Supplementary Information

A Reversible NO-Triggered Multiple Metallaborane Cluster Fusion By Ligand Expulsion/Addition From $(PMe_2Ph)_4Pt_2B_{10}H_{10}$ to Afford $(PMe_2Ph)_8Pt_8B_{40}H_{40}$ and $(PMe_2Ph)_5Pt_4B_{20}H_{20}$.

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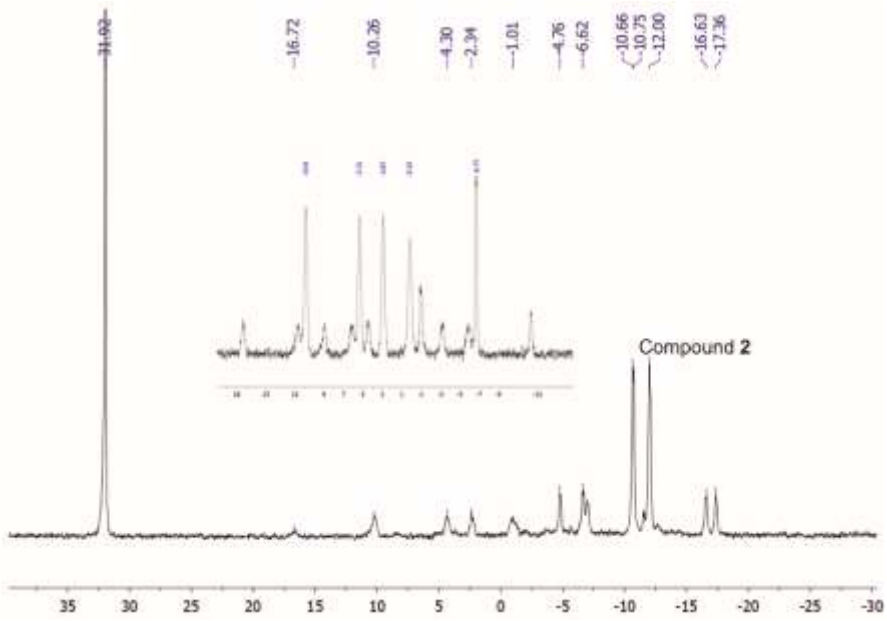

Figure S1. 243 MHz $^{31}P-\{^{1}H\}$ NMR spectrum of final reaction mixture in CH_2Cl_2 at 293 K showing PMe_2Ph at +32 ppm and compound (**2**-Pt_8) at *ca.* -10 to -12 ppm (with ^{195}Pt satellites) with the remaining resonances due to compound (**3**-Pt_4) and its ^{195}Pt satellites. Inset is $^{31}P-\{^{1}H\}$ spectrum for compound (**3**-Pt_4) in $CDCl_3$ solution at 293 K.

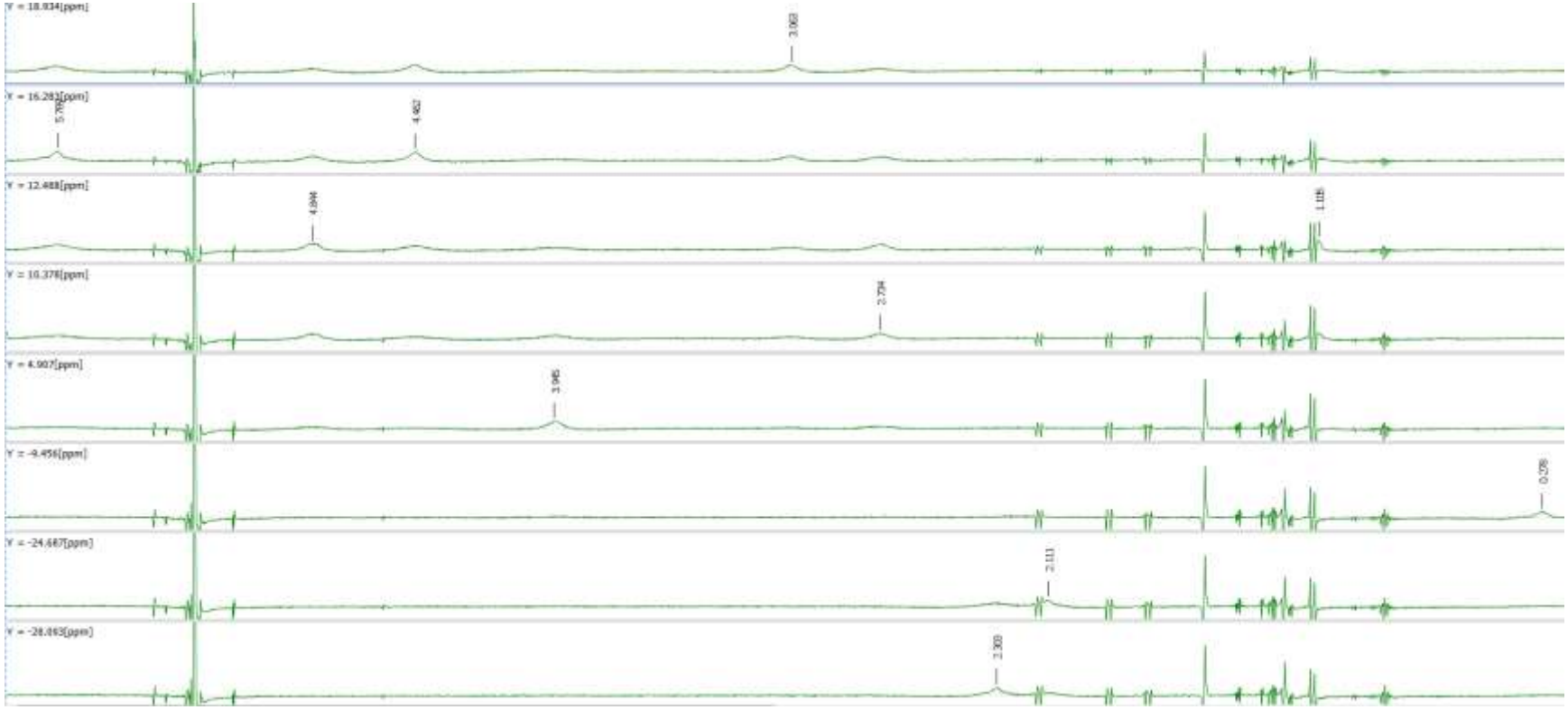

Figure S2. 600 MHz selective ^{1}H-{$^{11}B_{sel}$} proton spectra of $(PMe_2Ph)_8Pt_8B_{40}H_{40}$ (**2**-Pt_8) with ^{1}H-{$^{11}B_{off\ resonance}$} subtracted to remove non-decoupled resonances and demonstrating the clear presence of ten B-H proton resonances. CD_2Cl_2 solution at 291 K.

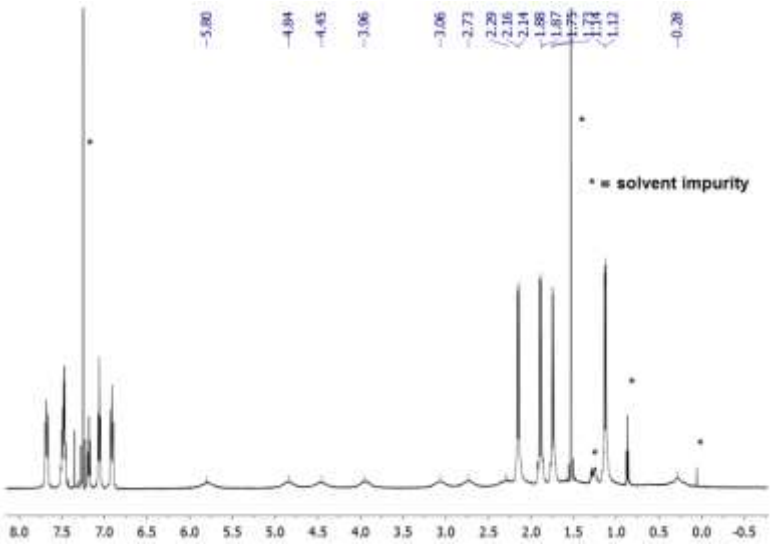

Figure S3. 600 MHz ^{1}H-{^{11}B} NMR spectrum of $(PMe_2Ph)_8Pt_8B_{40}H_{40}$ (**2**-Pt_8) in $CDCl_3$ at 293 K.

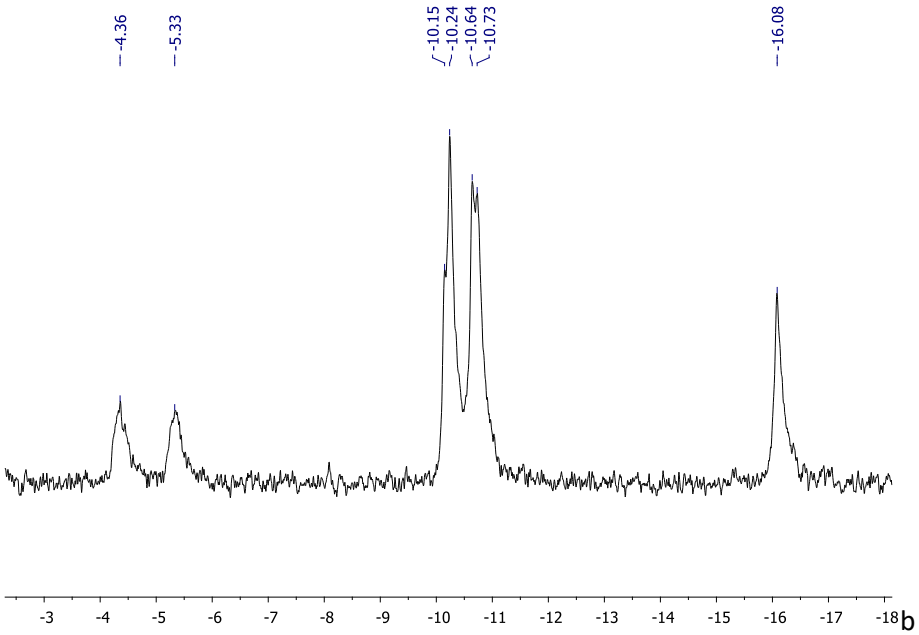

Figure S4. 243 MHz ^{31}P-{^{1}H} NMR spectrum of $(PMe_2Ph)_8Pt_8B_{40}H_{40}$ (**2**-Pt_8) in $CDCl_3$ at 292 K

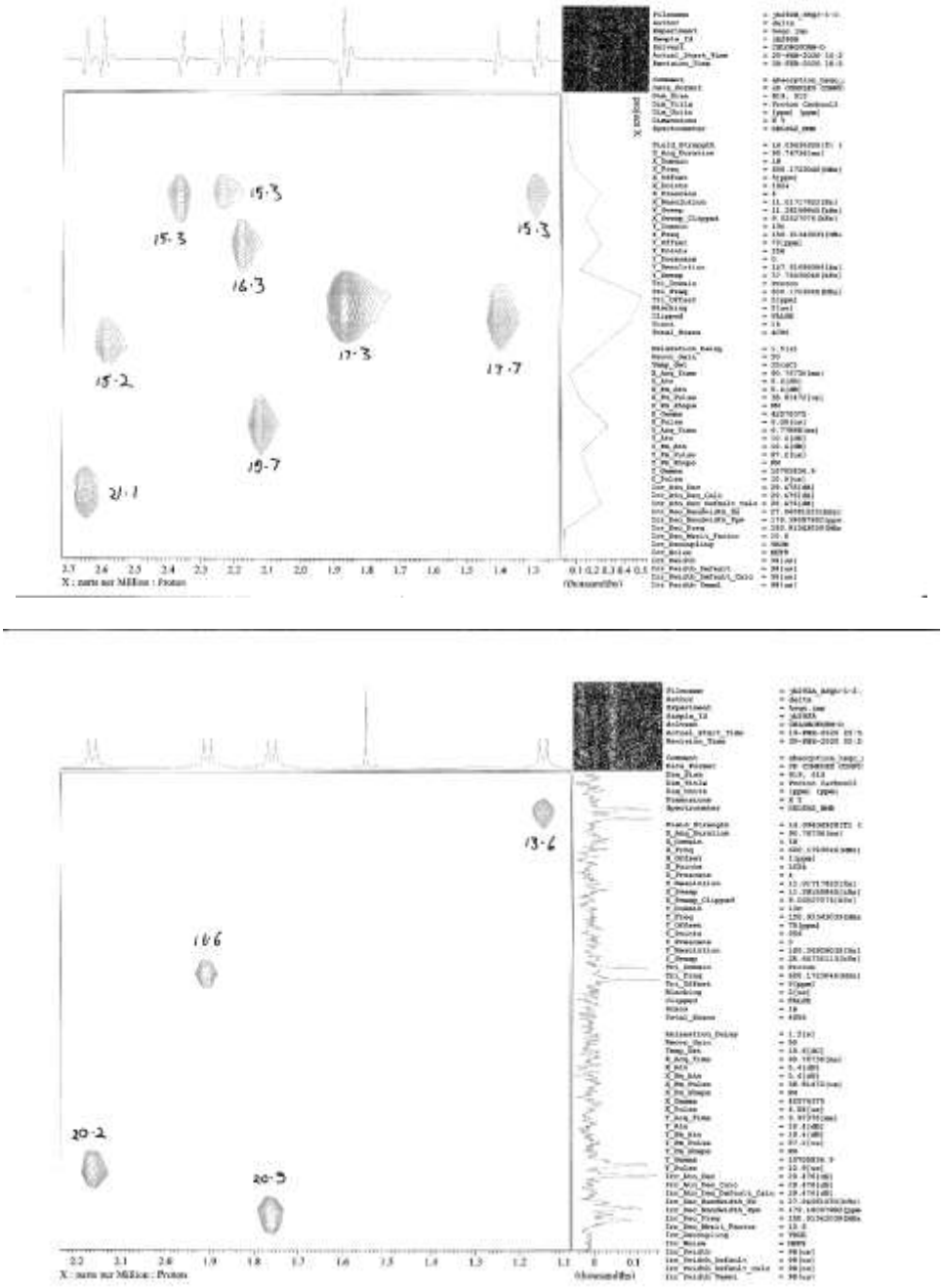

Figure S5. 2D HSQC ^{13}C – ^{1}H spectra of (top): $(PMe_2Ph)_5Pt_4B_{20}H_{20}$ (**3**-Pt_4) in $CDCl_3$ solution at 298 K showing carbon-13 resonances for ten methyl groups (the $\delta(^{13}C)$ at +17.3 ppm contains two methyl groups); and (bottom) $(PMe_2Ph)_8Pt_8B_{40}H_{40}$ (**2**-Pt_8) showing four methyl groups. For **2**-Pt_8, the abscissa (^{1}H) and ordinate (^{13}C) axes illustrate four doublets due to coupling to ^{31}P. The handwritten numbers in both spectra indicate ^{13}C chemical shift values.

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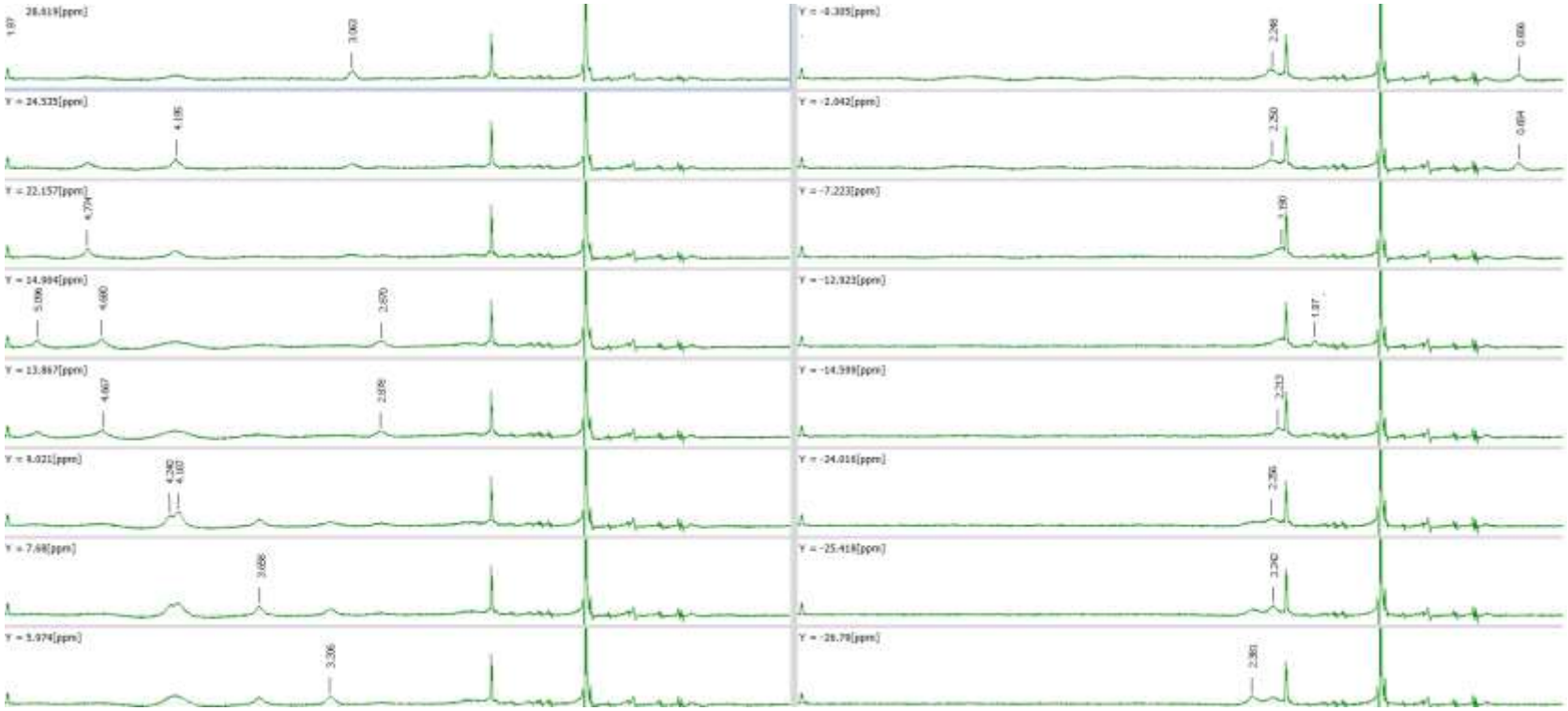

Figure S6. 600 MHz Selective ^{1}H-{$^{11}B_{sel}$} proton spectra of $(PMe_2Ph)_5Pt_4B_{20}H_{20}$ (**3**-Pt_4) with ^{1}H-{$^{11}B_{off\ resonance}$} subtracted to remove non-decoupled resonances. $CDCl_3$ solution at 291 K.

