C(13)	C(14)	114(2)
C(5)	C(13)	C(18)	113(2)	C(14)	C(13)	C(18)	111(2)
C(13)	C(14)	C(15)	112(2)	C(13)	C(14)	C(19)	110(2)
C(15)	C(14)	C(19)	110(2)	C(14)	C(15)	C(16)	107(2)
C(15)	C(16)	C(17)	110(2)	C(16)	C(17)	C(18)	114(2)
C(16)	C(17)	C(22)	111(2)	C(18)	C(17)	C(22)	104(2)

Table 5. Bond Angles(°) (continued)

atom	atom	atom	angle	atom	atom	atom	angle
C(13)	C(18)	C(17)	111(2)	C(14)	C(19)	C(20)	110(2)
C(14)	C(19)	C(21)	109(2)	C(20)	C(19)	C(21)	105(2)
C(24)	C(23)	C(25)	96(2)	C(24)	C(23)	C(26)	94(2)
C(24)	C(23)	C(10)	103(2)	C(25)	C(23)	C(26)	110(3)
C(25)	C(23)	C(10)	127(2)	C(26)	C(23)	C(10)	115(2)
Lu(2)	C(29)	Si(2)	106(1)	Lu(2)	C(29)	C(30)	74(1)
Lu(2)	C(29)	C(33)	77(1)	Si(2)	C(29)	C(30)	131(2)
Si(2)	C(29)	C(33)	131(2)	C(30)	C(29)	C(33)	96(2)
Lu(2)	C(30)	C(29)	69(1)	Lu(2)	C(30)	C(31)	74(1)
C(29)	C(30)	C(31)	115(2)	Lu(2)	C(31)	C(30)	75(1)
Lu(2)	C(31)	C(32)	77(1)	Lu(2)	C(31)	C(39)	128(2)
C(30)	C(31)	C(32)	104(2)	C(30)	C(31)	C(39)	129(2)
C(32)	C(31)	C(39)	122(2)	Lu(2)	C(32)	C(31)	68(1)
Lu(2)	C(32)	C(33)	75(1)	C(31)	C(32)	C(33)	113(2)
Lu(2)	C(33)	C(29)	65(1)	Lu(2)	C(33)	C(32)	75(1)
C(29)	C(33)	C(32)	108(2)	Lu(2)	C(34)	Si(2)	98(1)
Lu(2)	C(34)	C(35)	74(1)	Lu(2)	C(34)	C(38)	74(2)
Si(2)	C(34)	C(35)	122(2)	Si(2)	C(34)	C(38)	132(2)
C(35)	C(34)	C(38)	100(3)	Lu(2)	C(35)	C(34)	74(1)
Lu(2)	C(35)	C(36)	84(1)	C(34)	C(35)	C(36)	114(3)
C(35)	C(36)	C(37)	98(2)	C(35)	C(36)	C(49)	125(3)
C(37)	C(36)	C(49)	135(3)	Lu(2)	C(37)	C(36)	83(1)
Lu(2)	C(37)	C(38)	73(2)	C(36)	C(37)	C(38)	111(3)
Lu(2)	C(38)	C(34)	73(2)	Lu(2)	C(38)	C(37)	76(2)

Table 5. Bond Angles(°) (continued)

atom	atom	atom	angle	atom	atom	atom	angle
C(34)	C(38)	C(37)	112(3)	C(31)	C(39)	C(40)	118(2)
C(31)	C(39)	C(44)	108(2)	C(40)	C(39)	C(44)	111(2)
C(39)	C(40)	C(41)	115(2)	C(39)	C(40)	C(45)	113(2)
C(41)	C(40)	C(45)	113(2)	C(40)	C(41)	C(42)	106(2)
C(41)	C(42)	C(43)	106(2)	C(42)	C(43)	C(44)	103(2)
C(42)	C(43)	C(48)	104(3)	C(44)	C(43)	C(48)	116(3)
C(39)	C(44)	C(43)	121(2)	C(40)	C(45)	C(46)	118(2)
C(40)	C(45)	C(47)	109(2)	C(46)	C(45)	C(47)	101(2)
C(36)	C(49)	C(50)	113(3)	C(36)	C(49)	C(51)	109(2)
C(36)	C(49)	C(52)	107(3)	C(50)	C(49)	C(51)	116(3)
C(50)	C(49)	C(52)	103(3)	C(51)	C(49)	C(52)	105(3)
Lu(1)	C(9)	C(10)	80(1)	Lu(1)	C(9)	C(8)	72.8(10)
C(10)	C(9)	C(8)	107(1)	Lu(1)	C(10)	C(23)	127(1)
Lu(1)	C(10)	C(9)	68.0(10)	Lu(1)	C(10)	C(11)	77(1)
C(23)	C(10)	C(9)	112(2)	C(23)	C(10)	C(11)	137(2)
C(9)	C(10)	C(11)	107(1)	Lu(1)	C(11)	C(10)	72(1)
Lu(1)	C(11)	C(12)	70(1)	C(10)	C(11)	C(12)	108(1)
Lu(1)	C(12)	C(11)	79(1)	Lu(1)	C(12)	C(8)	68(1)
C(11)	C(12)	C(8)	107(1)	Lu(1)	C(8)	Si(1)	98.0(8)
Lu(1)	C(8)	C(9)	74.5(9)	Lu(1)	C(8)	C(12)	80(1)
Si(1)	C(8)	C(9)	121(1)	Si(1)	C(8)	C(12)	127(1)
C(9)	C(8)	C(12)	108(1)				

Table 6. Bond Angles(°)

atom	atom	atom	angle	atom	atom	atom	angle S15D
Si(1)	C(1)	H(1)	109.5	Si(1)	C(1)	H(2)	109.5
Si(1)	C(1)	H(3)	109.5	H(1)	C(1)	H(2)	109.4
H(1)	C(1)	H(3)	109.5	H(2)	C(1)	H(3)	109.4
Si(1)	C(2)	H(4)	109.5	Si(1)	C(2)	H(5)	109.5
Si(1)	C(2)	H(6)	109.5	H(4)	C(2)	H(5)	109.5
H(4)	C(2)	H(6)	109.5	H(5)	C(2)	H(6)	109.5
Lu(1)	C(4)	H(7)	116.5	C(3)	C(4)	H(7)	123.7
C(5)	C(4)	H(7)	123.7	Lu(1)	C(6)	H(8)	122.1
C(5)	C(6)	H(8)	125.9	C(7)	C(6)	H(8)	125.9
Lu(1)	C(7)	H(9)	115.5	C(3)	C(7)	H(9)	125.6
C(6)	C(7)	H(9)	125.5	C(5)	C(13)	H(10)	105.5
C(14)	C(13)	H(10)	105.5	C(18)	C(13)	H(10)	105.5
C(13)	C(14)	H(11)	107.4	C(15)	C(14)	H(11)	107.4
C(19)	C(14)	H(11)	107.4	C(14)	C(15)	H(12)	109.9
C(14)	C(15)	H(13)	109.9	C(16)	C(15)	H(12)	109.8
C(16)	C(15)	H(13)	109.9	H(12)	C(15)	H(13)	109.5
C(15)	C(16)	H(14)	109.3	C(15)	C(16)	H(15)	109.3
C(17)	C(16)	H(14)	109.4	C(17)	C(16)	H(15)	109.3
H(14)	C(16)	H(15)	109.5	C(16)	C(17)	H(16)	108.9
C(18)	C(17)	H(16)	109.0	C(22)	C(17)	H(16)	109.0
C(13)	C(18)	H(17)	109.0	C(13)	C(18)	H(18)	109.0
C(17)	C(18)	H(17)	109.1	C(17)	C(18)	H(18)	109.0
H(17)	C(18)	H(18)	109.4	C(19)	C(20)	H(19)	109.5
C(19)	C(20)	H(20)	109.5	C(19)	C(20)	H(21)	109.5