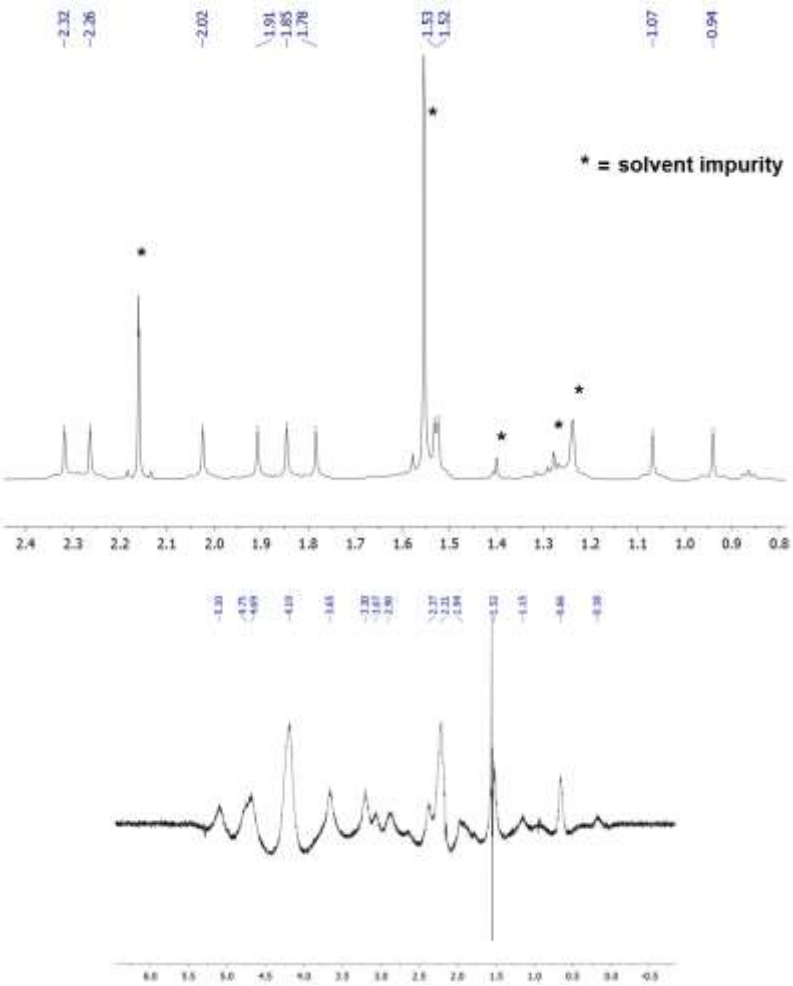

Figure S7. (Upper) 192 MHz ^{1}H-{^{31}P} spectrum for $(PMe_2Ph)_5Pt_4B_{20}H_{20}$ (**3**-Pt_4) in $CDCl_3$ solution at 293 K showing 10 methyl resonances. Compare to the x-axis in Fig. S5. (Lower). 600 MHz ^{1}H-{$^{11}B_{broadband}$} proton spectrum with ^{1}H-{$^{11}B_{off\ resonance}$} subtracted to remove non-decoupled resonances. $CDCl_3$ solution at 291 K. The B-H resonances are best delineated individually in Fig. S6.

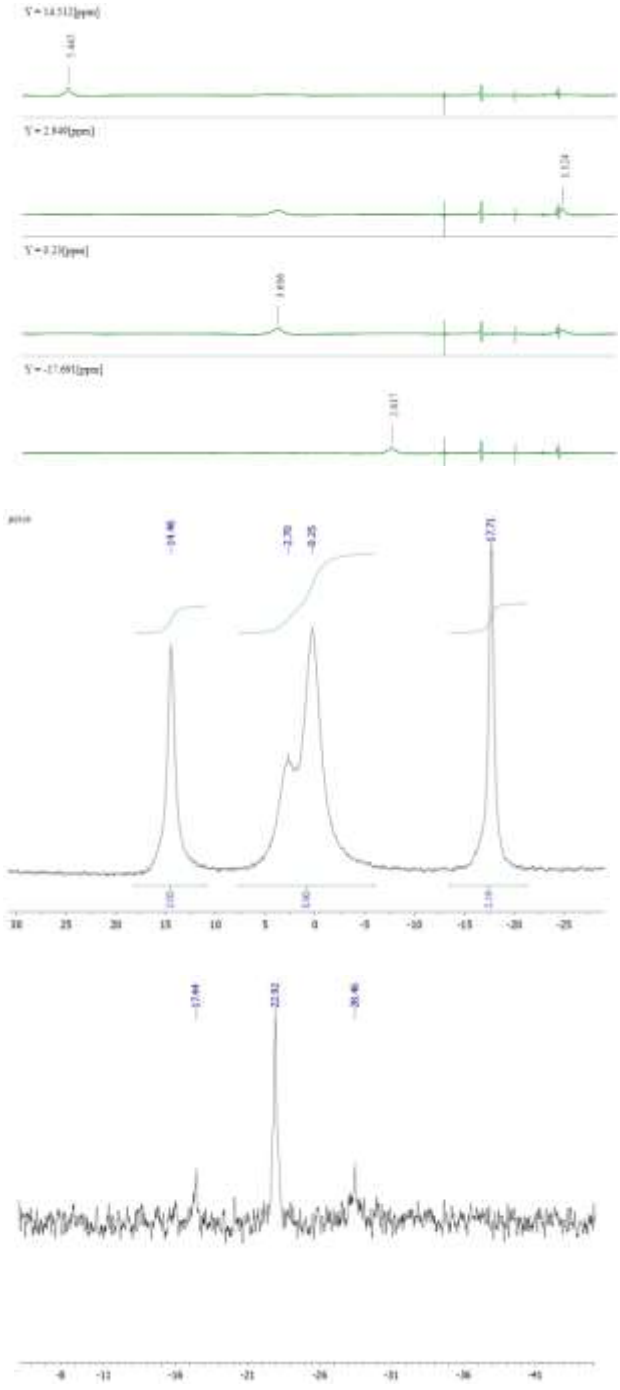

Figure S8. 600 MHz selective ^{1}H-{$^{11}B_{sel}$} proton spectrum of **4** with ^{1}H-{$^{11}B_{off\ resonance}$ } subtracted to remove non-decoupled resonances (upper), 192 MHz ^{11}B-{^{1}H} spectrum (center), and 243 MHz ^{31}P-{^{1}H} spectrum (bottom). All are directly of the reaction mixture as described in the experimental section, after removal of excess EtNC by evaporation. $CDCl_3$ solution at 293 K.

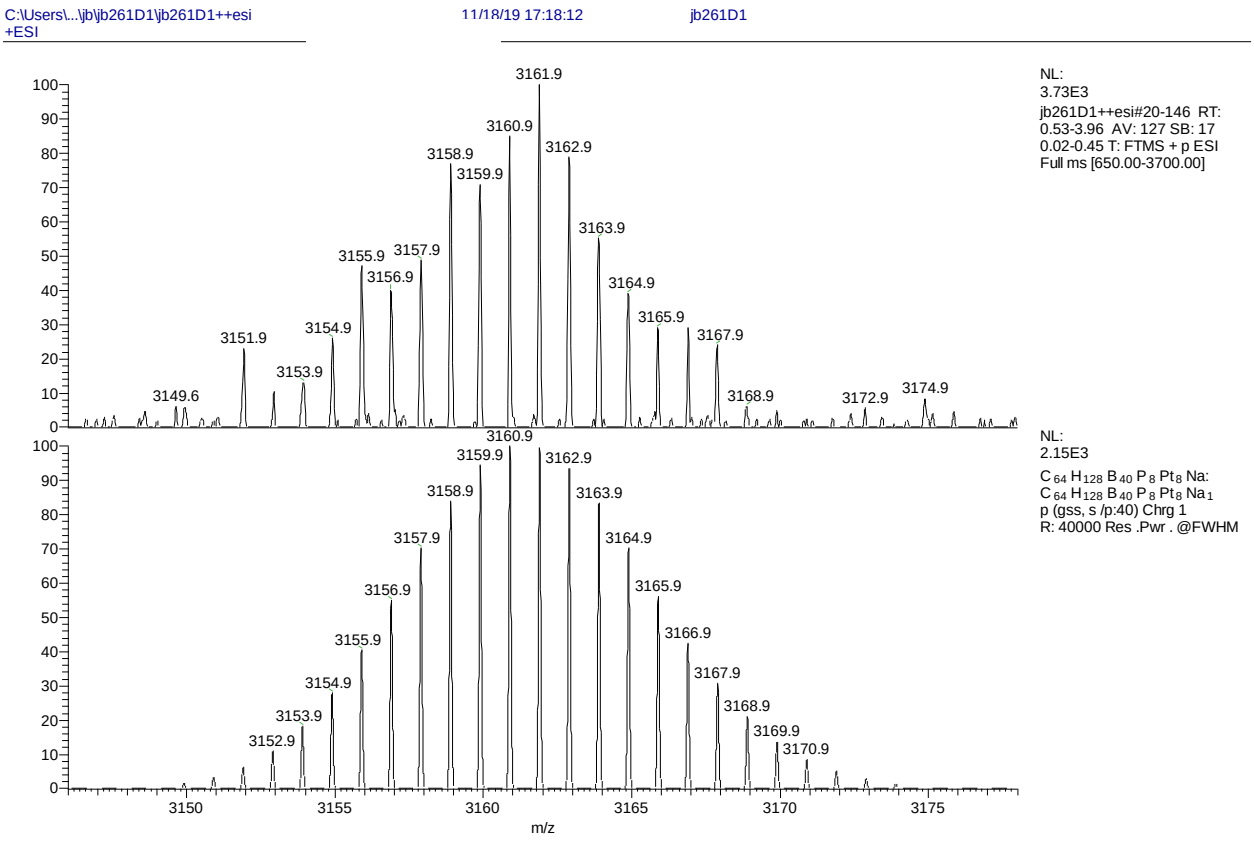

Figure S9. ESI measured and calculated mass spectrum for compound (**2**-Pt_8): Calculated for $C_{64}H_{128}B_{40}NaP_8Pt_8^+$ 3167.87133, measured 3167.87356 (+0.7 ppm).

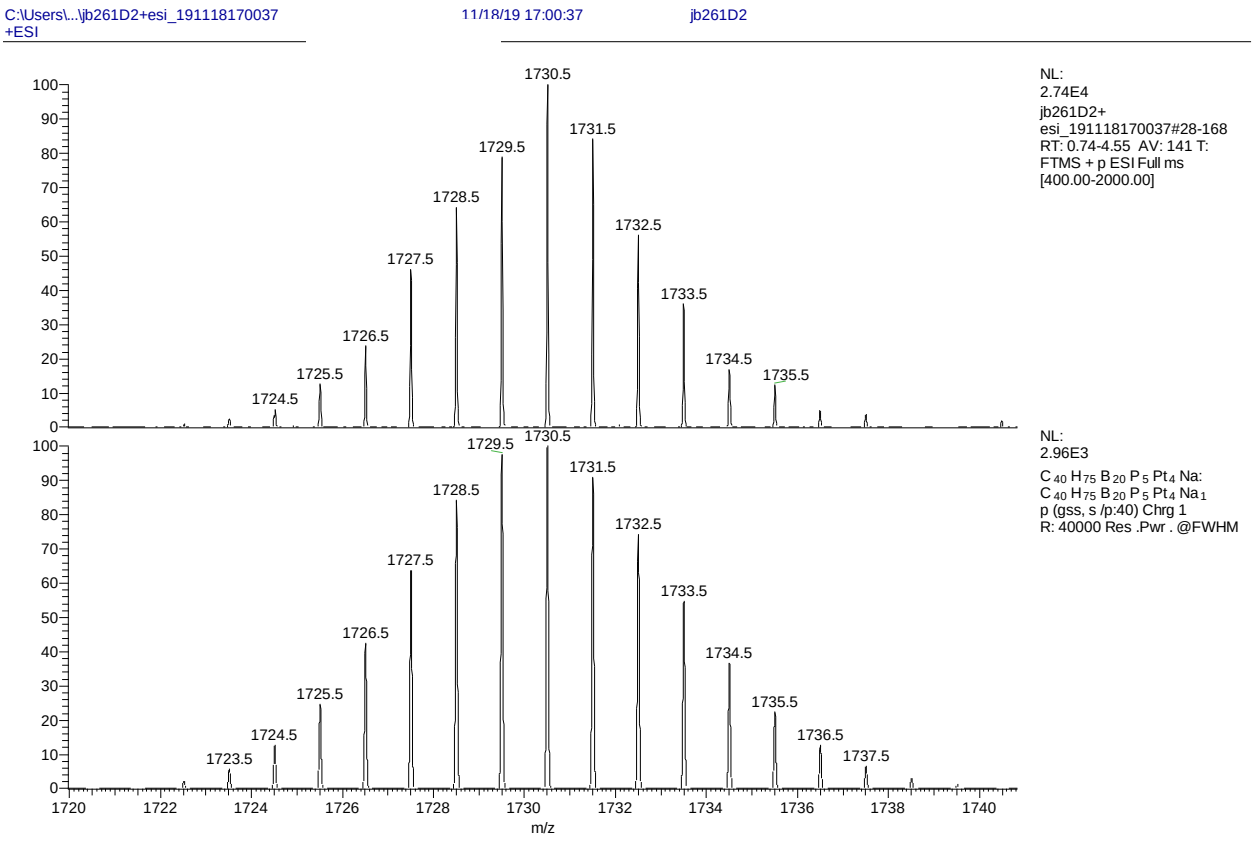

Figure S10. ESI measured and calculated mass spectrum for compound (**3**-Pt_4): Calculated for $C_{40}H_{75}B_{20}NaP_5Pt_4^+$ 1733.49011, measured 1733.49241 (+1.3 ppm).

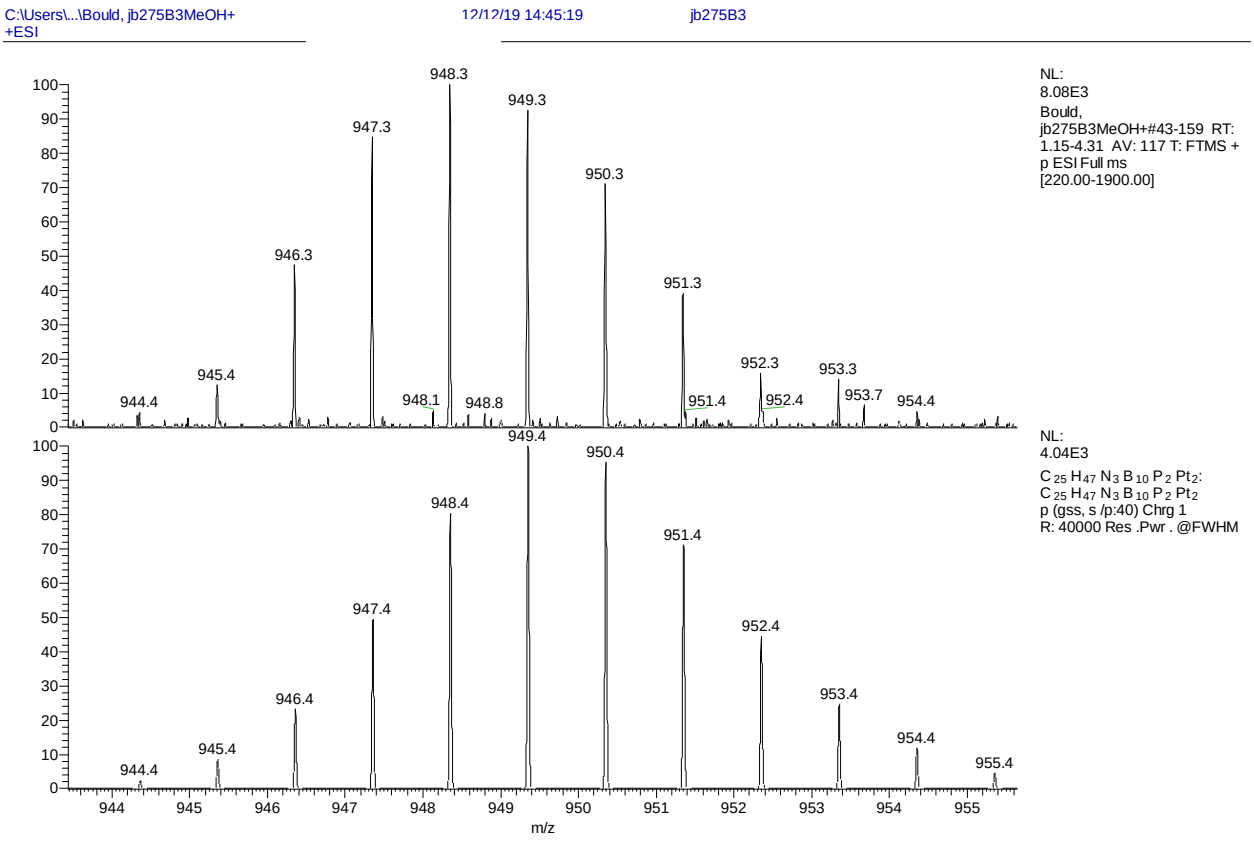

Figure S11. ESI measured and calculated mass spectrum for compound (**4**): Calculated for $C_{25}H_{47}N_3B_{10}P_2Pt_2^+$ 951.34658, measured 951.34418 (-2.5 ppm).

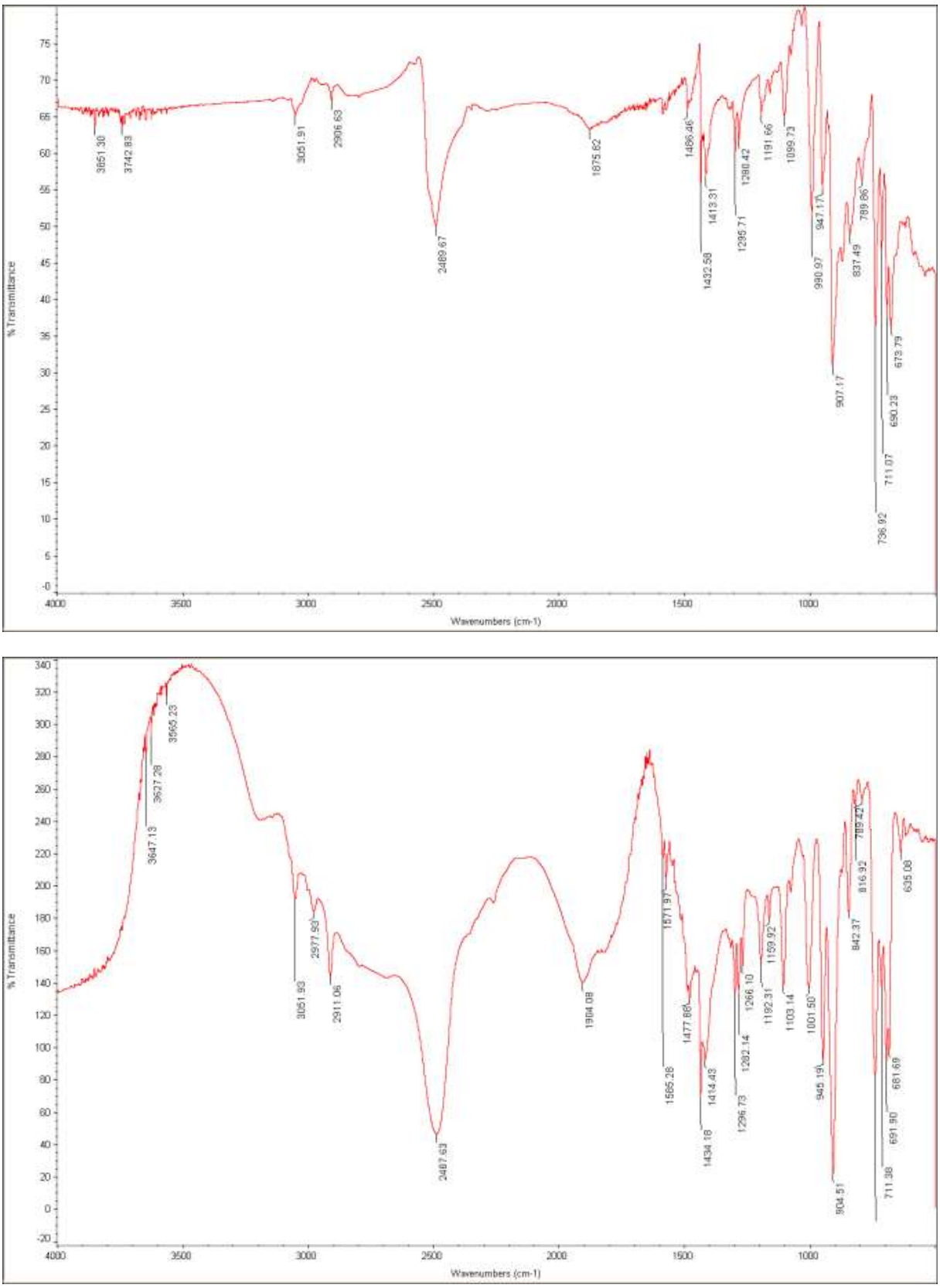

Figure S12. IR spectrum of (**2**-Pt_8, upper) and (**3**-Pt_4, lower).

X-ray diffraction experimental

Crystals of (**2**-Pt_8) and (**3**-Pt_4) were examined on a Rigaku Oxford Diffraction Gemini A Ultra diffractometer with Cu*K*α radiation (λ = 1.54184 Å) at 200 and 150 K respectively; cooling to 150 K led to deterioration of diffraction quality for (**2**-Pt_8), possibly indicating onset of a phase transition. Analytical absorption corrections based on crystal shape were applied. The structures were solved by dual-space methods (SHELXT) and refined by full-matrix least-squares methods on all unique F^2 values (SHELXL).[1] For (**2**-Pt_8), highly disordered solvent molecules that could not be unambiguously identified and modeled were treated with the SQUEEZE routine of PLATON;[2] all B–H distances were restrained to be approximately equal but without imposing a particular value, and the isotropic displacement parameters *U* for these H atoms were constrained to $1.2U_{eq}$ of the corresponding B atoms. C-bonded H atoms were constrained to expected geometry with a riding model. For (**3**-Pt_4) similarity and rigid-bond restraints were applied to the geometry and displacement parameters of the benzene solvent molecules (one of which lies on an inversion center) and to a disordered phenyl group of one phosphine, in addition to the same treatment of B–H as for (**3**-Pt_4).

Data for **4** were measured at 95 K with a Rigaku Oxford Diffraction SuperNova equipped with a Cu microfocus tube and an Atlas S2 CCD detector. The samples were of poor quality, split, weakly diffracting, and unstable. The data were collected for a full sphere (d_{min}=0.083) and the experiment lasted 14 hours. The scale factor of the CCD frames was slowly increasing, indicating decomposition. After 11 hours of measurement, the decomposition accelerated and the data from the last three hours had to be deleted. The measured sample exhibited three randomly orientated domains. Attempts to account for overlaps between these domains using the HKLF5 format of data were unsuccessful, probably due to insufficient overlapping reflections. The structure was solved with SHELXT[1c] and refined with Jana2006.[3] Due to the poor data quality, a rigid body approach was adopted in order to minimize the number of refined parameters and to stabilize the geometry. For the boron cage and Pt atoms, we refined one rigid body in two positions with displacement parameters described as a collective movement of the rigid body using TLS tensors.[4] The chloroform molecules were refined as one rigid body in eight positions with displacement parameters described with TLS tensors, where S components were set to zero. Since TLS can be refined individually for each rigid body position, we could account for the fact that some of the chloroform molecules were severely disordered. Phenyl groups were refined as one rigid body in four positions, with TLS tensors, S, fixed to zero. The non-bridging isonitrile groups were refined as one rigid body in four positions, and the displacement parameters were refined as individual ellipsoids for each atom of the rigid body (i.e., the same in all positions). The bridging isonitrile was refined separately because of its different shape, as a rigid body in four half-occupied positions, with

individual isotropic displacement parameters for each atom of the rigid body. Two pairs of rigid bodies define two disordered bridging isonitrile ligands. It should be noted that data quality limits accuracy and sensitivity of refinement. Refinement of all atoms individually, i.e. without rigid bodies, only slightly improved the R-value and lead to unacceptable displacement ellipsoids. The disordered isonitrile ligand cannot be refined anisotropically, and small differences between C-Pt distances could be an artefact.
CCDC 1978276–1978278 contain supplementary crystallographic data for this paper. These data can be obtained free of charge via www.ccdc.cam.ac.uk/conts/retrieving.html (or from The Cambridge Crystallographic Data Centre, 12 Union Road, Cambridge CB2 1EZ, U.K., fax (+44)-1223-336033, or deposit@ccdc.cam.ac.uk).

References

1. (a) Sheldrick, G. A short history of SHELX. *Acta Crystallogr. Sect. A* **2008,** 64 (1), 112-122 DOI: 10.1107/S0108767307043930; (b) Sheldrick, G. Crystal structure refinement with SHELXL. *Acta Crystallogr., Sect. C: Cryst. Struct. Commun.* **2015,** 71 (1), 3-8 DOI: doi:10.1107/S2053229614024218; (c) Sheldrick, G. SHELXT - Integrated space-group and crystal-structure determination. *Acta Cryst. Sect. A* **2015,** 71 (1), 3-8 DOI: 10.1107/S2053273314026370.
2. Spek, A. PLATON SQUEEZE: a tool for the calculation of the disordered solvent contribution to the calculated structure factors. *Acta Crystallogr., Sect. C: Cryst. Struct. Commun.* **2015,** 71 (1), 9-18 DOI: doi:10.1107/S2053229614024929.
3. Petříček, V.; Dušek, M.; Palatinus, L. Crystallographic Computing System JANA2006: General features. *Z. Anorg. Allg. Chem.* **2014,** 229 (5), 345 DOI: 10.1515/zkri-2014-1737.
4. Kuhs, W. Generalized atomic displacements in crystallographic structure analysis. *Acta Cryst. Sect. A* **1992,** 48 (2), 80-98 DOI: doi:10.1107/S0108767391009510.

Crystal data and structure refinement for **2**-Pt_8.

Chemical formula (moiety)	$C_{64}H_{128}B_{40}P_8Pt_8$	
Chemical formula (total)	$C_{64}H_{128}B_{40}P_8Pt_8$	
Formula weight	3138.54	
Temperature	200(2) K	
Radiation, wavelength	CuKα, 1.54178 Å	
Crystal system, space group	tetragonal, P4/n	
Unit cell parameters	a = 21.8818(3) Å	α = 90°
	b = 21.8818(3) Å	β = 90°
	c = 11.4152(3) Å	γ = 90°
Cell volume	5465.7(2) $Å^3$	
Z	2	
Calculated density	1.907 g/cm^3	
Absorption coefficient μ	19.969 mm^{-1}	
F(000)	2912	
Crystal colour and size	black, 0.120 × 0.090 × 0.050 mm^3	
Reflections for cell refinement	9654 (θ range 4.3 to 66.8°)	
Data collection method	Oxford Diffraction Gemini A Ultra diffractometer ω scans	
θ range for data collection	3.9 to 66.9°	
Index ranges	h −25 to 20, k −24 to 26, l −13 to 12	
Completeness to θ = 66.9°	99.3 %	
Reflections collected	40986	
Independent reflections	4840 (R_{int} = 0.0793)	
Reflections with $F^2>2\sigma$	3696	
Absorption correction	analytical	
Min. and max. transmission	0.142 and 0.416	
Structure solution	Dual-space interative method	
Refinement method	Full-matrix least-squares on F^2	
Weighting parameters a, b	0.0284,	
Data / restraints / parameters	4840 / 45 / 305	
Final R indices [$F^2>2\sigma$]	R1 = 0.0317, wR2 = 0.0655	
R indices (all data)	R1 = 0.0522, wR2 = 0.0740	
Goodness-of-fit on F^2	1.057	
Largest and mean shift/su	0.001 and 0.000	
Largest diff. peak and hole	1.23 and −1.02 e $Å^{-3}$	

Bond lengths [Å] and angles [°] for **2**-Pt_8.

Pt1–Pt1a	2.6962(4)	Pt1–Pt1b	2.6963(4)
Pt1–Pt2	2.8443(4)	Pt1–B3	2.266(8)
Pt1–B4	2.205(8)	Pt1–B4a	2.296(9)
Pt1–B5	2.197(7)	Pt1–B6	2.211(8)
Pt2–B3	2.318(7)	Pt2–H5a	2.42(6)
Pt2–B6	2.371(9)	Pt2–B7	2.219(8)
Pt2–B11	2.221(8)	Pt2–P1	2.3825(19)
Pt2–P2	2.3602(17)	B3–H3	1.05(3)
B3–B4	1.859(11)	B3–B7	1.852(11)
B3–B8	1.793(12)	B4–H4	1.06(3)
B4–B5	1.812(12)	B4–B8	1.718(13)
B4–B9	1.744(12)	B5–H5	1.05(3)
B5–B6	1.960(11)	B5–B9	1.774(13)
B5–B10	1.768(12)	B6–H6	1.05(3)
B6–B10	1.780(12)	B6–B11	1.819(14)
B7–H7	1.05(3)	B7–B8	1.781(11)
B7–B11	1.864(13)	B7–B12	1.767(12)
B8–H8	1.05(3)	B8–B9	1.780(13)
B8–B12	1.778(12)	B9–H9	1.05(3)
B9–B10	1.804(12)	B9–B12	1.765(12)
B10–H10	1.06(3)	B10–B11	1.774(13)
B10–B12	1.803(13)	B11–H11	1.05(3)
B11–B12	1.767(12)	B12–H12	1.05(3)
P1–C11	1.824(9)	P1–C17	1.788(8)
P1–C18	1.822(9)	C11–C12	1.383(13)
C11–C16	1.398(12)	C12–H12A	0.950
C12–C13	1.367(14)	C13–H13	0.950
C13–C14	1.392(16)	C14–H14	0.950
C14–C15	1.344(17)	C15–H15	0.950
C15–C16	1.433(15)	C16–H16	0.950
C17–H17A	0.980	C17–H17B	0.980
C17–H17C	0.980	C18–H18A	0.980
C18–H18B	0.980	C18–H18C	0.980
P2–C21	1.822(9)	P2–C27	1.792(9)
P2–C28	1.807(9)	C21–C22	1.391(12)
C21–C26	1.383(13)	C22–H22	0.950
C22–C23	1.376(13)	C23–H23	0.950
C23–C24	1.371(14)	C24–H24	0.950
C24–C25	1.368(14)	C25–H25	0.950
C25–C26	1.395(15)	C26–H26	0.950
C27–H27A	0.980	C27–H27B	0.980
C27–H27C	0.980	C28–H28A	0.980
C28–H28B	0.980	C28–H28C	0.980

Pt1a–Pt1–Pt1b	88.479(4)	Pt1a–Pt1–Pt2	107.219(15)
Pt1b–Pt1–Pt2	147.413(18)	Pt1a–Pt1–B3	102.7(2)
Pt1b–Pt1–B3	96.86(18)	Pt1a–Pt1–B4	120.2(2)
Pt1a–Pt1–B4a	51.68(19)	Pt1b–Pt1–B4	54.8(2)
Pt1b–Pt1–B4a	105.3(2)	Pt1a–Pt1–B5	154.3(2)

Pt1b–Pt1–B5	66.2(2)	Pt1a–Pt1–B6	151.5(2)
Pt1b–Pt1–B6	118.9(2)	Pt2–Pt1–B3	52.46(18)
Pt2–Pt1–B4	93.0(2)	Pt2–Pt1–B4a	106.8(2)
Pt2–Pt1–B5	97.0(2)	Pt2–Pt1–B6	54.2(2)
B3–Pt1–B4	49.1(3)	B3–Pt1–B4a	144.5(3)
B3–Pt1–B5	85.4(3)	B3–Pt1–B6	83.0(3)
B4–Pt1–B4a	160.0(3)	B4–Pt1–B5	48.6(3)
B4a–Pt1–B5	128.8(3)	B4–Pt1–B6	84.8(3)
B4a–Pt1–B6	108.8(3)	B5–Pt1–B6	52.8(3)
Pt1–Pt2–B3	50.85(19)	Pt1–Pt2–H5a	64.2(15)
Pt1–Pt2–B6	49.1(2)	Pt1–Pt2–B7	89.3(2)
Pt1–Pt2–B11	86.9(2)	Pt1–Pt2–P1	124.02(5)
Pt1–Pt2–P2	125.67(5)	B3–Pt2–H5a	92.9(18)
B3–Pt2–B6	78.5(3)	B3–Pt2–B7	48.1(3)
B3–Pt2–B11	81.2(3)	B3–Pt2–P1	91.6(2)
B3–Pt2–P2	174.5(2)	H5a–Pt2–B6	99.2(14)
H5a–Pt2–B7	140.3(19)	H5a–Pt2–B11	145.7(14)
H5a–Pt2–P1	81.4(15)	H5a–Pt2–P2	88.6(18)
B6–Pt2–B7	81.9(3)	B6–Pt2–B11	46.5(4)
B6–Pt2–P1	170.1(2)	B6–Pt2–P2	96.0(2)
B7–Pt2–B11	49.6(4)	B7–Pt2–P1	91.3(2)
B7–Pt2–P2	131.0(2)	B11–Pt2–P1	132.2(3)
B11–Pt2–P2	94.6(2)	P1–Pt2–P2	93.91(7)
Pt1–B3–Pt2	76.7(2)	Pt1–B3–H3	111(4)
Pt1–B3–B4	63.7(3)	Pt1–B3–B7	120.8(5)
Pt1–B3–B8	114.3(5)	Pt2–B3–H3	107(4)
Pt2–B3–B4	123.6(4)	Pt2–B3–B7	63.2(3)
Pt2–B3–B8	116.7(5)	H3–B3–B4	123(4)
H3–B3–B7	121(4)	H3–B3–B8	122(4)
B4–B3–B7	104.4(5)	B4–B3–B8	56.1(5)
B7–B3–B8	58.5(4)	Pt1–B4–Pt1b	73.6(3)
Pt1–B4–B3	67.2(3)	Pt1b–B4–B3	127.0(5)
Pt1–B4–H4	118(4)	Pt1b–B4–H4	55(5)
Pt1–B4–B5	65.5(4)	Pt1b–B4–B5	81.5(4)
Pt1–B4–B8	120.8(5)	Pt1b–B4–B8	163.8(5)
Pt1–B4–B9	119.1(5)	Pt1b–B4–B9	119.9(5)
B3–B4–H4	118(5)	B3–B4–B5	111.1(5)
B3–B4–B8	60.0(5)	B3–B4–B9	109.9(6)
H4–B4–B5	128(5)	H4–B4–B8	109(5)
H4–B4–B9	116(4)	B5–B4–B8	110.6(6)
B5–B4–B9	59.8(5)	B8–B4–B9	61.9(5)
Pt1–B5–B4	65.9(3)	Pt1–B5–H5	115(4)
Pt1–B5–B6	63.9(3)	Pt1–B5–B9	118.1(5)
Pt1–B5–B10	115.3(5)	B4–B5–H5	139(4)
B4–B5–B6	104.3(5)	B4–B5–B9	58.2(5)
B4–B5–B10	105.3(6)	H5–B5–B6	112(4)
H5–B5–B9	124(4)	H5–B5–B10	109(4)
B6–B5–B9	105.6(6)	B6–B5–B10	56.8(4)
B9–B5–B10	61.3(5)	Pt1–B6–Pt2	76.7(3)
Pt1–B6–B5	63.3(3)	Pt1–B6–H6	113(5)
Pt1–B6–B10	114.2(5)	Pt1–B6–B11	121.0(5)