Table 6. Bond Angles(°) (continued)

atom	atom	atom	angle	atom	atom	atom	angle
H(19)	C(20)	H(20)	109.4	H(19)	C(20)	H(21)	109.4
H(20)	C(20)	H(21)	109.4	C(19)	C(21)	H(22)	109.5
C(19)	C(21)	H(23)	109.5	C(19)	C(21)	H(24)	109.5
H(22)	C(21)	H(23)	109.4	H(22)	C(21)	H(24)	109.4
H(23)	C(21)	H(24)	109.5	C(17)	C(22)	H(25)	109.4
C(17)	C(22)	H(26)	109.5	C(17)	C(22)	H(27)	109.5
H(25)	C(22)	H(26)	109.4	H(25)	C(22)	H(27)	109.5
H(26)	C(22)	H(27)	109.5	C(23)	C(24)	H(28)	109.5
C(23)	C(24)	H(29)	109.6	C(23)	C(24)	H(30)	109.5
H(28)	C(24)	H(29)	109.4	H(28)	C(24)	H(30)	109.5
H(29)	C(24)	H(30)	109.4	C(23)	C(25)	H(31)	109.4
C(23)	C(25)	H(32)	109.5	C(23)	C(25)	H(33)	109.5
H(31)	C(25)	H(32)	109.5	H(31)	C(25)	H(33)	109.4
H(32)	C(25)	H(33)	109.5	C(23)	C(26)	H(34)	109.6
C(23)	C(26)	H(35)	109.2	C(23)	C(26)	H(36)	109.0
H(34)	C(26)	H(35)	110.0	H(34)	C(26)	H(36)	109.8
H(35)	C(26)	H(36)	109.2	Si(2)	C(27)	H(37)	109.5
Si(2)	C(27)	H(38)	109.5	Si(2)	C(27)	H(39)	109.5
H(37)	C(27)	H(38)	109.4	H(37)	C(27)	H(39)	109.4
H(38)	C(27)	H(39)	109.5	Si(2)	C(28)	H(40)	109.5
Si(2)	C(28)	H(41)	109.5	Si(2)	C(28)	H(42)	109.5
H(40)	C(28)	H(41)	109.4	H(40)	C(28)	H(42)	109.5
H(41)	C(28)	H(42)	109.4	Lu(2)	C(30)	H(43)	126.1
C(29)	C(30)	H(43)	122.2	C(31)	C(30)	H(43)	122.3

Table 6. Bond Angles(°) (continued)

atom	atom	atom	angle	atom	atom	atom	angle
Lu(2)	C(32)	H(44)	124.2	C(31)	C(32)	H(44)	123.2
C(33)	C(32)	H(44)	123.2	Lu(2)	C(33)	H(45)	124.5
C(29)	C(33)	H(45)	125.9	C(32)	C(33)	H(45)	125.8
Lu(2)	C(35)	H(46)	109.7	C(34)	C(35)	H(46)	122.6
C(36)	C(35)	H(46)	122.6	Lu(2)	C(37)	H(47)	111.1
C(36)	C(37)	H(47)	124.1	C(38)	C(37)	H(47)	124.2
Lu(2)	C(38)	H(48)	117.2	C(34)	C(38)	H(48)	123.6
C(37)	C(38)	H(48)	123.5	C(31)	C(39)	H(49)	106.1
C(40)	C(39)	H(49)	106.1	C(44)	C(39)	H(49)	106.2
C(39)	C(40)	H(50)	104.5	C(41)	C(40)	H(50)	104.6
C(45)	C(40)	H(50)	104.6	C(40)	C(41)	H(51)	110.2
C(40)	C(41)	H(52)	110.2	C(42)	C(41)	H(51)	110.3
C(42)	C(41)	H(52)	110.2	H(51)	C(41)	H(52)	109.3
C(41)	C(42)	H(53)	110.1	C(41)	C(42)	H(54)	110.2
C(43)	C(42)	H(53)	110.1	C(43)	C(42)	H(54)	110.2
H(53)	C(42)	H(54)	109.5	C(42)	C(43)	H(55)	110.6
C(44)	C(43)	H(55)	110.8	C(48)	C(43)	H(55)	110.9
C(39)	C(44)	H(56)	106.4	C(39)	C(44)	H(57)	106.5
C(43)	C(44)	H(56)	106.4	C(43)	C(44)	H(57)	106.4
H(56)	C(44)	H(57)	109.4	C(45)	C(46)	H(58)	109.4
C(45)	C(46)	H(59)	109.4	C(45)	C(46)	H(60)	109.5
H(58)	C(46)	H(59)	109.5	H(58)	C(46)	H(60)	109.5
H(59)	C(46)	H(60)	109.6	C(45)	C(47)	H(61)	109.5
C(45)	C(47)	H(62)	109.5	C(45)	C(47)	H(63)	109.5

Table 6. Bond Angles(°) (continued)

atom	atom	atom	angle	atom	atom	atom	angle
H(61)	C(47)	H(62)	109.5	H(61)	C(47)	H(63)	109.5
H(62)	C(47)	H(63)	109.4	C(43)	C(48)	H(64)	109.5
C(43)	C(48)	H(65)	109.5	C(43)	C(48)	H(66)	109.4
H(64)	C(48)	H(65)	109.5	H(64)	C(48)	H(66)	109.5
H(65)	C(48)	H(66)	109.5	C(49)	C(50)	H(67)	109.2
C(49)	C(50)	H(68)	109.5	C(49)	C(50)	H(69)	109.4
H(67)	C(50)	H(68)	109.6	H(67)	C(50)	H(69)	109.4
H(68)	C(50)	H(69)	109.8	C(49)	C(51)	H(70)	109.5
C(49)	C(51)	H(71)	109.4	C(49)	C(51)	H(72)	109.4
H(70)	C(51)	H(71)	109.5	H(70)	C(51)	H(72)	109.6
H(71)	C(51)	H(72)	109.4	C(49)	C(52)	H(73)	109.4
C(49)	C(52)	H(74)	109.6	C(49)	C(52)	H(75)	109.5
H(73)	C(52)	H(74)	109.5	H(73)	C(52)	H(75)	109.4
H(74)	C(52)	H(75)	109.5				