Pt2–B6–B5	122.5(5)	Pt2–B6–H6	107(5)
Pt2–B6–B10	116.1(6)	Pt2–B6–B11	62.4(4)
B5–B6–H6	125(5)	B5–B6–B10	56.2(4)
B5–B6–B11	104.8(6)	H6–B6–B10	121(5)
H6–B6–B11	118(5)	B10–B6–B11	59.0(5)
Pt2–B7–B3	68.7(4)	Pt2–B7–H7	116(4)
Pt2–B7–B8	122.3(5)	Pt2–B7–B11	65.2(4)
Pt2–B7–B12	119.4(5)	B3–B7–H7	133(4)
B3–B7–B8	59.1(4)	B3–B7–B11	105.4(6)
B3–B7–B12	106.6(6)	H7–B7–B8	117(4)
H7–B7–B11	119(4)	H7–B7–B12	109(4)
B8–B7–B11	105.6(6)	B8–B7–B12	60.2(5)
B11–B7–B12	58.2(5)	B3–B8–B4	63.9(5)
B3–B8–B7	62.4(5)	B3–B8–H8	122(4)
B3–B8–B9	111.4(6)	B3–B8–B12	108.7(6)
B4–B8–B7	113.9(6)	B4–B8–H8	124(5)
B4–B8–B9	59.8(5)	B4–B8–B12	107.8(6)
B7–B8–H8	116(5)	B7–B8–B9	110.2(6)
B7–B8–B12	59.5(5)	H8–B8–B9	121(5)
H8–B8–B12	119(4)	B9–B8–B12	59.5(5)
B4–B9–B5	62.0(5)	B4–B9–B8	58.4(5)
B4–B9–H9	120(4)	B4–B9–B10	106.6(6)
B4–B9–B12	107.2(6)	B5–B9–B8	109.5(6)
B5–B9–H9	116(5)	B5–B9–B10	59.2(5)
B5–B9–B12	110.0(6)	B8–B9–H9	124(5)
B8–B9–B10	107.3(6)	B8–B9–B12	60.2(5)
H9–B9–B10	123(5)	H9–B9–B12	125(5)
B10–B9–B12	60.7(5)	B5–B10–B6	67.1(5)
B5–B10–B9	59.5(5)	B5–B10–H10	118(5)
B5–B10–B11	115.5(6)	B5–B10–B12	108.5(6)
B6–B10–B9	112.3(6)	B6–B10–H10	117(5)
B6–B10–B11	61.6(5)	B6–B10–B12	108.9(6)
B9–B10–H10	123(4)	B9–B10–B11	108.5(6)
B9–B10–B12	58.6(5)	H10–B10–B11	119(4)
H10–B10–B12	124(5)	B11–B10–B12	59.2(5)
Pt2–B11–B6	71.1(4)	Pt2–B11–B7	65.1(4)
Pt2–B11–B10	124.1(5)	Pt2–B11–H11	108(5)
Pt2–B11–B12	119.3(5)	B6–B11–B7	109.6(6)
B6–B11–B10	59.4(5)	B6–B11–H11	116(5)
B6–B11–B12	108.8(6)	B7–B11–B10	107.8(6)
B7–B11–H11	128(5)	B7–B11–B12	58.2(5)
B10–B11–H11	115(5)	B10–B11–B12	61.2(5)
H11–B11–B12	122(5)	B7–B12–B8	60.3(5)
B7–B12–B9	111.6(6)	B7–B12–B10	110.9(6)
B7–B12–B11	63.7(5)	B7–B12–H12	117(5)
B8–B12–B9	60.3(5)	B8–B12–B10	107.4(6)
B8–B12–B11	110.0(6)	B8–B12–H12	123(5)
B9–B12–B10	60.7(5)	B9–B12–B11	110.7(6)
B9–B12–H12	122(4)	B10–B12–B11	59.6(5)
B10–B12–H12	122(5)	B11–B12–H12	118(4)
Pt2–P1–C11	118.7(3)	Pt2–P1–C17	115.8(3)

Pt2–P1–C18	113.0(3)	C11–P1–C17	101.5(4)
C11–P1–C18	103.7(4)	C17–P1–C18	101.9(4)
P1–C11–C12	118.8(7)	P1–C11–C16	122.5(7)
C12–C11–C16	118.8(8)	C11–C12–H12A	118.6
C11–C12–C13	122.7(9)	H12A–C12–C13	118.6
C12–C13–H13	120.7	C12–C13–C14	118.7(10)
H13–C13–C14	120.7	C13–C14–H14	119.7
C13–C14–C15	120.6(9)	H14–C14–C15	119.7
C14–C15–H15	119.4	C14–C15–C16	121.2(9)
H15–C15–C16	119.4	C11–C16–C15	117.8(9)
C11–C16–H16	121.1	C15–C16–H16	121.1
P1–C17–H17A	109.5	P1–C17–H17B	109.5
P1–C17–H17C	109.5	H17A–C17–H17B	109.5
H17A–C17–H17C	109.5	H17B–C17–H17C	109.5
P1–C18–H18A	109.5	P1–C18–H18B	109.5
P1–C18–H18C	109.5	H18A–C18–H18B	109.5
H18A–C18–H18C	109.5	H18B–C18–H18C	109.5
Pt2–P2–C21	111.3(3)	Pt2–P2–C27	115.8(3)
Pt2–P2–C28	117.2(3)	C21–P2–C27	102.7(4)
C21–P2–C28	105.5(4)	C27–P2–C28	102.7(4)
P2–C21–C22	122.9(6)	P2–C21–C26	119.5(7)
C22–C21–C26	117.5(8)	C21–C22–H22	119.5
C21–C22–C23	121.1(8)	H22–C22–C23	119.5
C22–C23–H23	119.5	C22–C23–C24	121.0(8)
H23–C23–C24	119.5	C23–C24–H24	120.6
C23–C24–C25	118.8(9)	H24–C24–C25	120.6
C24–C25–H25	119.7	C24–C25–C26	120.7(9)
H25–C25–C26	119.7	C21–C26–C25	120.8(9)
C21–C26–H26	119.6	C25–C26–H26	119.6
P2–C27–H27A	109.5	P2–C27–H27B	109.5
P2–C27–H27C	109.5	H27A–C27–H27B	109.5
H27A–C27–H27C	109.5	H27B–C27–H27C	109.5
P2–C28–H28A	109.5	P2–C28–H28B	109.5
P2–C28–H28C	109.5	H28A–C28–H28B	109.5
H28A–C28–H28C	109.5	H28B–C28–H28C	109.5

Symmetry operations for equivalent atoms
a –y+1,x+1/2,–z+1 b y–1/2,–x+1,–z+1

Crystal data and structure refinement for **3**-Pt_4.

Chemical formula (moiety)	$C_{40}H_{75}B_{20}P_5Pt_4 \cdot 1.5C_6H_6$	
Chemical formula (total)	$C_{49}H_{84}B_{20}P_5Pt_4$	
Formula weight	1824.57	
Temperature	150(2) K	
Radiation, wavelength	CuKα, 1.54184 Å	
Crystal system, space group	triclinic, $P\bar{1}$	
Unit cell parameters	a = 13.5302(4) Å	α = 73.010(2)°
	b = 14.2930(4) Å	β = 74.807(2)°
	c = 18.3556(5) Å	γ = 69.260(3)°
Cell volume	3124.51(17) $Å^3$	
Z	2	
Calculated density	1.939 g/cm^3	
Absorption coefficient μ	17.813 mm^{-1}	
F(000)	1730	
Crystal colour and size	black, 0.190 × 0.080 × 0.040 mm^3	
Reflections for cell refinement	15580 (θ range 3.7 to 66.9°)	
Data collection method	Oxford Diffraction Gemini A Ultra	
	ω scans	
θ range for data collection	3.5 to 66.9°	
Index ranges	h −16 to 16, k −17 to 16, l −19 to 21	
Completeness to θ = 66.9°	99.4 %	
Reflections collected	44540	
Independent reflections	11062 (R_{int} = 0.0488)	
Reflections with $F^2>2\sigma$	9317	
Absorption correction	analytical	
Min. and max. transmission	0.081 and 0.399	
Structure solution	Dual-space interative method	
Refinement method	Full-matrix least-squares on F^2	
Weighting parameters a, b	0.0332, 6.5540	
Data / restraints / parameters	11062 / 583 / 825	
Final R indices [$F^2>2\sigma$]	R1 = 0.0314, wR2 = 0.0696	
R indices (all data)	R1 = 0.0426, wR2 = 0.0763	
Goodness-of-fit on F^2	1.063	
Largest and mean shift/su	0.001 and 0.000	
Largest diff. peak and hole	2.25 and −0.99 e $Å^{-3}$	

Bond lengths [Å] and angles [°] for **3**-Pt_4.

Pt1A–Pt2A	2.8805(3)	Pt1A–B3A	2.317(7)
Pt1A–B4A	2.234(8)	Pt1A–B5A	2.229(7)
Pt1A–B6A	2.323(7)	Pt1A–P1A	2.3387(15)
Pt1A–P2A	2.3268(15)	Pt2A–B3A	2.307(7)
Pt2A–B6A	2.303(8)	Pt2A–B7A	2.171(8)
Pt2A–B11A	2.199(7)	Pt2A–P3A	2.3286(16)
Pt2A–Pt2B	2.9481(4)	Pt2A–B3B	2.360(7)
Pt2A–H3B	1.54(6)	B3A–H3A	1.112(18)
B3A–B4A	1.827(10)	B3A–B7A	1.816(11)
B3A–B8A	1.798(10)	B3A–Pt1B	2.648(7)
B4A–H4A	1.097(18)	B4A–B5A	1.854(11)
B4A–B8A	1.795(11)	B4A–B9A	1.788(11)
B5A–H5A	1.093(18)	B5A–B6A	1.872(12)
B5A–B9A	1.740(11)	B5A–B10A	1.755(12)
B6A–H6A	1.092(18)	B6A–B10A	1.781(11)
B6A–B11A	1.872(11)	B7A–H7A	1.101(18)
B7A–B8A	1.746(11)	B7A–B11A	1.830(11)
B7A–B12A	1.754(11)	B7A–Pt2B	2.484(8)
B8A–H8A	1.095(18)	B8A–B9A	1.768(10)
B8A–B12A	1.773(12)	B9A–H9A	1.098(18)
B9A–B10A	1.788(12)	B9A–B12A	1.757(12)
B10A–H10A	1.095(18)	B10A–B11A	1.774(11)
B10A–B12A	1.779(12)	B11A–H11A	1.094(18)
B11A–B12A	1.784(12)	B12A–H12A	1.099(18)
P1A–C11A	1.833(7)	P1A–C12A	1.817(7)
P1A–C13A	1.827(6)	C11A–H11C	0.980
C11A–H11D	0.980	C11A–H11E	0.980
C12A–H12C	0.980	C12A–H12D	0.980
C12A–H12E	0.980	C13A–C14A	1.379(11)
C13A–C18A	1.395(10)	C14A–H14A	0.950
C14A–C15A	1.397(11)	C15A–H15A	0.950
C15A–C16A	1.354(13)	C16A–H16A	0.950
C16A–C17A	1.378(13)	C17A–H17A	0.950
C17A–C18A	1.401(10)	C18A–H18A	0.950
P2A–C21A	1.826(7)	P2A–C22A	1.821(7)
P2A–C23A	1.813(7)	C21A–H21A	0.980
C21A–H21B	0.980	C21A–H21C	0.980
C22A–H22A	0.980	C22A–H22B	0.980
C22A–H22C	0.980	C23A–C24A	1.389(10)
C23A–C28A	1.389(10)	C24A–H24A	0.950
C24A–C25A	1.373(12)	C25A–H25A	0.950
C25A–C26A	1.366(12)	C26A–H26A	0.950
C26A–C27A	1.368(12)	C27A–H27A	0.950
C27A–C28A	1.390(11)	C28A–H28A	0.950
P3A–C31A	1.825(8)	P3A–C32A	1.803(8)
P3A–C33A	1.796(7)	C31A–H31A	0.980
C31A–H31B	0.980	C31A–H31C	0.980
C32A–H32A	0.980	C32A–H32B	0.980
C32A–H32C	0.980	C33A–C34A	1.394(12)

C33A–C38A	1.402(11)	C34A–H34A	0.950
C34A–C35A	1.400(13)	C35A–H35A	0.950
C35A–C36A	1.392(16)	C36A–H36A	0.950
C36A–C37A	1.355(15)	C37A–H37A	0.950
C37A–C38A	1.377(11)	C38A–H38A	0.950
Pt1B–H3A	1.89(6)	Pt1B–Pt2B	2.7710(4)
Pt1B–B3B	2.280(7)	Pt1B–B4B	2.257(7)
Pt1B–B5B	2.186(7)	Pt1B–B6B	2.283(8)
Pt1B–P1B	2.3109(17)	Pt2B–H7A	1.68(7)
Pt2B–B3B	2.369(6)	Pt2B–B6B	2.280(8)
Pt2B–B7B	2.263(7)	Pt2B–B11B	2.185(7)
Pt2B–P2B	2.2985(17)	B3B–H3B	1.081(18)
B3B–B4B	1.854(10)	B3B–B7B	1.840(9)
B3B–B8B	1.764(9)	B4B–H4B	1.097(18)
B4B–B5B	1.874(11)	B4B–B8B	1.775(10)
B4B–B9B	1.752(10)	B5B–H5B	1.094(18)
B5B–B6B	1.867(11)	B5B–B9B	1.788(11)
B5B–B10B	1.805(11)	B6B–H6B	1.120
B6B–B10B	1.750(11)	B6B–B11B	1.957(11)
B7B–H7B	1.098(18)	B7B–B8B	1.755(10)
B7B–B11B	1.818(11)	B7B–B12B	1.750(11)
B8B–H8B	1.096(18)	B8B–B9B	1.780(10)
B8B–B12B	1.777(10)	B9B–H9B	1.097(18)
B9B–B10B	1.806(11)	B9B–B12B	1.762(11)
B10B–H10B	1.094(18)	B10B–B11B	1.779(11)
B10B–B12B	1.784(11)	B11B–H11B	1.093(18)
B11B–B12B	1.753(11)	B12B–H12B	1.097(18)
P1B–C11B	1.809(9)	P1B–C12B	1.825(9)
P1B–C13B	1.822(7)	C11B–H11F	0.980
C11B–H11G	0.980	C11B–H11H	0.980
C12B–H12F	0.980	C12B–H12G	0.980
C12B–H12H	0.980	C13B–C14B	1.386(12)
C13B–C18B	1.378(12)	C14B–H14B	0.950
C14B–C15B	1.385(12)	C15B–H15B	0.950
C15B–C16B	1.358(15)	C16B–H16B	0.950
C16B–C17B	1.376(16)	C17B–H17B	0.950
C17B–C18B	1.390(13)	C18B–H18B	0.950
P2B–C21B	1.789(9)	P2B–C22B	1.793(9)
P2B–C23B	1.854(11)	P2B–C23C	1.754(18)
C21B–H21D	0.980	C21B–H21E	0.980
C21B–H21F	0.980	C22B–H22D	0.980
C22B–H22E	0.980	C22B–H22F	0.980
C23B–C24B	1.399(14)	C23B–C28B	1.387(13)
C24B–H24B	0.950	C24B–C25B	1.392(15)
C25B–H25B	0.950	C25B–C26B	1.349(15)
C26B–H26B	0.950	C26B–C27B	1.354(16)
C27B–H27B	0.950	C27B–C28B	1.426(16)
C28B–H28B	0.950	C23C–C24C	1.367(17)
C23C–C28C	1.373(17)	C24C–H24C	0.950
C24C–C25C	1.410(19)	C25C–H25C	0.950
C25C–C26C	1.353(18)	C26C–H26C	0.950

C26C–C27C	1.347(19)	C27C–H27C	0.950
C27C–C28C	1.41(2)	C28C–H28C	0.950
C1S–H1S	0.950	C1S–C2S	1.385(13)
C1S–C6S	1.313(13)	C2S–H2S	0.950
C2S–C3S	1.392(11)	C3S–H3S	0.950
C3S–C4S	1.260(12)	C4S–H4S	0.950
C4S–C5S	1.357(12)	C5S–H5S	0.950
C5S–C6S	1.382(13)	C6S–H6S	0.950
C7S–H7S	0.950	C7S–C8S	1.39(3)
C7S–C9Sa	1.45(3)	C8S–H8S	0.950
C8S–C9S	1.34(2)	C9S–H9S	0.950