Table 7. Torsion Angles(°) S15D

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
Lu(1)	Lu(2)	C(29)	Si(2)	-138.8(10)	Lu(1)	Lu(2)	C(29)	C(30)	91(1)
Lu(1)	Lu(2)	C(29)	C(33)	-8(2)	Lu(1)	Lu(2)	C(30)	C(29)	-126(1)
Lu(1)	Lu(2)	C(30)	C(31)	0(2)	Lu(1)	Lu(2)	C(31)	C(30)	179(1)
Lu(1)	Lu(2)	C(31)	C(32)	-71(1)	Lu(1)	Lu(2)	C(31)	C(39)	49(2)
Lu(1)	Lu(2)	C(32)	C(31)	110(1)	Lu(1)	Lu(2)	C(32)	C(33)	-126(2)
Lu(1)	Lu(2)	C(33)	C(29)	174(1)	Lu(1)	Lu(2)	C(33)	C(32)	56(2)
Lu(1)	Lu(2)	C(34)	Si(2)	135.6(10)	Lu(1)	Lu(2)	C(34)	C(35)	-102(2)
Lu(1)	Lu(2)	C(34)	C(38)	3(2)	Lu(1)	Lu(2)	C(35)	C(34)	122(1)
Lu(1)	Lu(2)	C(35)	C(36)	4(2)	Lu(1)	Lu(2)	C(37)	C(36)	-116(1)
Lu(1)	Lu(2)	C(37)	C(38)	128(2)	Lu(1)	Lu(2)	C(38)	C(34)	-177(1)
Lu(1)	Lu(2)	C(38)	C(37)	-58(2)	Lu(1)	C(3)	Si(1)	C(1)	-126(1)
Lu(1)	C(3)	Si(1)	C(2)	108(1)	Lu(1)	C(3)	Si(1)	C(8)	-11(1)
Lu(1)	C(3)	C(4)	C(5)	-69(2)	Lu(1)	C(3)	C(7)	C(6)	70(2)
Lu(1)	C(4)	C(3)	Si(1)	-89(2)	Lu(1)	C(4)	C(3)	C(7)	69(1)
Lu(1)	C(4)	C(5)	C(6)	-66(2)	Lu(1)	C(4)	C(5)	C(13)	116(3)
Lu(1)	C(5)	C(4)	C(3)	65(2)	Lu(1)	C(5)	C(6)	C(7)	-61(2)
Lu(1)	C(5)	C(13)	C(14)	173(1)	Lu(1)	C(5)	C(13)	C(18)	43(3)
Lu(1)	C(6)	C(5)	C(4)	63(2)	Lu(1)	C(6)	C(5)	C(13)	-119(2)
Lu(1)	C(6)	C(7)	C(3)	-66(2)	Lu(1)	C(7)	C(3)	Si(1)	88(2)
Lu(1)	C(7)	C(3)	C(4)	-69(1)	Lu(1)	C(7)	C(6)	C(5)	64(2)
Lu(1)	C(9)	C(10)	C(23)	-122(1)	Lu(1)	C(9)	C(10)	C(11)	68(1)
Lu(1)	C(9)	C(8)	Si(1)	89(1)	Lu(1)	C(9)	C(8)	C(12)	-73(1)
Lu(1)	C(10)	C(23)	C(24)	87(2)	Lu(1)	C(10)	C(23)	C(25)	-22(4)
Lu(1)	C(10)	C(23)	C(26)	-171(2)	Lu(1)	C(10)	C(9)	C(8)	-68(1)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
Lu(1)	C(10)	C(11)	C(12)	61(1)	Lu(1)	C(11)	C(10)	C(23)	133(3)
Lu(1)	C(11)	C(10)	C(9)	-61(1)	Lu(1)	C(11)	C(12)	C(8)	62(1)
Lu(1)	C(12)	C(11)	C(10)	-62(1)	Lu(1)	C(12)	C(8)	Si(1)	-92(1)
Lu(1)	C(12)	C(8)	C(9)	69(1)	Lu(1)	C(8)	Si(1)	C(1)	128(1)
Lu(1)	C(8)	Si(1)	C(2)	-103(1)	Lu(1)	C(8)	Si(1)	C(3)	11(1)
Lu(1)	C(8)	C(9)	C(10)	73(1)	Lu(1)	C(8)	C(12)	C(11)	-69(1)
Lu(2)	Lu(1)	C(3)	Si(1)	-128.1(10)	Lu(2)	Lu(1)	C(3)	C(4)	109(1)
Lu(2)	Lu(1)	C(3)	C(7)	-1(2)	Lu(2)	Lu(1)	C(4)	C(3)	-110(1)
Lu(2)	Lu(1)	C(4)	C(5)	7(2)	Lu(2)	Lu(1)	C(5)	C(4)	-174(1)
Lu(2)	Lu(1)	C(5)	C(6)	-61(1)	Lu(2)	Lu(1)	C(5)	C(13)	55(2)
Lu(2)	Lu(1)	C(6)	C(5)	123(1)	Lu(2)	Lu(1)	C(6)	C(7)	-120(1)
Lu(2)	Lu(1)	C(7)	C(3)	179(1)	Lu(2)	Lu(1)	C(7)	C(6)	64(1)
Lu(2)	Lu(1)	C(9)	C(10)	-3(1)	Lu(2)	Lu(1)	C(9)	C(8)	108.5(10)
Lu(2)	Lu(1)	C(10)	C(23)	-80(2)	Lu(2)	Lu(1)	C(10)	C(9)	177.3(9)
Lu(2)	Lu(1)	C(10)	C(11)	62(1)	Lu(2)	Lu(1)	C(11)	C(10)	-121.6(10)
Lu(2)	Lu(1)	C(11)	C(12)	121(1)	Lu(2)	Lu(1)	C(12)	C(11)	-62(1)
Lu(2)	Lu(1)	C(12)	C(8)	-177.0(9)	Lu(2)	Lu(1)	C(8)	Si(1)	131.4(6)
Lu(2)	Lu(1)	C(8)	C(9)	-107.7(10)	Lu(2)	Lu(1)	C(8)	C(12)	4(1)
Lu(2)	C(29)	Si(2)	C(27)	-127(1)	Lu(2)	C(29)	Si(2)	C(28)	104(1)
Lu(2)	C(29)	Si(2)	C(34)	-10(1)	Lu(2)	C(29)	C(30)	C(31)	-59(2)
Lu(2)	C(29)	C(33)	C(32)	63(2)	Lu(2)	C(30)	C(29)	Si(2)	-98(2)
Lu(2)	C(30)	C(29)	C(33)	74(1)	Lu(2)	C(30)	C(31)	C(32)	-72(2)
Lu(2)	C(30)	C(31)	C(39)	128(3)	Lu(2)	C(31)	C(30)	C(29)	57(2)
Lu(2)	C(31)	C(32)	C(33)	-62(2)	Lu(2)	C(31)	C(39)	C(40)	-176(2)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
Lu(2)	C(31)	C(39)	C(44)	55(3)	Lu(2)	C(32)	C(31)	C(30)	70(2)
Lu(2)	C(32)	C(31)	C(39)	-128(3)	Lu(2)	C(32)	C(33)	C(29)	-57(2)
Lu(2)	C(33)	C(29)	Si(2)	100(2)	Lu(2)	C(33)	C(29)	C(30)	-72(1)
Lu(2)	C(33)	C(32)	C(31)	58(2)	Lu(2)	C(34)	Si(2)	C(27)	124(1)
Lu(2)	C(34)	Si(2)	C(28)	-107(1)	Lu(2)	C(34)	Si(2)	C(29)	9(1)
Lu(2)	C(34)	C(35)	C(36)	76(2)	Lu(2)	C(34)	C(38)	C(37)	-67(2)
Lu(2)	C(35)	C(34)	Si(2)	89(2)	Lu(2)	C(35)	C(34)	C(38)	-70(2)
Lu(2)	C(35)	C(36)	C(37)	58(2)	Lu(2)	C(35)	C(36)	C(49)	-120(3)
Lu(2)	C(37)	C(36)	C(35)	-56(2)	Lu(2)	C(37)	C(36)	C(49)	121(3)
Lu(2)	C(37)	C(38)	C(34)	65(2)	Lu(2)	C(38)	C(34)	Si(2)	-87(3)
Lu(2)	C(38)	C(34)	C(35)	69(2)	Lu(2)	C(38)	C(37)	C(36)	-75(2)
Si(1)	C(3)	Lu(1)	C(4)	122(2)	Si(1)	C(3)	Lu(1)	C(5)	156(1)
Si(1)	C(3)	Lu(1)	C(6)	-163(1)	Si(1)	C(3)	Lu(1)	C(7)	-126(2)