Pt2A–Pt1A–B3A	51.31(17)	Pt2A–Pt1A–B4A	90.5(2)
Pt2A–Pt1A–B5A	90.1(2)	Pt2A–Pt1A–B6A	51.17(19)
Pt2A–Pt1A–P1A	109.45(4)	Pt2A–Pt1A–P2A	125.06(4)
B3A–Pt1A–B4A	47.3(3)	B3A–Pt1A–B5A	80.6(3)
B3A–Pt1A–B6A	79.1(3)	B3A–Pt1A–P1A	94.10(17)
B3A–Pt1A–P2A	169.33(17)	B4A–Pt1A–B5A	49.1(3)
B4A–Pt1A–B6A	83.1(3)	B4A–Pt1A–P1A	106.9(2)
B4A–Pt1A–P2A	127.5(2)	B5A–Pt1A–B6A	48.5(3)
B5A–Pt1A–P1A	150.3(2)	B5A–Pt1A–P2A	89.6(2)
B6A–Pt1A–P1A	159.2(2)	B6A–Pt1A–P2A	91.20(19)
P1A–Pt1A–P2A	96.52(6)	Pt1A–Pt2A–B3A	51.64(18)
Pt1A–Pt2A–B6A	51.80(19)	Pt1A–Pt2A–B7A	90.6(2)
Pt1A–Pt2A–B11A	92.3(2)	Pt1A–Pt2A–P3A	109.89(4)
Pt1A–Pt2A–Pt2B	134.350(12)	Pt1A–Pt2A–B3B	110.88(16)
Pt1A–Pt2A–H3B	109(3)	B3A–Pt2A–B6A	79.8(3)
B3A–Pt2A–B7A	47.7(3)	B3A–Pt2A–B11A	83.3(3)
B3A–Pt2A–P3A	160.79(18)	B3A–Pt2A–Pt2B	83.08(18)
B3A–Pt2A–B3B	84.8(2)	B3A–Pt2A–H3B	99(2)
B6A–Pt2A–B7A	82.2(3)	B6A–Pt2A–B11A	49.1(3)
B6A–Pt2A–P3A	92.2(2)	B6A–Pt2A–Pt2B	134.3(2)
B6A–Pt2A–B3B	162.0(3)	B6A–Pt2A–H3B	155(2)
B7A–Pt2A–B11A	49.5(3)	B7A–Pt2A–P3A	148.9(2)
B7A–Pt2A–Pt2B	55.6(2)	B7A–Pt2A–B3B	94.3(3)
B7A–Pt2A–H3B	115.7(17)	B11A–Pt2A–P3A	104.7(2)
B11A–Pt2A–Pt2B	87.1(2)	B11A–Pt2A–B3B	138.1(3)
B11A–Pt2A–H3B	155(2)	P3A–Pt2A–Pt2B	114.35(4)
P3A–Pt2A–B3B	99.58(18)	P3A–Pt2A–H3B	81(2)
Pt2B–Pt2A–B3B	51.56(15)	Pt2B–Pt2A–H3B	69(2)
B3B–Pt2A–H3B	21.4(17)	Pt1A–B3A–Pt2A	77.1(2)
Pt1A–B3A–H3A	122(4)	Pt1A–B3A–B4A	64.0(3)
Pt1A–B3A–B7A	122.1(4)	Pt1A–B3A–B8A	117.5(4)
Pt1A–B3A–Pt1B	134.2(3)	Pt2A–B3A–H3A	126(4)
Pt2A–B3A–B4A	124.2(4)	Pt2A–B3A–B7A	62.2(3)
Pt2A–B3A–B8A	115.6(4)	Pt2A–B3A–Pt1B	92.1(2)
H3A–B3A–B4A	108(4)	H3A–B3A–B7A	116(4)
H3A–B3A–B8A	100(4)	H3A–B3A–Pt1B	37(4)
B4A–B3A–B7A	106.7(5)	B4A–B3A–B8A	59.3(4)
B4A–B3A–Pt1B	143.7(4)	B7A–B3A–B8A	57.8(4)
B7A–B3A–Pt1B	88.8(4)	B8A–B3A–Pt1B	107.4(4)

Pt1A–B4A–B3A	68.7(3)	Pt1A–B4A–H4A	107(4)
Pt1A–B4A–B5A	65.3(3)	Pt1A–B4A–B8A	121.9(5)
Pt1A–B4A–B9A	117.7(5)	B3A–B4A–H4A	124(4)
B3A–B4A–B5A	106.2(5)	B3A–B4A–B8A	59.5(4)
B3A–B4A–B9A	105.7(5)	H4A–B4A–B5A	124(4)
H4A–B4A–B8A	122(4)	H4A–B4A–B9A	122(4)
B5A–B4A–B8A	104.8(5)	B5A–B4A–B9A	57.0(4)
B8A–B4A–B9A	59.1(4)	Pt1A–B5A–B4A	65.6(3)
Pt1A–B5A–H5A	110(4)	Pt1A–B5A–B6A	68.3(3)
Pt1A–B5A–B9A	120.3(4)	Pt1A–B5A–B10A	121.6(5)
B4A–B5A–H5A	124(4)	B4A–B5A–B6A	108.5(5)
B4A–B5A–B9A	59.6(4)	B4A–B5A–B10A	108.9(5)
H5A–B5A–B6A	122(4)	H5A–B5A–B9A	119(4)
H5A–B5A–B10A	117(4)	B6A–B5A–B9A	108.1(5)
B6A–B5A–B10A	58.7(4)	B9A–B5A–B10A	61.6(5)
Pt1A–B6A–Pt2A	77.0(2)	Pt1A–B6A–B5A	63.1(3)
Pt1A–B6A–H6A	108(4)	Pt1A–B6A–B10A	115.7(5)
Pt1A–B6A–B11A	123.0(4)	Pt2A–B6A–B5A	121.3(4)
Pt2A–B6A–H6A	119(4)	Pt2A–B6A–B10A	114.9(4)
Pt2A–B6A–B11A	62.6(3)	B5A–B6A–H6A	113(4)
B5A–B6A–B10A	57.4(5)	B5A–B6A–B11A	105.1(5)
H6A–B6A–B10A	115(4)	H6A–B6A–B11A	126(4)
B10A–B6A–B11A	58.1(4)	Pt2A–B7A–B3A	70.0(3)
Pt2A–B7A–H7A	111(4)	Pt2A–B7A–B8A	125.3(5)
Pt2A–B7A–B11A	66.1(3)	Pt2A–B7A–B12A	121.2(5)
Pt2A–B7A–Pt2B	78.3(2)	B3A–B7A–H7A	124(4)
B3A–B7A–B8A	60.6(4)	B3A–B7A–B11A	110.4(5)
B3A–B7A–B12A	109.0(6)	B3A–B7A–Pt2B	108.8(4)
H7A–B7A–B8A	115(4)	H7A–B7A–B11A	121(4)
H7A–B7A–B12A	115(4)	H7A–B7A–Pt2B	33(4)
B8A–B7A–B11A	110.0(5)	B8A–B7A–B12A	60.9(5)
B8A–B7A–Pt2B	137.9(5)	B11A–B7A–B12A	59.7(5)
B11A–B7A–Pt2B	111.7(5)	B12A–B7A–Pt2B	141.6(5)
B3A–B8A–B4A	61.1(4)	B3A–B8A–B7A	61.6(4)
B3A–B8A–H8A	115(4)	B3A–B8A–B9A	107.8(5)
B3A–B8A–B12A	109.0(5)	B4A–B8A–B7A	111.2(5)
B4A–B8A–H8A	115(4)	B4A–B8A–B9A	60.3(4)
B4A–B8A–B12A	109.6(5)	B7A–B8A–H8A	122(4)
B7A–B8A–B9A	107.6(6)	B7A–B8A–B12A	59.8(5)
H8A–B8A–B9A	125(4)	H8A–B8A–B12A	128(4)
B9A–B8A–B12A	59.5(5)	B4A–B9A–B5A	63.4(5)
B4A–B9A–B8A	60.6(4)	B4A–B9A–H9A	117(4)
B4A–B9A–B10A	110.4(5)	B4A–B9A–B12A	110.6(5)
B5A–B9A–B8A	111.0(5)	B5A–B9A–H9A	124(4)
B5A–B9A–B10A	59.6(5)	B5A–B9A–B12A	110.0(6)
B8A–B9A–H9A	116(4)	B8A–B9A–B10A	108.2(5)
B8A–B9A–B12A	60.4(5)	H9A–B9A–B10A	126(4)
H9A–B9A–B12A	119(4)	B10A–B9A–B12A	60.2(5)
B5A–B10A–B6A	64.0(5)	B5A–B10A–B9A	58.8(5)
B5A–B10A–H10A	118(4)	B5A–B10A–B11A	114.7(5)
B5A–B10A–B12A	108.3(6)	B6A–B10A–B9A	110.1(6)

B6A–B10A–H10A	122(4)	B6A–B10A–B11A	63.6(4)
B6A–B10A–B12A	110.6(5)	B9A–B10A–H10A	119(4)
B9A–B10A–B11A	109.4(5)	B9A–B10A–B12A	59.0(5)
H10A–B10A–B11A	121(4)	H10A–B10A–B12A	120(4)
B11A–B10A–B12A	60.3(5)	Pt2A–B11A–B6A	68.3(3)
Pt2A–B11A–B7A	64.4(3)	Pt2A–B11A–B10A	120.4(5)
Pt2A–B11A–H11A	113(4)	Pt2A–B11A–B12A	118.2(5)
B6A–B11A–B7A	105.2(5)	B6A–B11A–B10A	58.4(4)
B6A–B11A–H11A	122(4)	B6A–B11A–B12A	106.3(6)
B7A–B11A–B10A	104.7(6)	B7A–B11A–H11A	128(4)
B7A–B11A–B12A	58.0(4)	B10A–B11A–H11A	117(4)
B10A–B11A–B12A	60.0(5)	H11A–B11A–B12A	119(4)
B7A–B12A–B8A	59.4(4)	B7A–B12A–B9A	107.8(6)
B7A–B12A–B10A	107.8(6)	B7A–B12A–B11A	62.3(5)
B7A–B12A–H12A	117(4)	B8A–B12A–B9A	60.1(5)
B8A–B12A–B10A	108.3(6)	B8A–B12A–B11A	110.9(5)
B8A–B12A–H12A	125(4)	B9A–B12A–B10A	60.8(5)
B9A–B12A–B11A	110.4(6)	B9A–B12A–H12A	129(5)
B10A–B12A–B11A	59.7(5)	B10A–B12A–H12A	122(4)
B11A–B12A–H12A	112(5)	Pt1A–P1A–C11A	114.6(2)
Pt1A–P1A–C12A	117.7(2)	Pt1A–P1A–C13A	115.6(2)
C11A–P1A–C12A	102.1(4)	C11A–P1A–C13A	99.3(3)
C12A–P1A–C13A	105.2(3)	P1A–C11A–H11C	109.5
P1A–C11A–H11D	109.5	P1A–C11A–H11E	109.5
H11C–C11A–H11D	109.5	H11C–C11A–H11E	109.5
H11D–C11A–H11E	109.5	P1A–C12A–H12C	109.5
P1A–C12A–H12D	109.5	P1A–C12A–H12E	109.5
H12C–C12A–H12D	109.5	H12C–C12A–H12E	109.5
H12D–C12A–H12E	109.5	P1A–C13A–C14A	118.4(6)
P1A–C13A–C18A	122.4(5)	C14A–C13A–C18A	119.2(6)
C13A–C14A–H14A	119.8	C13A–C14A–C15A	120.4(8)
H14A–C14A–C15A	119.8	C14A–C15A–H15A	119.8
C14A–C15A–C16A	120.4(8)	H15A–C15A–C16A	119.8
C15A–C16A–H16A	119.8	C15A–C16A–C17A	120.5(7)
H16A–C16A–C17A	119.8	C16A–C17A–H17A	120.0
C16A–C17A–C18A	120.0(8)	H17A–C17A–C18A	120.0
C13A–C18A–C17A	119.6(7)	C13A–C18A–H18A	120.2
C17A–C18A–H18A	120.2	Pt1A–P2A–C21A	118.4(2)
Pt1A–P2A–C22A	107.3(3)	Pt1A–P2A–C23A	123.0(2)
C21A–P2A–C22A	101.5(3)	C21A–P2A–C23A	99.9(3)
C22A–P2A–C23A	104.0(3)	P2A–C21A–H21A	109.5
P2A–C21A–H21B	109.5	P2A–C21A–H21C	109.5
H21A–C21A–H21B	109.5	H21A–C21A–H21C	109.5
H21B–C21A–H21C	109.5	P2A–C22A–H22A	109.5
P2A–C22A–H22B	109.5	P2A–C22A–H22C	109.5
H22A–C22A–H22B	109.5	H22A–C22A–H22C	109.5
H22B–C22A–H22C	109.5	P2A–C23A–C24A	120.7(6)
P2A–C23A–C28A	120.8(5)	C24A–C23A–C28A	118.3(7)
C23A–C24A–H24A	119.8	C23A–C24A–C25A	120.4(7)
H24A–C24A–C25A	119.8	C24A–C25A–H25A	119.7
C24A–C25A–C26A	120.5(8)	H25A–C25A–C26A	119.7

C25A–C26A–H26A	119.6	C25A–C26A–C27A	120.7(8)
H26A–C26A–C27A	119.6	C26A–C27A–H27A	120.4
C26A–C27A–C28A	119.2(7)	H27A–C27A–C28A	120.4
C23A–C28A–C27A	120.9(6)	C23A–C28A–H28A	119.6
C27A–C28A–H28A	119.6	Pt2A–P3A–C31A	116.8(3)
Pt2A–P3A–C32A	114.5(2)	Pt2A–P3A–C33A	115.6(2)
C31A–P3A–C32A	100.8(4)	C31A–P3A–C33A	101.8(4)
C32A–P3A–C33A	105.5(4)	P3A–C31A–H31A	109.5
P3A–C31A–H31B	109.5	P3A–C31A–H31C	109.5
H31A–C31A–H31B	109.5	H31A–C31A–H31C	109.5
H31B–C31A–H31C	109.5	P3A–C32A–H32A	109.5
P3A–C32A–H32B	109.5	P3A–C32A–H32C	109.5
H32A–C32A–H32B	109.5	H32A–C32A–H32C	109.5
H32B–C32A–H32C	109.5	P3A–C33A–C34A	119.0(6)
P3A–C33A–C38A	122.6(6)	C34A–C33A–C38A	118.4(7)
C33A–C34A–H34A	120.0	C33A–C34A–C35A	119.9(9)
H34A–C34A–C35A	120.0	C34A–C35A–H35A	120.1
C34A–C35A–C36A	119.8(9)	H35A–C35A–C36A	120.1
C35A–C36A–H36A	119.8	C35A–C36A–C37A	120.4(8)
H36A–C36A–C37A	119.8	C36A–C37A–H37A	119.7
C36A–C37A–C38A	120.6(9)	H37A–C37A–C38A	119.7
C33A–C38A–C37A	120.9(8)	C33A–C38A–H38A	119.5
C37A–C38A–H38A	119.5	B3A–Pt1B–H3A	20.9(12)
B3A–Pt1B–Pt2B	80.91(15)	B3A–Pt1B–B3B	79.0(2)
B3A–Pt1B–B4B	113.0(2)	B3A–Pt1B–B5B	161.7(3)
B3A–Pt1B–B6B	131.9(3)	B3A–Pt1B–P1B	99.44(15)
H3A–Pt1B–Pt2B	100.3(14)	H3A–Pt1B–B3B	96.3(16)
H3A–Pt1B–B4B	119(2)	H3A–Pt1B–B5B	163(2)
H3A–Pt1B–B6B	147.2(19)	H3A–Pt1B–P1B	84.0(18)
Pt2B–Pt1B–B3B	54.90(15)	Pt2B–Pt1B–B4B	94.18(19)
Pt2B–Pt1B–B5B	93.1(2)	Pt2B–Pt1B–B6B	52.6(2)
Pt2B–Pt1B–P1B	116.64(5)	B3B–Pt1B–B4B	48.2(2)
B3B–Pt1B–B5B	83.4(3)	B3B–Pt1B–B6B	82.7(3)
B3B–Pt1B–P1B	171.49(16)	B4B–Pt1B–B5B	49.9(3)
B4B–Pt1B–B6B	84.8(3)	B4B–Pt1B–P1B	138.52(18)
B5B–Pt1B–B6B	49.3(3)	B5B–Pt1B–P1B	98.7(2)
B6B–Pt1B–P1B	92.4(2)	Pt2A–Pt2B–B7A	46.14(18)
Pt2A–Pt2B–H7A	67.1(17)	Pt2A–Pt2B–Pt1B	77.291(9)
Pt2A–Pt2B–B3B	51.30(18)	Pt2A–Pt2B–B6B	126.7(2)
Pt2A–Pt2B–B7B	79.04(19)	Pt2A–Pt2B–B11B	126.7(2)
Pt2A–Pt2B–P2B	136.39(5)	B7A–Pt2B–H7A	21.2(17)
B7A–Pt2B–Pt1B	74.23(19)	B7A–Pt2B–B3B	86.4(2)
B7A–Pt2B–B6B	120.7(3)	B7A–Pt2B–B7B	124.9(3)
B7A–Pt2B–B11B	167.0(3)	B7A–Pt2B–P2B	104.16(18)
H7A–Pt2B–Pt1B	79(2)	H7A–Pt2B–B3B	105.2(19)
H7A–Pt2B–B6B	113(2)	H7A–Pt2B–B7B	146.0(17)
H7A–Pt2B–B11B	163(2)	H7A–Pt2B–P2B	85.5(19)
Pt1B–Pt2B–B3B	51.94(18)	Pt1B–Pt2B–B6B	52.7(2)
Pt1B–Pt2B–B7B	90.82(18)	Pt1B–Pt2B–B11B	94.1(2)
Pt1B–Pt2B–P2B	131.91(6)	B3B–Pt2B–B6B	80.8(3)
B3B–Pt2B–B7B	46.7(2)	B3B–Pt2B–B11B	81.8(3)