Si(1)	C(3)	Lu(1)	C(9)	39(1)	Si(1)	C(3)	Lu(1)	C(10)	35(1)
Si(1)	C(3)	Lu(1)	C(11)	2(1)	Si(1)	C(3)	Lu(1)	C(12)	-11(1)
Si(1)	C(3)	Lu(1)	C(8)	9(1)	Si(1)	C(3)	C(4)	C(5)	-159(2)
Si(1)	C(3)	C(7)	C(6)	159(2)	Si(1)	C(8)	Lu(1)	C(3)	-9.1(10)
Si(1)	C(8)	Lu(1)	C(4)	-39.0(10)	Si(1)	C(8)	Lu(1)	C(5)	-37(1)
Si(1)	C(8)	Lu(1)	C(6)	-2(1)	Si(1)	C(8)	Lu(1)	C(7)	12.9(10)
Si(1)	C(8)	Lu(1)	C(9)	-120(1)	Si(1)	C(8)	Lu(1)	C(10)	-158(1)
Si(1)	C(8)	Lu(1)	C(11)	163(1)	Si(1)	C(8)	Lu(1)	C(12)	127(1)
Si(1)	C(8)	C(9)	C(10)	163(1)	Si(1)	C(8)	C(12)	C(11)	-162(1)
Si(2)	C(29)	Lu(2)	C(30)	129(2)	Si(2)	C(29)	Lu(2)	C(31)	158(2)
Si(2)	C(29)	Lu(2)	C(32)	-161(2)	Si(2)	C(29)	Lu(2)	C(33)	-130(2)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
Si(2)	C(29)	Lu(2)	C(34)	8(1)	Si(2)	C(29)	Lu(2)	C(35)	38(1)
Si(2)	C(29)	Lu(2)	C(37)	2(1)	Si(2)	C(29)	Lu(2)	C(38)	-11(1)
Si(2)	C(29)	C(30)	C(31)	-157(2)	Si(2)	C(29)	C(33)	C(32)	164(2)
Si(2)	C(34)	Lu(2)	C(29)	-7(1)	Si(2)	C(34)	Lu(2)	C(30)	-38(1)
Si(2)	C(34)	Lu(2)	C(31)	-35(1)	Si(2)	C(34)	Lu(2)	C(32)	1(1)
Si(2)	C(34)	Lu(2)	C(33)	15(1)	Si(2)	C(34)	Lu(2)	C(35)	-121(2)
Si(2)	C(34)	Lu(2)	C(37)	165(2)	Si(2)	C(34)	Lu(2)	C(38)	131(2)
Si(2)	C(34)	C(35)	C(36)	166(2)	Si(2)	C(34)	C(38)	C(37)	-155(2)
C(1)	Si(1)	C(3)	C(4)	-48(2)	C(1)	Si(1)	C(3)	C(7)	156(2)
C(1)	Si(1)	C(8)	C(9)	51(2)	C(1)	Si(1)	C(8)	C(12)	-148(1)
C(2)	Si(1)	C(3)	C(4)	-174(2)	C(2)	Si(1)	C(3)	C(7)	31(3)
C(2)	Si(1)	C(8)	C(9)	179(1)	C(2)	Si(1)	C(8)	C(12)	-20(2)
C(3)	Lu(1)	Lu(2)	C(29)	-65(1)	C(3)	Lu(1)	Lu(2)	C(30)	-14(1)
C(3)	Lu(1)	Lu(2)	C(31)	-14(1)	C(3)	Lu(1)	Lu(2)	C(32)	-46(1)
C(3)	Lu(1)	Lu(2)	C(33)	-70(1)	C(3)	Lu(1)	Lu(2)	C(34)	173(1)
C(3)	Lu(1)	Lu(2)	C(35)	119(1)	C(3)	Lu(1)	Lu(2)	C(37)	150(1)
C(3)	Lu(1)	Lu(2)	C(38)	175(1)	C(3)	Lu(1)	C(4)	C(5)	118(2)
C(3)	Lu(1)	C(5)	C(4)	-36(1)	C(3)	Lu(1)	C(5)	C(6)	77(1)
C(3)	Lu(1)	C(5)	C(13)	-165(2)	C(3)	Lu(1)	C(6)	C(5)	-79(1)
C(3)	Lu(1)	C(6)	C(7)	37(1)	C(3)	Lu(1)	C(7)	C(6)	-114(2)
C(3)	Lu(1)	C(9)	C(10)	-172(1)	C(3)	Lu(1)	C(9)	C(8)	-60(1)
C(3)	Lu(1)	C(10)	C(23)	110(2)	C(3)	Lu(1)	C(10)	C(9)	8(1)
C(3)	Lu(1)	C(10)	C(11)	-107(1)	C(3)	Lu(1)	C(11)	C(10)	87(1)
C(3)	Lu(1)	C(11)	C(12)	-29(1)	C(3)	Lu(1)	C(12)	C(11)	154(1)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(3)	Lu(1)	C(12)	C(8)	39(1)	C(3)	Lu(1)	C(8)	C(9)	111(1)
C(3)	Lu(1)	C(8)	C(12)	-136(1)	C(3)	Si(1)	C(8)	C(9)	-65(1)
C(3)	Si(1)	C(8)	C(12)	94(1)	C(3)	C(4)	Lu(1)	C(5)	-118(2)
C(3)	C(4)	Lu(1)	C(6)	-80(2)	C(3)	C(4)	Lu(1)	C(7)	-39(1)
C(3)	C(4)	Lu(1)	C(9)	91(1)	C(3)	C(4)	Lu(1)	C(10)	105(1)
C(3)	C(4)	Lu(1)	C(11)	81(1)	C(3)	C(4)	Lu(1)	C(12)	51(1)
C(3)	C(4)	Lu(1)	C(8)	59(1)	C(3)	C(4)	C(5)	C(6)	-1(3)
C(3)	C(4)	C(5)	C(13)	-177(3)	C(3)	C(7)	Lu(1)	C(4)	39(1)
C(3)	C(7)	Lu(1)	C(5)	78(1)	C(3)	C(7)	Lu(1)	C(6)	114(2)
C(3)	C(7)	Lu(1)	C(9)	-14(1)	C(3)	C(7)	Lu(1)	C(10)	-28(2)
C(3)	C(7)	Lu(1)	C(11)	-73(1)	C(3)	C(7)	Lu(1)	C(12)	-69(1)
C(3)	C(7)	Lu(1)	C(8)	-40(1)	C(3)	C(7)	C(6)	C(5)	-2(3)
C(4)	Lu(1)	Lu(2)	C(29)	-13(1)	C(4)	Lu(1)	Lu(2)	C(30)	37(1)
C(4)	Lu(1)	Lu(2)	C(31)	36(1)	C(4)	Lu(1)	Lu(2)	C(32)	5(1)
C(4)	Lu(1)	Lu(2)	C(33)	-19(1)	C(4)	Lu(1)	Lu(2)	C(34)	-135(1)
C(4)	Lu(1)	Lu(2)	C(35)	170(1)	C(4)	Lu(1)	Lu(2)	C(37)	-158(1)
C(4)	Lu(1)	Lu(2)	C(38)	-132(1)	C(4)	Lu(1)	C(3)	C(7)	-110(2)
C(4)	Lu(1)	C(5)	C(6)	113(2)	C(4)	Lu(1)	C(5)	C(13)	-129(3)
C(4)	Lu(1)	C(6)	C(5)	-37(1)	C(4)	Lu(1)	C(6)	C(7)	79(1)
C(4)	Lu(1)	C(7)	C(6)	-74(1)	C(4)	Lu(1)	C(9)	C(10)	154(1)
C(4)	Lu(1)	C(9)	C(8)	-93(1)	C(4)	Lu(1)	C(10)	C(23)	76(2)
C(4)	Lu(1)	C(10)	C(9)	-26(1)	C(4)	Lu(1)	C(10)	C(11)	-141(1)
C(4)	Lu(1)	C(11)	C(10)	50(1)	C(4)	Lu(1)	C(11)	C(12)	-66(1)
C(4)	Lu(1)	C(12)	C(11)	129(1)	C(4)	Lu(1)	C(12)	C(8)	15(1)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(4)	Lu(1)	C(8)	C(9)	81(1)	C(4)	Lu(1)	C(8)	C(12)	-166(1)
C(4)	C(3)	Lu(1)	C(5)	34(1)	C(4)	C(3)	Lu(1)	C(6)	73(1)
C(4)	C(3)	Lu(1)	C(7)	110(2)	C(4)	C(3)	Lu(1)	C(9)	-82(1)
C(4)	C(3)	Lu(1)	C(10)	-87(1)	C(4)	C(3)	Lu(1)	C(11)	-120(1)
C(4)	C(3)	Lu(1)	C(12)	-134(1)	C(4)	C(3)	Lu(1)	C(8)	-113(1)
C(4)	C(3)	Si(1)	C(8)	66(2)	C(4)	C(3)	C(7)	C(6)	1(3)