B3B–Pt2B–P2B	169.30(17)	B6B–Pt2B–B7B	84.0(3)
B6B–Pt2B–B11B	51.9(3)	B6B–Pt2B–P2B	94.7(2)
B7B–Pt2B–B11B	48.2(3)	B7B–Pt2B–P2B	123.38(18)
B11B–Pt2B–P2B	87.8(2)	Pt2A–B3B–Pt1B	100.8(2)
Pt2A–B3B–Pt2B	77.1(2)	Pt2A–B3B–H3B	31(4)
Pt2A–B3B–B4B	147.2(4)	Pt2A–B3B–B7B	105.5(4)
Pt2A–B3B–B8B	141.4(5)	Pt1B–B3B–Pt2B	73.2(2)
Pt1B–B3B–H3B	127(4)	Pt1B–B3B–B4B	65.2(3)
Pt1B–B3B–B7B	121.6(4)	Pt1B–B3B–B8B	117.7(4)
Pt2B–B3B–H3B	102(4)	Pt2B–B3B–B4B	121.9(4)
Pt2B–B3B–B7B	63.6(3)	Pt2B–B3B–B8B	115.9(4)
H3B–B3B–B4B	135(4)	H3B–B3B–B7B	100(4)
H3B–B3B–B8B	112(4)	B4B–B3B–B7B	107.0(5)
B4B–B3B–B8B	58.7(4)	B7B–B3B–B8B	58.2(4)
Pt1B–B4B–B3B	66.5(3)	Pt1B–B4B–H4B	110(4)
Pt1B–B4B–B5B	63.1(3)	Pt1B–B4B–B8B	118.3(4)
Pt1B–B4B–B9B	116.1(4)	B3B–B4B–H4B	124(4)
B3B–B4B–B5B	105.8(5)	B3B–B4B–B8B	58.1(4)
B3B–B4B–B9B	105.5(5)	H4B–B4B–B5B	123(4)
H4B–B4B–B8B	122(4)	H4B–B4B–B9B	123(4)
B5B–B4B–B8B	107.4(5)	B5B–B4B–B9B	59.0(4)
B8B–B4B–B9B	60.6(4)	Pt1B–B5B–B4B	67.0(3)
Pt1B–B5B–H5B	109(4)	Pt1B–B5B–B6B	68.0(3)
Pt1B–B5B–B9B	117.9(4)	Pt1B–B5B–B10B	117.8(5)
B4B–B5B–H5B	122(4)	B4B–B5B–B6B	109.9(5)
B4B–B5B–B9B	57.1(4)	B4B–B5B–B10B	105.6(5)
H5B–B5B–B6B	122(4)	H5B–B5B–B9B	122(4)
H5B–B5B–B10B	123(4)	B6B–B5B–B9B	106.6(5)
B6B–B5B–B10B	56.9(4)	B9B–B5B–B10B	60.3(4)
Pt1B–B6B–Pt2B	74.8(2)	Pt1B–B6B–B5B	62.6(3)
Pt1B–B6B–H6B	110.7	Pt1B–B6B–B10B	115.5(5)
Pt1B–B6B–B11B	118.5(4)	Pt2B–B6B–B5B	121.3(4)
Pt2B–B6B–H6B	110.8	Pt2B–B6B–B10B	113.8(5)
Pt2B–B6B–B11B	61.5(3)	B5B–B6B–H6B	120.7
B5B–B6B–B10B	59.8(4)	B5B–B6B–B11B	105.6(5)
H6B–B6B–B10B	121.8	H6B–B6B–B11B	123.6
B10B–B6B–B11B	57.0(4)	Pt2B–B7B–B3B	69.6(3)
Pt2B–B7B–H7B	106(4)	Pt2B–B7B–B8B	121.7(4)
Pt2B–B7B–B11B	63.7(3)	Pt2B–B7B–B12B	116.8(5)
B3B–B7B–H7B	117(4)	B3B–B7B–B8B	58.7(4)
B3B–B7B–B11B	109.4(5)	B3B–B7B–B12B	106.9(5)
H7B–B7B–B8B	120(4)	H7B–B7B–B11B	124(4)
H7B–B7B–B12B	127(4)	B8B–B7B–B11B	109.1(5)
B8B–B7B–B12B	60.9(4)	B11B–B7B–B12B	58.8(4)
B3B–B8B–B4B	63.2(4)	B3B–B8B–B7B	63.1(4)
B3B–B8B–H8B	120(4)	B3B–B8B–B9B	108.2(5)
B3B–B8B–B12B	109.1(5)	B4B–B8B–B7B	114.5(5)
B4B–B8B–H8B	112(4)	B4B–B8B–B9B	59.0(4)
B4B–B8B–B12B	109.1(5)	B7B–B8B–H8B	126(4)
B7B–B8B–B9B	108.3(5)	B7B–B8B–B12B	59.4(4)
H8B–B8B–B9B	118(4)	H8B–B8B–B12B	126(4)

B9B–B8B–B12B	59.4(4)	B4B–B9B–B5B	63.9(4)
B4B–B9B–B8B	60.3(4)	B4B–B9B–H9B	120(4)
B4B–B9B–B10B	111.0(5)	B4B–B9B–B12B	110.9(5)
B5B–B9B–B8B	111.0(5)	B5B–B9B–H9B	114(4)
B5B–B9B–B10B	60.3(4)	B5B–B9B–B12B	110.8(5)
B8B–B9B–H9B	128(4)	B8B–B9B–B10B	107.5(5)
B8B–B9B–B12B	60.2(4)	H9B–B9B–B10B	118(4)
H9B–B9B–B12B	123(4)	B10B–B9B–B12B	60.0(4)
B5B–B10B–B6B	63.3(4)	B5B–B10B–B9B	59.4(4)
B5B–B10B–H10B	115(4)	B5B–B10B–B11B	116.4(5)
B5B–B10B–B12B	109.0(5)	B6B–B10B–B9B	111.1(5)
B6B–B10B–H10B	115(4)	B6B–B10B–B11B	67.4(5)
B6B–B10B–B12B	113.2(6)	B9B–B10B–H10B	122(4)
B9B–B10B–B11B	108.6(5)	B9B–B10B–B12B	58.8(4)
H10B–B10B–B11B	120(4)	H10B–B10B–B12B	125(4)
B11B–B10B–B12B	58.9(4)	Pt2B–B11B–B6B	66.5(3)
Pt2B–B11B–B7B	68.2(3)	Pt2B–B11B–B10B	117.1(4)
Pt2B–B11B–H11B	115(4)	Pt2B–B11B–B12B	120.6(4)
B6B–B11B–B7B	107.3(5)	B6B–B11B–B10B	55.6(4)
B6B–B11B–H11B	128(4)	B6B–B11B–B12B	105.2(5)
B7B–B11B–B10B	106.2(5)	B7B–B11B–H11B	121(4)
B7B–B11B–B12B	58.6(4)	B10B–B11B–H11B	119(4)
B10B–B11B–B12B	60.7(4)	H11B–B11B–B12B	114(4)
B7B–B12B–B8B	59.7(4)	B7B–B12B–B9B	109.4(5)
B7B–B12B–B10B	108.9(5)	B7B–B12B–B11B	62.5(4)
B7B–B12B–H12B	120(4)	B8B–B12B–B9B	60.4(4)
B8B–B12B–B10B	108.5(5)	B8B–B12B–B11B	111.1(5)
B8B–B12B–H12B	121(4)	B9B–B12B–B10B	61.2(4)
B9B–B12B–B11B	111.8(5)	B9B–B12B–H12B	121(4)
B10B–B12B–B11B	60.4(4)	B10B–B12B–H12B	122(4)
B11B–B12B–H12B	118(4)	Pt1B–P1B–C11B	115.2(3)
Pt1B–P1B–C12B	115.6(3)	Pt1B–P1B–C13B	112.9(2)
C11B–P1B–C12B	102.8(4)	C11B–P1B–C13B	104.9(4)
C12B–P1B–C13B	104.1(4)	P1B–C11B–H11F	109.5
P1B–C11B–H11G	109.5	P1B–C11B–H11H	109.5
H11F–C11B–H11G	109.5	H11F–C11B–H11H	109.5
H11G–C11B–H11H	109.5	P1B–C12B–H12F	109.5
P1B–C12B–H12G	109.5	P1B–C12B–H12H	109.5
H12F–C12B–H12G	109.5	H12F–C12B–H12H	109.5
H12G–C12B–H12H	109.5	P1B–C13B–C14B	119.8(6)
P1B–C13B–C18B	120.5(6)	C14B–C13B–C18B	119.6(7)
C13B–C14B–H14B	120.0	C13B–C14B–C15B	119.9(9)
H14B–C14B–C15B	120.0	C14B–C15B–H15B	119.9
C14B–C15B–C16B	120.1(9)	H15B–C15B–C16B	119.9
C15B–C16B–H16B	119.6	C15B–C16B–C17B	120.8(8)
H16B–C16B–C17B	119.6	C16B–C17B–H17B	120.3
C16B–C17B–C18B	119.5(9)	H17B–C17B–C18B	120.3
C13B–C18B–C17B	120.1(9)	C13B–C18B–H18B	120.0
C17B–C18B–H18B	120.0	Pt2B–P2B–C21B	119.2(3)
Pt2B–P2B–C22B	113.5(3)	Pt2B–P2B–C23B	109.3(4)
Pt2B–P2B–C23C	118.6(9)	C21B–P2B–C22B	102.1(5)

C21B–P2B–C23B	105.9(5)	C21B–P2B–C23C	111.2(13)
C22B–P2B–C23B	105.8(6)	C22B–P2B–C23C	86.2(11)
P2B–C21B–H21D	109.5	P2B–C21B–H21E	109.5
P2B–C21B–H21F	109.5	H21D–C21B–H21E	109.5
H21D–C21B–H21F	109.5	H21E–C21B–H21F	109.5
P2B–C22B–H22D	109.5	P2B–C22B–H22E	109.5
P2B–C22B–H22F	109.5	H22D–C22B–H22E	109.5
H22D–C22B–H22F	109.5	H22E–C22B–H22F	109.5
P2B–C23B–C24B	116.6(8)	P2B–C23B–C28B	128.2(10)
C24B–C23B–C28B	114.9(11)	C23B–C24B–H24B	118.2
C23B–C24B–C25B	123.5(12)	H24B–C24B–C25B	118.2
C24B–C25B–H25B	120.4	C24B–C25B–C26B	119.2(14)
H25B–C25B–C26B	120.4	C25B–C26B–H26B	119.7
C25B–C26B–C27B	120.6(15)	H26B–C26B–C27B	119.7
C26B–C27B–H27B	120.1	C26B–C27B–C28B	119.7(12)
H27B–C27B–C28B	120.1	C23B–C28B–C27B	121.5(12)
C23B–C28B–H28B	119.3	C27B–C28B–H28B	119.3
P2B–C23C–C24C	112.6(15)	P2B–C23C–C28C	123.6(17)
C24C–C23C–C28C	123.7(18)	C23C–C24C–H24C	121.3
C23C–C24C–C25C	117.4(18)	H24C–C24C–C25C	121.3
C24C–C25C–H25C	121.1	C24C–C25C–C26C	117.8(19)
H25C–C25C–C26C	121.1	C25C–C26C–H26C	118.7
C25C–C26C–C27C	123(2)	H26C–C26C–C27C	118.7
C26C–C27C–H27C	120.1	C26C–C27C–C28C	120(2)
H27C–C27C–C28C	120.1	C23C–C28C–C27C	116.5(18)
C23C–C28C–H28C	121.7	C27C–C28C–H28C	121.7
H1S–C1S–C2S	122.0	H1S–C1S–C6S	122.0
C2S–C1S–C6S	116.0(11)	C1S–C2S–H2S	118.5
C1S–C2S–C3S	123.1(11)	H2S–C2S–C3S	118.5
C2S–C3S–H3S	121.1	C2S–C3S–C4S	117.7(10)
H3S–C3S–C4S	121.1	C3S–C4S–H4S	119.0
C3S–C4S–C5S	121.9(11)	H4S–C4S–C5S	119.0
C4S–C5S–H5S	119.8	C4S–C5S–C6S	120.4(11)
H5S–C5S–C6S	119.8	C1S–C6S–C5S	120.5(12)
C1S–C6S–H6S	119.7	C5S–C6S–H6S	119.7
H7S–C7S–C8S	119.7	H7S–C7S–C9Sa	119.7
C8S–C7S–C9Sa	120.7(15)	C7S–C8S–H8S	119.6
C7S–C8S–C9S	120.9(17)	H8S–C8S–C9S	119.6
C7Sa–C9S–C8S	117.9(19)	C7Sa–C9S–H9S	121.0
C8S–C9S–H9S	121.0		

Symmetry operations for equivalent atoms
a –x,–y+2,–z+1

Crystal data and structure refinement data tables and interatomic separations and angles for **4**.

Chemical formula (total)	$C_{58}H_{102}B_{20}Cl_{24}N_6P_4Pt_4$	
Formula weight	2854.8	
Temperature	94.97 K	
Radiation, wavelength	Cu Kα, 1.54184 Å	
Crystal system, space group	triclinic, $P\bar{1}$	
Unit cell parameters	a = 10.6353(2) Å	α = 92.712(2)°
	b = 21.8941(5) Å	β = 94.663(2)°
	c = 22.5326(4) Å	γ = 91.380(2)°
Cell volume	5221.44(18) $Å^3$	
Z	2	
Calculated density	1.8158 g/cm^3	
Absorption coefficient μ	16.318 mm^{-1}	
F(000)	2744	
Crystal colour and size	orange, 0.253 × 0.084 × 0.036 mm^3	
Reflections for cell refinement	23468 (θ range 3.9 to 74.1°)	
Data collection method	SuperNova, Dual, Cu at home/near, AtlasS2 ω scans	
θ range for data collection	2.9 to 77.0°	
Index ranges	h −12 to 12, k −27 to 27, l −28 to 28	
Completeness to θ = 61.2°	98 %	
Reflections collected	78567	
Independent reflections	20303 (R_{int} = 0.0917)	
Reflections with $F^2>2\sigma$	12053	
Absorption correction	gaussian	
Min. and max. transmission	0.139 and 0.801	
Structure solution	Dual-space interative method	
Refinement method	Full-matrix least-squares on F^2	
Weighting parameters a, b	,	
Data / restraints / parameters	20303 / 0 / 513	
Final R indices [$F^2>2\sigma$]	R1 = 0.0789, wR2 = 0.1651	
R indices (all data)	R1 = 0.1312, wR2 = 0.1908	
Goodness-of-fit on F^2	1.69	
Largest and mean shift/su	0.0004 and 0.0000	
Largest diff. peak and hole	3.73 and −3.22 e $Å^{-3}$	

Bond lengths [Å] and angles [°] for **4**.

P2–C21	1.816(15)	P2–C22	1.795(15)
P2–Pt2b	2.320(5)	P2–C131a	1.820(10)
P1–C12	1.823(15)	P1–C11	1.827(17)
P1–Pt1b	2.336(5)	P1–C131b	1.822(10)
P3–C32	1.798(15)	P3–C31	1.807(16)
P3–Pt1a	2.313(4)	P3–C131d	1.835(11)
P4–C42	1.808(16)	P4–C41	1.804(16)
P4–Pt2a	2.331(4)	P4–C131c	1.817(12)
C32–H1c32	0.96	C32–H2c32	0.96
C32–H3c32	0.96	C21–H1c21	0.96
C21–H2c21	0.96	C21–H3c21	0.96
C31–H1c31	0.96	C31–H2c31	0.96
C31–H3c31	0.96	C12–H1c12	0.96
C12–H2c12	0.96	C12–H3c12	0.96
C42–H1c42	0.96	C42–H2c42	0.96
C42–H3c42	0.96	C41–H1c41	0.96
C41–H2c41	0.96	C41–H3c41	0.96
C22–H1c22	0.96	C22–H2c22	0.96
C22–H3c22	0.96	C11–H1c11	0.96
C11–H2c11	0.96	C11–H3c11	0.96
Pt1a–Pt2a	2.7168(11)	Pt1a–B5a	2.235(12)
Pt1a–B4a	2.236(12)	Pt1a–B6a	2.258(10)
Pt1a–B3a	2.317(11)	Pt1a–C1c	1.99(2)
Pt1a–C4c	2.15(4)	Pt1a–C4d	2.07(4)
Pt2a–B7a	2.225(12)	Pt2a–B11a	2.244(11)
Pt2a–B6a	2.318(11)	Pt2a–B3a	2.277(11)
Pt2a–C1d	1.958(15)	Pt2a–C4c	2.05(4)
Pt2a–C4d	2.25(4)	B5a–B9a	1.745(17)
B5a–B4a	1.796(16)	B5a–B6a	1.860(16)
B5a–B10a	1.752(16)	B5a–H1b5a	1.2
B7a–B11a	1.792(16)	B7a–B12a	1.755(17)
B7a–B8a	1.754(17)	B7a–H1b7a	1.2
B11a–B12a	1.759(18)	B11a–B10a	1.742(16)
B11a–H1b11a	1.2	B9a–B4a	1.754(16)
B9a–B12a	1.754(17)	B9a–B10a	1.755(17)
B9a–B8a	1.778(17)	B9a–H1b9a	1.2
B4a–B8a	1.785(16)	B4a–H1b4a	1.2
B12a–B10a	1.758(17)	B12a–B8a	1.770(16)
B12a–H1b12a	1.2	B6a–B10a	1.766(16)
B6a–H1b6a	1.2	B10a–H1b10a	1.2
B8a–B3a	1.723(17)	B8a–H1b8a	1.2
B3a–H1b3a	1.2	Pt1b–Pt2b	2.717(7)
Pt1b–B5b	2.235(13)	Pt1b–B4b	2.236(13)
Pt1b–B6b	2.258(12)	Pt1b–B3b	2.317(12)
Pt1b–C1a	2.002(14)	Pt1b–C4a	2.21(3)
Pt1b–C4b	2.16(4)	Pt2b–B7b	2.225(13)
Pt2b–B11b	2.244(12)	Pt2b–B6b	2.318(12)
Pt2b–B3b	2.277(14)	Pt2b–C1b	2.000(18)
Pt2b–C4a	2.15(3)	Pt2b–C4b	2.10(3)