C(4)	C(5)	Lu(1)	C(6)	-113(2)	C(4)	C(5)	Lu(1)	C(7)	-76(1)
C(4)	C(5)	Lu(1)	C(9)	31(1)	C(4)	C(5)	Lu(1)	C(10)	57(1)
C(4)	C(5)	Lu(1)	C(11)	42(2)	C(4)	C(5)	Lu(1)	C(12)	-16(2)
C(4)	C(5)	Lu(1)	C(8)	-2(1)	C(4)	C(5)	C(6)	C(7)	1(3)
C(4)	C(5)	C(13)	C(14)	80(4)	C(4)	C(5)	C(13)	C(18)	-49(4)
C(5)	Lu(1)	Lu(2)	C(29)	-9(1)	C(5)	Lu(1)	Lu(2)	C(30)	41(1)
C(5)	Lu(1)	Lu(2)	C(31)	40(1)	C(5)	Lu(1)	Lu(2)	C(32)	9.0(10)
C(5)	Lu(1)	Lu(2)	C(33)	-15(1)	C(5)	Lu(1)	Lu(2)	C(34)	-131(1)
C(5)	Lu(1)	Lu(2)	C(35)	174(1)	C(5)	Lu(1)	Lu(2)	C(37)	-154(1)
C(5)	Lu(1)	Lu(2)	C(38)	-128(1)	C(5)	Lu(1)	C(3)	C(7)	-76(1)
C(5)	Lu(1)	C(6)	C(7)	116(2)	C(5)	Lu(1)	C(7)	C(6)	-35(1)
C(5)	Lu(1)	C(9)	C(10)	138(1)	C(5)	Lu(1)	C(9)	C(8)	-108(1)
C(5)	Lu(1)	C(10)	C(23)	49(2)	C(5)	Lu(1)	C(10)	C(9)	-53(1)
C(5)	Lu(1)	C(10)	C(11)	-168(1)	C(5)	Lu(1)	C(11)	C(10)	23(2)
C(5)	Lu(1)	C(11)	C(12)	-94(2)	C(5)	Lu(1)	C(12)	C(11)	139(1)
C(5)	Lu(1)	C(12)	C(8)	24(1)	C(5)	Lu(1)	C(8)	C(9)	83(1)
C(5)	Lu(1)	C(8)	C(12)	-164(1)	C(5)	C(4)	Lu(1)	C(6)	37(1)
C(5)	C(4)	Lu(1)	C(7)	78(1)	C(5)	C(4)	Lu(1)	C(9)	-149(1)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(5)	C(4)	Lu(1)	C(10)	-136(1)	C(5)	C(4)	Lu(1)	C(11)	-160(1)
C(5)	C(4)	Lu(1)	C(12)	169(1)	C(5)	C(4)	Lu(1)	C(8)	177(1)
C(5)	C(4)	C(3)	C(7)	0(3)	C(5)	C(6)	Lu(1)	C(7)	-116(2)
C(5)	C(6)	Lu(1)	C(9)	-47(2)	C(5)	C(6)	Lu(1)	C(10)	-22(3)
C(5)	C(6)	Lu(1)	C(11)	-139(2)	C(5)	C(6)	Lu(1)	C(12)	-122(1)
C(5)	C(6)	Lu(1)	C(8)	-86(1)	C(5)	C(13)	C(14)	C(15)	-73(3)
C(5)	C(13)	C(14)	C(19)	51(3)	C(5)	C(13)	C(18)	C(17)	81(3)
C(6)	Lu(1)	Lu(2)	C(29)	-37(1)	C(6)	Lu(1)	Lu(2)	C(30)	13(1)
C(6)	Lu(1)	Lu(2)	C(31)	13(1)	C(6)	Lu(1)	Lu(2)	C(32)	-18.4(10)
C(6)	Lu(1)	Lu(2)	C(33)	-42(1)	C(6)	Lu(1)	Lu(2)	C(34)	-158(1)
C(6)	Lu(1)	Lu(2)	C(35)	147(1)	C(6)	Lu(1)	Lu(2)	C(37)	178(1)
C(6)	Lu(1)	Lu(2)	C(38)	-156(1)	C(6)	Lu(1)	C(3)	C(7)	-36(1)
C(6)	Lu(1)	C(5)	C(13)	117(3)	C(6)	Lu(1)	C(9)	C(10)	162(1)
C(6)	Lu(1)	C(9)	C(8)	-85(1)	C(6)	Lu(1)	C(10)	C(23)	63(3)
C(6)	Lu(1)	C(10)	C(9)	-39(2)	C(6)	Lu(1)	C(10)	C(11)	-154(2)
C(6)	Lu(1)	C(11)	C(10)	140(3)	C(6)	Lu(1)	C(11)	C(12)	22(3)
C(6)	Lu(1)	C(12)	C(11)	-172(1)	C(6)	Lu(1)	C(12)	C(8)	73(1)
C(6)	Lu(1)	C(8)	C(9)	118(1)	C(6)	Lu(1)	C(8)	C(12)	-129(1)
C(6)	C(5)	Lu(1)	C(7)	36(1)	C(6)	C(5)	Lu(1)	C(9)	144(1)
C(6)	C(5)	Lu(1)	C(10)	170(1)	C(6)	C(5)	Lu(1)	C(11)	155(1)
C(6)	C(5)	Lu(1)	C(12)	96(2)	C(6)	C(5)	Lu(1)	C(8)	110(1)
C(6)	C(5)	C(13)	C(14)	-95(3)	C(6)	C(5)	C(13)	C(18)	134(2)
C(6)	C(7)	Lu(1)	C(9)	-128(1)	C(6)	C(7)	Lu(1)	C(10)	-142(1)
C(6)	C(7)	Lu(1)	C(11)	172(1)	C(6)	C(7)	Lu(1)	C(12)	176(1)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(6)	C(7)	Lu(1)	C(8)	-154(1)	C(7)	Lu(1)	Lu(2)	C(29)	-65(1)
C(7)	Lu(1)	Lu(2)	C(30)	-14(1)	C(7)	Lu(1)	Lu(2)	C(31)	-15(1)
C(7)	Lu(1)	Lu(2)	C(32)	-47.0(10)	C(7)	Lu(1)	Lu(2)	C(33)	-71(1)
C(7)	Lu(1)	Lu(2)	C(34)	172(1)	C(7)	Lu(1)	Lu(2)	C(35)	118(1)
C(7)	Lu(1)	Lu(2)	C(37)	149(1)	C(7)	Lu(1)	Lu(2)	C(38)	175(1)
C(7)	Lu(1)	C(5)	C(13)	153(2)	C(7)	Lu(1)	C(9)	C(10)	-164(1)
C(7)	Lu(1)	C(9)	C(8)	-52(1)	C(7)	Lu(1)	C(10)	C(23)	126(2)
C(7)	Lu(1)	C(10)	C(9)	24(1)	C(7)	Lu(1)	C(10)	C(11)	-90(1)
C(7)	Lu(1)	C(11)	C(10)	123(1)	C(7)	Lu(1)	C(11)	C(12)	6(1)
C(7)	Lu(1)	C(12)	C(11)	-175(1)	C(7)	Lu(1)	C(12)	C(8)	70(1)
C(7)	Lu(1)	C(8)	C(9)	133(1)	C(7)	Lu(1)	C(8)	C(12)	-114(1)
C(7)	C(3)	Lu(1)	C(9)	166(1)	C(7)	C(3)	Lu(1)	C(10)	162(1)
C(7)	C(3)	Lu(1)	C(11)	129(1)	C(7)	C(3)	Lu(1)	C(12)	114(1)
C(7)	C(3)	Lu(1)	C(8)	136(1)	C(7)	C(3)	Si(1)	C(8)	-88(2)
C(7)	C(6)	Lu(1)	C(9)	69(1)	C(7)	C(6)	Lu(1)	C(10)	94(2)
C(7)	C(6)	Lu(1)	C(11)	-22(4)	C(7)	C(6)	Lu(1)	C(12)	-5(2)
C(7)	C(6)	Lu(1)	C(8)	30(2)	C(7)	C(6)	C(5)	C(13)	179(2)
C(13)	C(5)	Lu(1)	C(9)	-98(2)	C(13)	C(5)	Lu(1)	C(10)	-72(2)
C(13)	C(5)	Lu(1)	C(11)	-86(3)	C(13)	C(5)	Lu(1)	C(12)	-145(2)
C(13)	C(5)	Lu(1)	C(8)	-132(2)	C(13)	C(14)	C(15)	C(16)	-59(3)
C(13)	C(14)	C(19)	C(20)	69(3)	C(13)	C(14)	C(19)	C(21)	-174(2)
C(13)	C(18)	C(17)	C(16)	51(3)	C(13)	C(18)	C(17)	C(22)	172(2)
C(14)	C(13)	C(18)	C(17)	-49(3)	C(14)	C(15)	C(16)	C(17)	58(3)
C(15)	C(14)	C(13)	C(18)	56(3)	C(15)	C(14)	C(19)	C(20)	-164(2)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(15)	C(14)	C(19)	C(21)	-48(3)	C(15)	C(16)	C(17)	C(18)	-55(3)
C(15)	C(16)	C(17)	C(22)	-173(2)	C(16)	C(15)	C(14)	C(19)	175(2)
C(18)	C(13)	C(14)	C(19)	-178(2)	C(23)	C(10)	Lu(1)	C(9)	102(2)
C(23)	C(10)	Lu(1)	C(11)	-142(2)	C(23)	C(10)	Lu(1)	C(12)	-177(2)
C(23)	C(10)	Lu(1)	C(8)	141(2)	C(23)	C(10)	C(9)	C(8)	168(2)
C(23)	C(10)	C(11)	C(12)	-164(2)	C(24)	C(23)	C(10)	C(9)	166(1)
C(24)	C(23)	C(10)	C(11)	-29(3)	C(25)	C(23)	C(10)	C(9)	56(3)
C(25)	C(23)	C(10)	C(11)	-139(2)	C(26)	C(23)	C(10)	C(9)	-92(3)
C(26)	C(23)	C(10)	C(11)	72(4)	C(27)	Si(2)	C(29)	C(30)	-44(3)
C(27)	Si(2)	C(29)	C(33)	144(2)	C(27)	Si(2)	C(34)	C(35)	48(3)
C(27)	Si(2)	C(34)	C(38)	-159(3)	C(28)	Si(2)	C(29)	C(30)	-171(2)
C(28)	Si(2)	C(29)	C(33)	17(3)	C(28)	Si(2)	C(34)	C(35)	176(2)
C(28)	Si(2)	C(34)	C(38)	-30(3)	C(29)	Lu(2)	Lu(1)	C(9)	132(1)
C(29)	Lu(2)	Lu(1)	C(10)	130(1)	C(29)	Lu(2)	Lu(1)	C(11)	156(1)
C(29)	Lu(2)	Lu(1)	C(12)	-176(1)	C(29)	Lu(2)	Lu(1)	C(8)	-179(1)
C(29)	Lu(2)	C(30)	C(31)	125(2)	C(29)	Lu(2)	C(31)	C(30)	-34(1)
C(29)	Lu(2)	C(31)	C(32)	74(1)	C(29)	Lu(2)	C(31)	C(39)	-163(3)
C(29)	Lu(2)	C(32)	C(31)	-83(2)	C(29)	Lu(2)	C(32)	C(33)	39(2)
C(29)	Lu(2)	C(33)	C(32)	-118(2)	C(29)	Lu(2)	C(34)	C(35)	114(2)
C(29)	Lu(2)	C(34)	C(38)	-139(2)	C(29)	Lu(2)	C(35)	C(34)	-55(2)
C(29)	Lu(2)	C(35)	C(36)	-172(2)	C(29)	Lu(2)	C(37)	C(36)	86(2)
C(29)	Lu(2)	C(37)	C(38)	-28(2)	C(29)	Lu(2)	C(38)	C(34)	34(2)
C(29)	Lu(2)	C(38)	C(37)	153(2)	C(29)	Si(2)	C(34)	C(35)	-66(3)
C(29)	Si(2)	C(34)	C(38)	86(3)	C(29)	C(30)	Lu(2)	C(31)	-125(2)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(29)	C(30)	Lu(2)	C(32)	-83(1)	C(29)	C(30)	Lu(2)	C(33)	-46(1)
C(29)	C(30)	Lu(2)	C(34)	49(1)	C(29)	C(30)	Lu(2)	C(35)	81(1)
C(29)	C(30)	Lu(2)	C(37)	73(1)	C(29)	C(30)	Lu(2)	C(38)	43(1)
C(29)	C(30)	C(31)	C(32)	-15(3)	C(29)	C(30)	C(31)	C(39)	-174(3)
C(29)	C(33)	Lu(2)	C(30)	45(1)	C(29)	C(33)	Lu(2)	C(31)	83(1)
C(29)	C(33)	Lu(2)	C(32)	118(2)	C(29)	C(33)	Lu(2)	C(34)	-35(1)
C(29)	C(33)	Lu(2)	C(35)	-12(1)	C(29)	C(33)	Lu(2)	C(37)	-69(2)
C(29)	C(33)	Lu(2)	C(38)	-64(1)	C(29)	C(33)	C(32)	C(31)	0(3)
C(30)	Lu(2)	Lu(1)	C(9)	-176(1)	C(30)	Lu(2)	Lu(1)	C(10)	-178.6(9)
C(30)	Lu(2)	Lu(1)	C(11)	-152.3(9)	C(30)	Lu(2)	Lu(1)	C(12)	-125.8(9)
C(30)	Lu(2)	Lu(1)	C(8)	-128(1)	C(30)	Lu(2)	C(29)	C(33)	-100(2)
C(30)	Lu(2)	C(31)	C(32)	108(2)	C(30)	Lu(2)	C(31)	C(39)	-129(3)
C(30)	Lu(2)	C(32)	C(31)	-38(1)	C(30)	Lu(2)	C(32)	C(33)	84(2)
C(30)	Lu(2)	C(33)	C(32)	-72(2)	C(30)	Lu(2)	C(34)	C(35)	83(2)
C(30)	Lu(2)	C(34)	C(38)	-170(2)	C(30)	Lu(2)	C(35)	C(34)	-92(2)
C(30)	Lu(2)	C(35)	C(36)	150(2)	C(30)	Lu(2)	C(37)	C(36)	47(2)
C(30)	Lu(2)	C(37)	C(38)	-67(2)	C(30)	Lu(2)	C(38)	C(34)	10(2)
C(30)	Lu(2)	C(38)	C(37)	129(2)	C(30)	C(29)	Lu(2)	C(31)	28(1)
C(30)	C(29)	Lu(2)	C(32)	68(1)	C(30)	C(29)	Lu(2)	C(33)	100(2)
C(30)	C(29)	Lu(2)	C(34)	-120(1)	C(30)	C(29)	Lu(2)	C(35)	-91(1)
C(30)	C(29)	Lu(2)	C(37)	-127(1)	C(30)	C(29)	Lu(2)	C(38)	-141(1)
C(30)	C(29)	Si(2)	C(34)	72(3)	C(30)	C(29)	C(33)	C(32)	-8(3)
C(30)	C(31)	Lu(2)	C(32)	-108(2)	C(30)	C(31)	Lu(2)	C(33)	-78(2)
C(30)	C(31)	Lu(2)	C(34)	-5(2)	C(30)	C(31)	Lu(2)	C(35)	28(2)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(30)	C(31)	Lu(2)	C(37)	42(3)	C(30)	C(31)	Lu(2)	C(38)	-16(2)
C(30)	C(31)	C(32)	C(33)	8(3)	C(30)	C(31)	C(39)	C(40)	79(4)
C(30)	C(31)	C(39)	C(44)	-48(4)	C(31)	Lu(2)	Lu(1)	C(9)	-176.8(9)
C(31)	Lu(2)	Lu(1)	C(10)	-178.9(8)	C(31)	Lu(2)	Lu(1)	C(11)	-152.6(9)
C(31)	Lu(2)	Lu(1)	C(12)	-126.1(9)	C(31)	Lu(2)	Lu(1)	C(8)	-128.4(10)
C(31)	Lu(2)	C(29)	C(33)	-71(1)	C(31)	Lu(2)	C(32)	C(33)	123(3)
C(31)	Lu(2)	C(33)	C(32)	-34(2)	C(31)	Lu(2)	C(34)	C(35)	85(2)
C(31)	Lu(2)	C(34)	C(38)	-167(1)	C(31)	Lu(2)	C(35)	C(34)	-106(2)
C(31)	Lu(2)	C(35)	C(36)	135(1)	C(31)	Lu(2)	C(37)	C(36)	20(3)
C(31)	Lu(2)	C(37)	C(38)	-94(3)	C(31)	Lu(2)	C(38)	C(34)	19(3)
C(31)	Lu(2)	C(38)	C(37)	138(2)	C(31)	C(30)	Lu(2)	C(32)	42(1)