B5b–B9b	1.745(18)	B5b–B4b	1.796(17)
B5b–B6b	1.860(18)	B5b–B10b	1.752(17)
B5b–H1b5b	1.2	B7b–B11b	1.792(17)
B7b–B12b	1.755(18)	B7b–B8b	1.754(18)
B7b–H1b7b	1.2	B11b–B12b	1.759(18)
B11b–B10b	1.742(18)	B11b–H1b11b	1.2
B9b–B4b	1.754(17)	B9b–B12b	1.754(19)
B9b–B10b	1.755(18)	B9b–B8b	1.778(18)
B9b–H1b9b	1.2	B4b–B8b	1.785(17)
B4b–H1b4b	1.2	B12b–B10b	1.758(18)
B12b–B8b	1.770(17)	B12b–H1b12b	1.2
B6b–B10b	1.766(16)	B6b–H1b6b	1.2
B10b–H1b10b	1.2	B8b–B3b	1.723(17)
B8b–H1b8b	1.2	B3b–H1b3b	1.2
Cl1a–C25a	1.751(9)	Cl2a–C25a	1.746(10)
Cl3a–C25a	1.754(10)	C25a–H1c25a	0.96
Cl1b–C25b	1.751(9)	Cl2b–C25b	1.746(11)
Cl3b–C25b	1.754(12)	C25b–H1c25b	0.96
Cl1c–C25c	1.751(12)	Cl2c–C25c	1.746(11)
Cl3c–C25c	1.754(12)	C25c–H1c25c	0.96
Cl1d–C25d	1.751(11)	Cl2d–C25d	1.746(11)
Cl3d–C25d	1.754(11)	C25d–H1c25d	0.96
Cl1e–C25e	1.751(12)	Cl2e–C25e	1.746(14)
Cl3e–C25e	1.754(15)	Cl3e–N1c'	3.706(15)
C25e–H1c25e	0.96	Cl1f–C25f	1.751(11)
Cl2f–C25f	1.746(12)	Cl3f–C25f	1.754(16)
C25f–H1c25f	0.96	Cl1g–C25g	1.751(11)
Cl2g–C25g	1.746(12)	Cl3g–C25g	1.754(11)
C25g–H1c25g	0.96	Cl1h–C25h	1.751(14)
Cl2h–C25h	1.746(12)	Cl3h–C25h	1.754(16)
C25h–H1c25h	0.96	C131a–C132a	1.374(16)
C131a–C133a	1.386(18)	C132a–C134a	1.38(2)
C132a–H1c132a	0.96	C133a–C136a	1.37(2)
C133a–H1c133a	0.96	C134a–C135a	1.41(3)
C134a–H1c134a	0.96	C135a–C136a	1.39(2)
C135a–H1c135a	0.96	C136a–H1c136a	0.96
C131b–C132b	1.37(2)	C131b–C133b	1.39(2)
C132b–C134b	1.38(3)	C132b–H1c132b	0.96
C133b–C136b	1.37(3)	C133b–H1c133b	0.96
C134b–C135b	1.41(4)	C134b–H1c134b	0.96
C135b–C136b	1.39(4)	C135b–H1c135b	0.96
C136b–H1c136b	0.96	C131c–C132c	1.37(2)
C131c–C133c	1.39(2)	C132c–C134c	1.38(3)
C132c–H1c132c	0.96	C133c–C136c	1.37(3)
C133c–H1c133c	0.96	C134c–C135c	1.41(4)
C134c–H1c134c	0.96	C135c–C136c	1.39(3)
C135c–H1c135c	0.96	C136c–H1c136c	0.96
C131d–C132d	1.37(2)	C131d–C133d	1.39(2)
C132d–C134d	1.38(3)	C132d–H1c132d	0.96
C133d–C136d	1.37(3)	C133d–H1c133d	0.96
C134d–C135d	1.41(4)	C134d–H1c134d	0.96

C135d–C136d	1.39(4)	C135d–H1c135d	0.96
C136d–H1c136d	0.96	N1a–C1a	1.149(16)
N1a–C2a	1.444(16)	C2a–C3a	1.50(3)
C2a–H1c2a	0.96	C2a–H2c2a	0.96
C3a–H1c3a	0.96	C3a–H2c3a	0.96
C3a–H3c3a	0.96	N1b–C1b	1.149(19)
N1b–C2b	1.44(2)	C2b–C3b	1.50(5)
C2b–H1c2b	0.96	C2b–H2c2b	0.96
C3b–H1c3b	0.96	C3b–H2c3b	0.96
C3b–H3c3b	0.96	N1c–C1c	1.15(2)
N1c–C2c	1.44(3)	C2c–C3c	1.50(5)
C2c–H1c2c	0.96	C2c–H2c2c	0.96
C3c–H1c3c	0.96	C3c–H2c3c	0.96
C3c–H3c3c	0.96	N1d–C1d	1.149(17)
N1d–C2d	1.444(19)	C2d–C3d	1.50(5)
C2d–H1c2d	0.96	C2d–H2c2d	0.96
C3d–H1c3d	0.96	C3d–H2c3d	0.96
C3d–H3c3d	0.96	N2a–C4a	1.18(3)
N2a–C5a	1.47(3)	C5a–C6a	1.50(5)
C5a–H1c5a	0.96	C5a–H2c5a	0.96
C6a–H1c6a	0.96	C6a–H2c6a	0.96
C6a–H3c6a	0.96	N2b–C4b	1.18(6)
N2b–C5b	1.47(11)	C5b–C6b	1.50(19)
C5b–H1c5b	0.96	C5b–H2c5b	0.96
C6b–H1c6b	0.96	C6b–H2c6b	0.96
C6b–H3c6b	0.96	N2c–C4c	1.18(7)
N2c–C5c	1.47(11)	C5c–C6c	1.50(18)
C5c–H1c5c	0.96	C5c–H2c5c	0.96
C6c–H1c6c	0.96	C6c–H2c6c	0.96
C6c–H3c6c	0.96	N2d–C4d	1.18(7)
N2d–C5d	1.47(12)	C5d–C6d	1.50(18)
C5d–H1c5d	0.96	C5d–H2c5d	0.96
C6d–H1c6d	0.96	C6d–H2c6d	0.96
C6d–H3c6d	0.96		

C21–P2–C22	103.5(7)	C21–P2–Pt2b	112.6(5)
C21–P2–C131a	101.8(6)	C22–P2–Pt2b	116.0(6)
C22–P2–C131a	106.2(6)	Pt2b–P2–C131a	115.2(4)
C12–P1–C11	103.9(8)	C12–P1–Pt1b	115.0(5)
C12–P1–C131b	103.0(6)	C11–P1–Pt1b	115.2(6)
C11–P1–C131b	104.6(6)	Pt1b–P1–C131b	113.7(4)
C32–P3–C31	103.7(8)	C32–P3–Pt1a	116.9(5)
C32–P3–C131d	103.6(6)	C31–P3–Pt1a	112.6(6)
C31–P3–C131d	104.4(7)	Pt1a–P3–C131d	114.2(4)
C42–P4–C41	102.5(8)	C42–P4–Pt2a	116.6(6)
C42–P4–C131c	102.8(7)	C41–P4–Pt2a	114.1(6)
C41–P4–C131c	106.6(7)	Pt2a–P4–C131c	113.0(4)
P3–C32–H1c32	109.47	P3–C32–H2c32	109.47
P3–C32–H3c32	109.47	H1c32–C32–H2c32	109.47
H1c32–C32–H3c32	109.47	H2c32–C32–H3c32	109.47
P2–C21–H1c21	109.47	P2–C21–H2c21	109.47

P2–C21–H3c21	109.47	H1c21–C21–H2c21	109.47
H1c21–C21–H3c21	109.47	H2c21–C21–H3c21	109.47
P3–C31–H1c31	109.47	P3–C31–H2c31	109.47
P3–C31–H3c31	109.47	H1c31–C31–H2c31	109.47
H1c31–C31–H3c31	109.47	H2c31–C31–H3c31	109.47
P1–C12–H1c12	109.47	P1–C12–H2c12	109.47
P1–C12–H3c12	109.47	H1c12–C12–H2c12	109.47
H1c12–C12–H3c12	109.47	H2c12–C12–H3c12	109.47
P4–C42–H1c42	109.47	P4–C42–H2c42	109.47
P4–C42–H3c42	109.47	H1c42–C42–H2c42	109.47
H1c42–C42–H3c42	109.47	H2c42–C42–H3c42	109.47
P4–C41–H1c41	109.47	P4–C41–H2c41	109.47
P4–C41–H3c41	109.47	H1c41–C41–H2c41	109.47
H1c41–C41–H3c41	109.47	H2c41–C41–H3c41	109.47
P2–C22–H1c22	109.47	P2–C22–H2c22	109.47
P2–C22–H3c22	109.47	H1c22–C22–H2c22	109.47
H1c22–C22–H3c22	109.47	H2c22–C22–H3c22	109.47
P1–C11–H1c11	109.47	P1–C11–H2c11	109.47
P1–C11–H3c11	109.47	H1c11–C11–H2c11	109.47
H1c11–C11–H3c11	109.47	H2c11–C11–H3c11	109.47
P3–Pt1a–Pt2a	133.73(10)	P3–Pt1a–B5a	91.4(3)
P3–Pt1a–B4a	122.7(3)	P3–Pt1a–B6a	98.0(3)
P3–Pt1a–B3a	171.0(3)	P3–Pt1a–C1c	89.5(8)
P3–Pt1a–C4c	96.9(12)	P3–Pt1a–C4d	93.0(12)
Pt2a–Pt1a–B5a	93.5(3)	Pt2a–Pt1a–B4a	92.9(3)
Pt2a–Pt1a–B6a	54.6(3)	Pt2a–Pt1a–B3a	53.1(3)
Pt2a–Pt1a–C1c	119.5(7)	Pt2a–Pt1a–C4c	48.1(11)
Pt2a–Pt1a–C4d	54.2(11)	B5a–Pt1a–B4a	47.4(4)
B5a–Pt1a–B6a	48.9(4)	B5a–Pt1a–B3a	81.7(4)
B5a–Pt1a–C1c	131.6(7)	B5a–Pt1a–C4c	130.9(10)
B5a–Pt1a–C4d	136.5(11)	B4a–Pt1a–B6a	82.8(4)
B4a–Pt1a–B3a	48.3(4)	B4a–Pt1a–C1c	93.4(7)
B4a–Pt1a–C4c	139.2(12)	B4a–Pt1a–C4d	143.9(12)
B6a–Pt1a–B3a	81.9(4)	B6a–Pt1a–C1c	172.5(8)
B6a–Pt1a–C4c	82.0(10)	B6a–Pt1a–C4d	87.6(11)
B3a–Pt1a–C1c	90.8(8)	B3a–Pt1a–C4c	92.0(12)
B3a–Pt1a–C4d	96.0(12)	C1c–Pt1a–C4c	96.9(12)
C1c–Pt1a–C4d	91.7(12)	C4c–Pt1a–C4d	6.4(15)
P4–Pt2a–Pt1a	116.15(10)	P4–Pt2a–B7a	94.1(3)
P4–Pt2a–B11a	134.9(3)	P4–Pt2a–B6a	167.7(3)
P4–Pt2a–B3a	87.5(3)	P4–Pt2a–C1d	95.5(6)
P4–Pt2a–C4c	93.2(11)	P4–Pt2a–C4d	93.1(10)
Pt1a–Pt2a–B7a	94.4(3)	Pt1a–Pt2a–B11a	92.7(3)
Pt1a–Pt2a–B6a	52.6(3)	Pt1a–Pt2a–B3a	54.4(3)
Pt1a–Pt2a–C1d	129.2(7)	Pt1a–Pt2a–C4c	51.2(11)
Pt1a–Pt2a–C4d	48.2(10)	B7a–Pt2a–B11a	47.3(4)
B7a–Pt2a–B6a	82.8(4)	B7a–Pt2a–B3a	49.4(4)
B7a–Pt2a–C1d	123.4(7)	B7a–Pt2a–C4c	144.0(12)
B7a–Pt2a–C4d	140.4(11)	B11a–Pt2a–B6a	48.9(4)
B11a–Pt2a–B3a	82.2(4)	B11a–Pt2a–C1d	91.0(6)
B11a–Pt2a–C4c	131.4(11)	B11a–Pt2a–C4d	130.9(10)

B6a–Pt2a–B3a	81.4(4)	B6a–Pt2a–C1d	96.2(7)
B6a–Pt2a–C4c	82.7(11)	B6a–Pt2a–C4d	82.0(10)
B3a–Pt2a–C1d	172.6(7)	B3a–Pt2a–C4c	95.8(12)
B3a–Pt2a–C4d	92.2(11)	C1d–Pt2a–C4c	90.8(13)
C1d–Pt2a–C4d	94.5(13)	C4c–Pt2a–C4d	3.7(16)
Pt1a–B5a–B9a	119.5(7)	Pt1a–B5a–B4a	66.3(5)
Pt1a–B5a–B6a	66.2(5)	Pt1a–B5a–B10a	118.1(7)
Pt1a–B5a–H1b5a	110.26	B9a–B5a–B4a	59.4(7)
B9a–B5a–B6a	107.8(8)	B9a–B5a–B10a	60.3(7)
B9a–B5a–H1b5a	119.82	B4a–B5a–B6a	108.7(8)
B4a–B5a–B10a	107.0(8)	B4a–B5a–H1b5a	122.27
B6a–B5a–B10a	58.4(6)	B6a–B5a–H1b5a	122.39
B10a–B5a–H1b5a	121.09	Pt2a–B7a–B11a	66.9(5)
Pt2a–B7a–B12a	120.1(7)	Pt2a–B7a–B8a	117.5(7)
Pt2a–B7a–H1b7a	109.64	B11a–B7a–B12a	59.4(7)
B11a–B7a–B8a	106.9(8)	B11a–B7a–H1b7a	122.13
B12a–B7a–B8a	60.6(7)	B12a–B7a–H1b7a	119.89
B8a–B7a–H1b7a	121.82	Pt2a–B11a–B7a	65.8(5)
Pt2a–B11a–B12a	119.0(7)	Pt2a–B11a–B10a	118.9(7)
Pt2a–B11a–H1b11a	109.86	B7a–B11a–B12a	59.3(7)
B7a–B11a–B10a	107.3(8)	B7a–B11a–H1b11a	122.23
B12a–B11a–B10a	60.3(7)	B12a–B11a–H1b11a	120.3
B10a–B11a–H1b11a	120.93	B5a–B9a–B4a	61.8(7)
B5a–B9a–B12a	110.9(9)	B5a–B9a–B10a	60.1(7)
B5a–B9a–B8a	109.2(9)	B5a–B9a–H1b9a	119.97
B4a–B9a–B12a	111.2(9)	B4a–B9a–B10a	108.8(9)
B4a–B9a–B8a	60.7(7)	B4a–B9a–H1b9a	119.78
B12a–B9a–B10a	60.1(7)	B12a–B9a–B8a	60.1(7)
B12a–B9a–H1b9a	119.74	B10a–B9a–B8a	106.0(9)
B10a–B9a–H1b9a	122.96	B8a–B9a–H1b9a	122.52
Pt1a–B4a–B5a	66.3(5)	Pt1a–B4a–B9a	119.0(7)
Pt1a–B4a–B8a	118.0(7)	Pt1a–B4a–H1b4a	109.56
B5a–B4a–B9a	58.9(7)	B5a–B4a–B8a	106.6(8)
B5a–B4a–H1b4a	122.29	B9a–B4a–B8a	60.3(7)
B9a–B4a–H1b4a	120.73	B8a–B4a–H1b4a	121.88
B7a–B12a–B11a	61.3(7)	B7a–B12a–B9a	110.4(8)
B7a–B12a–B10a	108.2(9)	B7a–B12a–B8a	59.7(7)
B7a–B12a–H1b12a	120.47	B11a–B12a–B9a	109.4(8)
B11a–B12a–B10a	59.4(7)	B11a–B12a–B8a	107.7(8)
B11a–B12a–H1b12a	121.22	B9a–B12a–B10a	60.0(7)
B9a–B12a–B8a	60.6(7)	B9a–B12a–H1b12a	120.15
B10a–B12a–B8a	106.2(8)	B10a–B12a–H1b12a	122.88
B8a–B12a–H1b12a	122.75	Pt1a–B6a–Pt2a	72.8(3)
Pt1a–B6a–B5a	64.9(5)	Pt1a–B6a–B10a	116.3(7)
Pt1a–B6a–H1b6a	109.54	Pt2a–B6a–B5a	119.9(6)
Pt2a–B6a–B10a	114.2(6)	Pt2a–B6a–H1b6a	111.26
B5a–B6a–B10a	57.7(6)	B5a–B6a–H1b6a	121.86
B10a–B6a–H1b6a	122.3	B5a–B10a–B11a	115.9(8)
B5a–B10a–B9a	59.7(7)	B5a–B10a–B12a	110.4(8)
B5a–B10a–B6a	63.9(6)	B5a–B10a–H1b10a	118.43
B11a–B10a–B9a	110.1(8)	B11a–B10a–B12a	60.3(7)