C(31)	C(30)	Lu(2)	C(33)	79(2)	C(31)	C(30)	Lu(2)	C(34)	175(2)
C(31)	C(30)	Lu(2)	C(35)	-152(2)	C(31)	C(30)	Lu(2)	C(37)	-160(1)
C(31)	C(30)	Lu(2)	C(38)	169(1)	C(31)	C(30)	C(29)	C(33)	15(3)
C(31)	C(32)	Lu(2)	C(33)	-123(3)	C(31)	C(32)	Lu(2)	C(34)	-93(1)
C(31)	C(32)	Lu(2)	C(35)	-57(2)	C(31)	C(32)	Lu(2)	C(37)	-141(3)
C(31)	C(32)	Lu(2)	C(38)	-126(1)	C(31)	C(39)	C(40)	C(41)	-75(3)
C(31)	C(39)	C(40)	C(45)	56(3)	C(31)	C(39)	C(44)	C(43)	83(3)
C(32)	Lu(2)	Lu(1)	C(9)	151.3(9)	C(32)	Lu(2)	Lu(1)	C(10)	149.3(8)
C(32)	Lu(2)	Lu(1)	C(11)	175.6(8)	C(32)	Lu(2)	Lu(1)	C(12)	-157.9(8)
C(32)	Lu(2)	Lu(1)	C(8)	-160.3(9)	C(32)	Lu(2)	C(29)	C(33)	-31(1)
C(32)	Lu(2)	C(31)	C(39)	121(3)	C(32)	Lu(2)	C(34)	C(35)	123(2)
C(32)	Lu(2)	C(34)	C(38)	-130(2)	C(32)	Lu(2)	C(35)	C(34)	-76(2)
C(32)	Lu(2)	C(35)	C(36)	165(1)	C(32)	Lu(2)	C(37)	C(36)	136(3)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(32)	Lu(2)	C(37)	C(38)	21(4)	C(32)	Lu(2)	C(38)	C(34)	69(2)
C(32)	Lu(2)	C(38)	C(37)	-171(2)	C(32)	C(31)	Lu(2)	C(33)	30(1)
C(32)	C(31)	Lu(2)	C(34)	103(1)	C(32)	C(31)	Lu(2)	C(35)	136(1)
C(32)	C(31)	Lu(2)	C(37)	151(2)	C(32)	C(31)	Lu(2)	C(38)	92(2)
C(32)	C(31)	C(39)	C(40)	-76(4)	C(32)	C(31)	C(39)	C(44)	156(2)
C(32)	C(33)	Lu(2)	C(34)	-153(2)	C(32)	C(33)	Lu(2)	C(35)	-130(2)
C(32)	C(33)	Lu(2)	C(37)	172(2)	C(32)	C(33)	Lu(2)	C(38)	177(2)
C(33)	Lu(2)	Lu(1)	C(9)	127.1(9)	C(33)	Lu(2)	Lu(1)	C(10)	125.1(8)
C(33)	Lu(2)	Lu(1)	C(11)	151.4(9)	C(33)	Lu(2)	Lu(1)	C(12)	177.9(9)
C(33)	Lu(2)	Lu(1)	C(8)	175.6(10)	C(33)	Lu(2)	C(31)	C(39)	151(3)
C(33)	Lu(2)	C(34)	C(35)	137(2)	C(33)	Lu(2)	C(34)	C(38)	-116(2)
C(33)	Lu(2)	C(35)	C(34)	-47(2)	C(33)	Lu(2)	C(35)	C(36)	-165(1)
C(33)	Lu(2)	C(37)	C(36)	124(2)	C(33)	Lu(2)	C(37)	C(38)	9(2)
C(33)	Lu(2)	C(38)	C(34)	67(2)	C(33)	Lu(2)	C(38)	C(37)	-173(2)
C(33)	C(29)	Lu(2)	C(34)	138(1)	C(33)	C(29)	Lu(2)	C(35)	168(1)
C(33)	C(29)	Lu(2)	C(37)	132(1)	C(33)	C(29)	Lu(2)	C(38)	118(1)
C(33)	C(29)	Si(2)	C(34)	-97(3)	C(33)	C(32)	Lu(2)	C(34)	30(2)
C(33)	C(32)	Lu(2)	C(35)	65(2)	C(33)	C(32)	Lu(2)	C(37)	-18(4)
C(33)	C(32)	Lu(2)	C(38)	-3(2)	C(33)	C(32)	C(31)	C(39)	169(3)
C(34)	Lu(2)	Lu(1)	C(9)	11(1)	C(34)	Lu(2)	Lu(1)	C(10)	9(1)
C(34)	Lu(2)	Lu(1)	C(11)	35(1)	C(34)	Lu(2)	Lu(1)	C(12)	61(1)
C(34)	Lu(2)	Lu(1)	C(8)	59(1)	C(34)	Lu(2)	C(31)	C(39)	-135(2)
C(34)	Lu(2)	C(35)	C(36)	-117(2)	C(34)	Lu(2)	C(37)	C(36)	79(2)
C(34)	Lu(2)	C(37)	C(38)	-35(2)	C(34)	Lu(2)	C(38)	C(37)	118(3)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(34)	C(35)	Lu(2)	C(37)	80(2)	C(34)	C(35)	Lu(2)	C(38)	41(2)
C(34)	C(35)	C(36)	C(37)	-11(3)	C(34)	C(35)	C(36)	C(49)	169(3)
C(34)	C(38)	Lu(2)	C(35)	-41(1)	C(34)	C(38)	Lu(2)	C(37)	-118(3)
C(34)	C(38)	C(37)	C(36)	-9(4)	C(35)	Lu(2)	Lu(1)	C(9)	-43(1)
C(35)	Lu(2)	Lu(1)	C(10)	-45(1)	C(35)	Lu(2)	Lu(1)	C(11)	-18(1)
C(35)	Lu(2)	Lu(1)	C(12)	7(1)	C(35)	Lu(2)	Lu(1)	C(8)	5(1)
C(35)	Lu(2)	C(31)	C(39)	-101(2)	C(35)	Lu(2)	C(34)	C(38)	106(2)
C(35)	Lu(2)	C(37)	C(36)	38(1)	C(35)	Lu(2)	C(37)	C(38)	-76(2)
C(35)	Lu(2)	C(38)	C(37)	77(2)	C(35)	C(34)	Lu(2)	C(37)	-73(2)
C(35)	C(34)	Lu(2)	C(38)	-106(2)	C(35)	C(34)	C(38)	C(37)	2(3)
C(35)	C(36)	C(37)	C(38)	12(3)	C(35)	C(36)	C(49)	C(50)	40(4)
C(35)	C(36)	C(49)	C(51)	-91(4)	C(35)	C(36)	C(49)	C(52)	154(3)
C(36)	C(35)	Lu(2)	C(37)	-37(1)	C(36)	C(35)	Lu(2)	C(38)	-76(2)
C(36)	C(35)	C(34)	C(38)	6(3)	C(36)	C(37)	Lu(2)	C(38)	115(3)
C(37)	Lu(2)	Lu(1)	C(9)	-12.1(9)	C(37)	Lu(2)	Lu(1)	C(10)	-14.1(9)
C(37)	Lu(2)	Lu(1)	C(11)	12.1(9)	C(37)	Lu(2)	Lu(1)	C(12)	38.6(9)
C(37)	Lu(2)	Lu(1)	C(8)	36.3(10)	C(37)	Lu(2)	C(31)	C(39)	-87(3)
C(37)	Lu(2)	C(34)	C(38)	33(1)	C(37)	C(36)	C(49)	C(50)	-137(4)
C(37)	C(36)	C(49)	C(51)	90(4)	C(37)	C(36)	C(49)	C(52)	-23(5)
C(38)	Lu(2)	Lu(1)	C(9)	13(1)	C(38)	Lu(2)	Lu(1)	C(10)	11.3(9)
C(38)	Lu(2)	Lu(1)	C(11)	37.6(10)	C(38)	Lu(2)	Lu(1)	C(12)	64.1(10)
C(38)	Lu(2)	Lu(1)	C(8)	61(1)	C(38)	Lu(2)	C(31)	C(39)	-146(2)
C(38)	C(37)	C(36)	C(49)	-169(3)	C(39)	C(40)	C(41)	C(42)	-61(3)
C(39)	C(40)	C(45)	C(46)	-95(3)	C(39)	C(40)	C(45)	C(47)	149(2)

Table 7. Torsion Angles(°) (continued)

atom	atom	atom	atom	angle	atom	atom	atom	atom	angle
C(39)	C(44)	C(43)	C(42)	52(3)	C(39)	C(44)	C(43)	C(48)	166(3)
C(40)	C(39)	C(44)	C(43)	-47(3)	C(40)	C(41)	C(42)	C(43)	64(3)
C(41)	C(40)	C(39)	C(44)	50(3)	C(41)	C(40)	C(45)	C(46)	38(3)
C(41)	C(40)	C(45)	C(47)	-77(3)	C(41)	C(42)	C(43)	C(44)	-57(3)
C(41)	C(42)	C(43)	C(48)	-179(2)	C(42)	C(41)	C(40)	C(45)	166(2)
C(44)	C(39)	C(40)	C(45)	-177(2)	C(9)	Lu(1)	C(10)	C(11)	-115(1)
C(9)	Lu(1)	C(11)	C(10)	37.2(10)	C(9)	Lu(1)	C(11)	C(12)	-80(1)
C(9)	Lu(1)	C(12)	C(11)	75(1)	C(9)	Lu(1)	C(12)	C(8)	-39(1)
C(9)	Lu(1)	C(8)	C(12)	111(1)	C(9)	C(10)	Lu(1)	C(11)	115(1)
C(9)	C(10)	Lu(1)	C(12)	80(1)	C(9)	C(10)	Lu(1)	C(8)	39.2(10)
C(9)	C(10)	C(11)	C(12)	0(2)	C(9)	C(8)	Lu(1)	C(10)	-37.5(10)
C(9)	C(8)	Lu(1)	C(11)	-76(1)	C(9)	C(8)	Lu(1)	C(12)	-111(1)
C(9)	C(8)	C(12)	C(11)	0(2)	C(10)	Lu(1)	C(9)	C(8)	112(1)
C(10)	Lu(1)	C(11)	C(12)	-117(1)	C(10)	Lu(1)	C(12)	C(11)	35(1)
C(10)	Lu(1)	C(12)	C(8)	-79(1)	C(10)	Lu(1)	C(8)	C(12)	74(1)
C(10)	C(9)	Lu(1)	C(11)	-35.6(9)	C(10)	C(9)	Lu(1)	C(12)	-74(1)
C(10)	C(9)	Lu(1)	C(8)	-112(1)	C(10)	C(9)	C(8)	C(12)	0(2)
C(10)	C(11)	Lu(1)	C(12)	117(1)	C(10)	C(11)	Lu(1)	C(8)	79(1)
C(10)	C(11)	C(12)	C(8)	0(2)	C(11)	Lu(1)	C(9)	C(8)	76(1)
C(11)	Lu(1)	C(12)	C(8)	-114(1)	C(11)	Lu(1)	C(8)	C(12)	35(1)
C(11)	C(10)	Lu(1)	C(12)	-35(1)	C(11)	C(10)	Lu(1)	C(8)	-76(1)
C(11)	C(10)	C(9)	C(8)	0(2)	C(11)	C(12)	Lu(1)	C(8)	114(1)
C(12)	Lu(1)	C(9)	C(8)	37(1)	C(12)	C(11)	Lu(1)	C(8)	-37(1)