B11a–B10a–B6a	65.1(7)	B11a–B10a–H1b10a	117.75
B9a–B10a–B12a	59.9(7)	B9a–B10a–B6a	111.7(8)
B9a–B10a–H1b10a	122.05	B12a–B10a–B6a	113.2(8)
B12a–B10a–H1b10a	120.95	B6a–B10a–H1b10a	116.77
B7a–B8a–B9a	109.3(8)	B7a–B8a–B4a	116.0(9)
B7a–B8a–B12a	59.8(7)	B7a–B8a–B3a	65.6(7)
B7a–B8a–H1b8a	117.81	B9a–B8a–B4a	59.0(7)
B9a–B8a–B12a	59.3(7)	B9a–B8a–B3a	111.3(9)
B9a–B8a–H1b8a	122.75	B4a–B8a–B12a	109.1(8)
B4a–B8a–B3a	64.2(7)	B4a–B8a–H1b8a	118.77
B12a–B8a–B3a	112.7(9)	B12a–B8a–H1b8a	121.89
B3a–B8a–H1b8a	116.49	Pt1a–B3a–Pt2a	72.5(3)
Pt1a–B3a–B8a	116.8(7)	Pt1a–B3a–H1b3a	110.72
Pt2a–B3a–B8a	116.4(7)	Pt2a–B3a–H1b3a	110.44
B8a–B3a–H1b3a	120.47	P1–Pt1b–Pt2b	113.0(2)
P1–Pt1b–B5b	96.9(4)	P1–Pt1b–B4b	138.3(4)
P1–Pt1b–B6b	86.5(3)	P1–Pt1b–B3b	165.7(4)
P1–Pt1b–C1a	97.0(5)	P1–Pt1b–C4a	90.1(7)
P1–Pt1b–C4b	95.7(9)	Pt2b–Pt1b–B5b	93.5(4)
Pt2b–Pt1b–B4b	92.9(4)	Pt2b–Pt1b–B6b	54.6(3)
Pt2b–Pt1b–B3b	53.1(3)	Pt2b–Pt1b–C1a	129.4(5)
Pt2b–Pt1b–C4a	50.4(7)	Pt2b–Pt1b–C4b	49.3(9)
B5b–Pt1b–B4b	47.4(4)	B5b–Pt1b–B6b	48.9(4)
B5b–Pt1b–B3b	81.7(4)	B5b–Pt1b–C1a	123.2(6)
B5b–Pt1b–C4a	142.5(8)	B5b–Pt1b–C4b	142.7(9)
B4b–Pt1b–B6b	82.8(4)	B4b–Pt1b–B3b	48.3(5)
B4b–Pt1b–C1a	89.8(6)	B4b–Pt1b–C4a	130.9(8)
B4b–Pt1b–C4b	125.5(9)	B6b–Pt1b–B3b	81.9(4)
B6b–Pt1b–C1a	171.9(6)	B6b–Pt1b–C4a	95.2(8)
B6b–Pt1b–C4b	97.2(10)	B3b–Pt1b–C1a	95.6(6)
B3b–Pt1b–C4a	82.7(8)	B3b–Pt1b–C4b	77.6(9)
C1a–Pt1b–C4a	92.1(8)	C1a–Pt1b–C4b	89.7(11)
C4a–Pt1b–C4b	5.9(12)	P2–Pt2b–Pt1b	132.1(3)
P2–Pt2b–B7b	91.7(4)	P2–Pt2b–B11b	124.4(4)
P2–Pt2b–B6b	173.3(3)	P2–Pt2b–B3b	97.9(4)
P2–Pt2b–C1b	92.4(7)	P2–Pt2b–C4a	91.4(8)
P2–Pt2b–C4b	89.1(11)	Pt1b–Pt2b–B7b	94.4(4)
Pt1b–Pt2b–B11b	92.7(4)	Pt1b–Pt2b–B6b	52.6(3)
Pt1b–Pt2b–B3b	54.4(3)	Pt1b–Pt2b–C1b	118.3(7)
Pt1b–Pt2b–C4a	52.5(8)	Pt1b–Pt2b–C4b	51.4(11)
B7b–Pt2b–B11b	47.3(4)	B7b–Pt2b–B6b	82.8(4)
B7b–Pt2b–B3b	49.4(4)	B7b–Pt2b–C1b	129.8(7)
B7b–Pt2b–C4a	134.3(8)	B7b–Pt2b–C4b	128.8(11)
B11b–Pt2b–B6b	48.9(4)	B11b–Pt2b–B3b	82.2(5)
B11b–Pt2b–C1b	91.4(7)	B11b–Pt2b–C4a	143.2(8)
B11b–Pt2b–C4b	143.8(12)	B6b–Pt2b–B3b	81.4(5)
B6b–Pt2b–C1b	88.3(8)	B6b–Pt2b–C4a	95.2(8)
B6b–Pt2b–C4b	97.3(11)	B3b–Pt2b–C1b	169.7(8)
B3b–Pt2b–C4a	85.0(8)	B3b–Pt2b–C4b	79.8(11)
C1b–Pt2b–C4a	95.6(9)	C1b–Pt2b–C4b	101.2(12)
C4a–Pt2b–C4b	6.0(12)	Pt1b–B5b–B9b	119.5(8)

Pt1b–B5b–B4b	66.3(6)	Pt1b–B5b–B6b	66.2(5)
Pt1b–B5b–B10b	118.1(8)	Pt1b–B5b–H1b5b	110.26
B9b–B5b–B4b	59.4(7)	B9b–B5b–B6b	107.8(8)
B9b–B5b–B10b	60.3(7)	B9b–B5b–H1b5b	119.82
B4b–B5b–B6b	108.7(8)	B4b–B5b–B10b	107.0(8)
B4b–B5b–H1b5b	122.27	B6b–B5b–B10b	58.4(7)
B6b–B5b–H1b5b	122.39	B10b–B5b–H1b5b	121.09
Pt2b–B7b–B11b	66.9(6)	Pt2b–B7b–B12b	120.1(8)
Pt2b–B7b–B8b	117.5(7)	Pt2b–B7b–H1b7b	109.64
B11b–B7b–B12b	59.4(7)	B11b–B7b–B8b	106.9(9)
B11b–B7b–H1b7b	122.13	B12b–B7b–B8b	60.6(7)
B12b–B7b–H1b7b	119.89	B8b–B7b–H1b7b	121.82
Pt2b–B11b–B7b	65.8(5)	Pt2b–B11b–B12b	119.0(7)
Pt2b–B11b–B10b	118.9(7)	Pt2b–B11b–H1b11b	109.86
B7b–B11b–B12b	59.3(7)	B7b–B11b–B10b	107.3(9)
B7b–B11b–H1b11b	122.23	B12b–B11b–B10b	60.3(7)
B12b–B11b–H1b11b	120.3	B10b–B11b–H1b11b	120.93
B5b–B9b–B4b	61.8(7)	B5b–B9b–B12b	110.9(9)
B5b–B9b–B10b	60.1(7)	B5b–B9b–B8b	109.2(9)
B5b–B9b–H1b9b	119.97	B4b–B9b–B12b	111.2(9)
B4b–B9b–B10b	108.8(9)	B4b–B9b–B8b	60.7(7)
B4b–B9b–H1b9b	119.78	B12b–B9b–B10b	60.1(7)
B12b–B9b–B8b	60.1(7)	B12b–B9b–H1b9b	119.74
B10b–B9b–B8b	106.0(9)	B10b–B9b–H1b9b	122.96
B8b–B9b–H1b9b	122.52	Pt1b–B4b–B5b	66.3(6)
Pt1b–B4b–B9b	119.0(8)	Pt1b–B4b–B8b	118.0(8)
Pt1b–B4b–H1b4b	109.56	B5b–B4b–B9b	58.9(7)
B5b–B4b–B8b	106.6(8)	B5b–B4b–H1b4b	122.29
B9b–B4b–B8b	60.3(7)	B9b–B4b–H1b4b	120.73
B8b–B4b–H1b4b	121.88	B7b–B12b–B11b	61.3(7)
B7b–B12b–B9b	110.4(9)	B7b–B12b–B10b	108.2(9)
B7b–B12b–B8b	59.7(7)	B7b–B12b–H1b12b	120.47
B11b–B12b–B9b	109.4(9)	B11b–B12b–B10b	59.4(7)
B11b–B12b–B8b	107.7(9)	B11b–B12b–H1b12b	121.22
B9b–B12b–B10b	60.0(7)	B9b–B12b–B8b	60.6(7)
B9b–B12b–H1b12b	120.15	B10b–B12b–B8b	106.2(9)
B10b–B12b–H1b12b	122.88	B8b–B12b–H1b12b	122.75
Pt1b–B6b–Pt2b	72.8(4)	Pt1b–B6b–B5b	64.9(5)
Pt1b–B6b–B10b	116.3(7)	Pt1b–B6b–H1b6b	109.54
Pt2b–B6b–B5b	119.9(7)	Pt2b–B6b–B10b	114.2(7)
Pt2b–B6b–H1b6b	111.26	B5b–B6b–B10b	57.7(7)
B5b–B6b–H1b6b	121.86	B10b–B6b–H1b6b	122.3
B5b–B10b–B11b	115.9(9)	B5b–B10b–B9b	59.7(7)
B5b–B10b–B12b	110.4(9)	B5b–B10b–B6b	63.9(7)
B5b–B10b–H1b10b	118.43	B11b–B10b–B9b	110.1(9)
B11b–B10b–B12b	60.3(7)	B11b–B10b–B6b	65.1(7)
B11b–B10b–H1b10b	117.75	B9b–B10b–B12b	59.9(7)
B9b–B10b–B6b	111.7(8)	B9b–B10b–H1b10b	122.05
B12b–B10b–B6b	113.2(9)	B12b–B10b–H1b10b	120.95
B6b–B10b–H1b10b	116.77	B7b–B8b–B9b	109.3(9)
B7b–B8b–B4b	116.0(9)	B7b–B8b–B12b	59.8(7)

B7b–B8b–B3b	65.6(7)	B7b–B8b–H1b8b	117.81
B9b–B8b–B4b	59.0(7)	B9b–B8b–B12b	59.3(7)
B9b–B8b–B3b	111.3(9)	B9b–B8b–H1b8b	122.75
B4b–B8b–B12b	109.1(9)	B4b–B8b–B3b	64.2(7)
B4b–B8b–H1b8b	118.77	B12b–B8b–B3b	112.7(9)
B12b–B8b–H1b8b	121.89	B3b–B8b–H1b8b	116.49
Pt1b–B3b–Pt2b	72.5(4)	Pt1b–B3b–B8b	116.8(7)
Pt1b–B3b–H1b3b	110.72	Pt2b–B3b–B8b	116.4(7)
Pt2b–B3b–H1b3b	110.44	B8b–B3b–H1b3b	120.47
Cl1a–C25a–Cl2a	110.0(5)	Cl1a–C25a–Cl3a	110.7(6)
Cl1a–C25a–H1c25a	108.58	Cl2a–C25a–Cl3a	110.3(5)
Cl2a–C25a–H1c25a	108.99	Cl3a–C25a–H1c25a	108.18
Cl1b–C25b–Cl2b	110.0(5)	Cl1b–C25b–Cl3b	110.7(6)
Cl1b–C25b–H1c25b	108.58	Cl2b–C25b–Cl3b	110.3(6)
Cl2b–C25b–H1c25b	108.99	Cl3b–C25b–H1c25b	108.18
Cl1c–C25c–Cl2c	110.0(6)	Cl1c–C25c–Cl3c	110.7(6)
Cl1c–C25c–H1c25c	108.58	Cl2c–C25c–Cl3c	110.3(7)
Cl2c–C25c–H1c25c	108.99	Cl3c–C25c–H1c25c	108.18
Cl1d–C25d–Cl2d	110.0(6)	Cl1d–C25d–Cl3d	110.7(6)
Cl1d–C25d–H1c25d	108.58	Cl2d–C25d–Cl3d	110.3(6)
Cl2d–C25d–H1c25d	108.99	Cl3d–C25d–H1c25d	108.18
C25e–Cl3e–N1c'	102.7(6)	Cl1e–C25e–Cl2e	110.0(7)
Cl1e–C25e–Cl3e	110.7(7)	Cl1e–C25e–H1c25e	108.58
Cl2e–C25e–Cl3e	110.3(7)	Cl2e–C25e–H1c25e	108.99
Cl3e–C25e–H1c25e	108.18	Cl1f–C25f–Cl2f	110.0(7)
Cl1f–C25f–Cl3f	110.7(7)	Cl1f–C25f–H1c25f	108.58
Cl2f–C25f–Cl3f	110.3(7)	Cl2f–C25f–H1c25f	108.99
Cl3f–C25f–H1c25f	108.18	Cl1g–C25g–Cl2g	110.0(6)
Cl1g–C25g–Cl3g	110.7(6)	Cl1g–C25g–H1c25g	108.58
Cl2g–C25g–Cl3g	110.3(7)	Cl2g–C25g–H1c25g	108.99
Cl3g–C25g–H1c25g	108.18	Cl1h–C25h–Cl2h	110.0(6)
Cl1h–C25h–Cl3h	110.7(8)	Cl1h–C25h–H1c25h	108.58
Cl2h–C25h–Cl3h	110.3(6)	Cl2h–C25h–H1c25h	108.99
Cl3h–C25h–H1c25h	108.18	P2–C131a–C132a	120.9(9)
P2–C131a–C133a	119.2(8)	C132a–C131a–C133a	119.5(11)
C131a–C132a–C134a	121.0(14)	C131a–C132a–H1c132a	119.49
C134a–C132a–H1c132a	119.49	C131a–C133a–C136a	120.1(13)
C131a–C133a–H1c133a	119.94	C136a–C133a–H1c133a	119.94
C132a–C134a–C135a	120.0(14)	C132a–C134a–H1c134a	120.02
C135a–C134a–H1c134a	120.02	C134a–C135a–C136a	117.8(15)
C134a–C135a–H1c135a	121.09	C136a–C135a–H1c135a	121.09
C133a–C136a–C135a	121.6(15)	C133a–C136a–H1c136a	119.2
C135a–C136a–H1c136a	119.2	P1–C131b–C132b	123.0(11)
P1–C131b–C133b	117.3(10)	C132b–C131b–C133b	119.5(13)
C131b–C132b–C134b	121.0(18)	C131b–C132b–H1c132b	119.49
C134b–C132b–H1c132b	119.49	C131b–C133b–C136b	120.1(17)
C131b–C133b–H1c133b	119.94	C136b–C133b–H1c133b	119.94
C132b–C134b–C135b	120(2)	C132b–C134b–H1c134b	120.02
C135b–C134b–H1c134b	120.02	C134b–C135b–C136b	118(2)
C134b–C135b–H1c135b	121.09	C136b–C135b–H1c135b	121.09
C133b–C136b–C135b	122(2)	C133b–C136b–H1c136b	119.2

C135b–C136b–H1c136b	119.2	P4–C131c–C132c	117.8(11)
P4–C131c–C133c	122.7(10)	C132c–C131c–C133c	119.5(14)
C131c–C132c–C134c	121.0(19)	C131c–C132c–H1c132c	119.49
C134c–C132c–H1c132c	119.49	C131c–C133c–C136c	120.1(17)
C131c–C133c–H1c133c	119.94	C136c–C133c–H1c133c	119.94
C132c–C134c–C135c	120(2)	C132c–C134c–H1c134c	120.02
C135c–C134c–H1c134c	120.02	C134c–C135c–C136c	118(2)
C134c–C135c–H1c135c	121.09	C136c–C135c–H1c135c	121.09
C133c–C136c–C135c	122(2)	C133c–C136c–H1c136c	119.2
C135c–C136c–H1c136c	119.2	P3–C131d–C132d	120.2(11)
P3–C131d–C133d	120.4(10)	C132d–C131d–C133d	119.5(13)
C131d–C132d–C134d	121.0(18)	C131d–C132d–H1c132d	119.49
C134d–C132d–H1c132d	119.49	C131d–C133d–C136d	120.1(17)
C131d–C133d–H1c133d	119.94	C136d–C133d–H1c133d	119.94
C132d–C134d–C135d	120(2)	C132d–C134d–H1c134d	120.02
C135d–C134d–H1c134d	120.02	C134d–C135d–C136d	118(2)
C134d–C135d–H1c135d	121.09	C136d–C135d–H1c135d	121.09
C133d–C136d–C135d	122(2)	C133d–C136d–H1c136d	119.2
C135d–C136d–H1c136d	119.2	C1a–N1a–C2a	175.9(13)
Pt1b–C1a–N1a	169.6(13)	N1a–C2a–C3a	110.2(13)
N1a–C2a–H1c2a	109.47	N1a–C2a–H2c2a	109.47
C3a–C2a–H1c2a	109.47	C3a–C2a–H2c2a	109.47
H1c2a–C2a–H2c2a	108.78	C2a–C3a–H1c3a	109.47
C2a–C3a–H2c3a	109.47	C2a–C3a–H3c3a	109.47
H1c3a–C3a–H2c3a	109.47	H1c3a–C3a–H3c3a	109.47
H2c3a–C3a–H3c3a	109.47	C1b–N1b–C2b	175.9(16)
Pt2b–C1b–N1b	171.3(16)	N1b–C2b–C3b	110.2(19)
N1b–C2b–H1c2b	109.47	N1b–C2b–H2c2b	109.47
C3b–C2b–H1c2b	109.47	C3b–C2b–H2c2b	109.47
H1c2b–C2b–H2c2b	108.78	C2b–C3b–H1c3b	109.47
C2b–C3b–H2c3b	109.47	C2b–C3b–H3c3b	109.47
H1c3b–C3b–H2c3b	109.47	H1c3b–C3b–H3c3b	109.47
H2c3b–C3b–H3c3b	109.47	Cl3e'–N1c–C1c	105.8(12)
Cl3e'–N1c–C2c	78.3(11)	C1c–N1c–C2c	175.9(17)
Pt1a–C1c–N1c	171(2)	N1c–C2c–C3c	110(2)
N1c–C2c–H1c2c	109.47	N1c–C2c–H2c2c	109.47
C3c–C2c–H1c2c	109.47	C3c–C2c–H2c2c	109.47
H1c2c–C2c–H2c2c	108.78	C2c–C3c–H1c3c	109.47
C2c–C3c–H2c3c	109.47	C2c–C3c–H3c3c	109.47
H1c3c–C3c–H2c3c	109.47	H1c3c–C3c–H3c3c	109.47
H2c3c–C3c–H3c3c	109.47	C1d–N1d–C2d	175.9(15)
Pt2a–C1d–N1d	171.0(16)	N1d–C2d–C3d	110.2(18)
N1d–C2d–H1c2d	109.47	N1d–C2d–H2c2d	109.47
C3d–C2d–H1c2d	109.47	C3d–C2d–H2c2d	109.47
H1c2d–C2d–H2c2d	108.78	C2d–C3d–H1c3d	109.47
C2d–C3d–H2c3d	109.47	C2d–C3d–H3c3d	109.47
H1c3d–C3d–H2c3d	109.47	H1c3d–C3d–H3c3d	109.47
H2c3d–C3d–H3c3d	109.47	C4a–N2a–C5a	135(2)
Pt1b–C4a–Pt2b	77.1(9)	Pt1b–C4a–N2a	144(2)
Pt2b–C4a–N2a	137(2)	N2a–C5a–C6a	113(2)
N2a–C5a–H1c5a	109.47	N2a–C5a–H2c5a	109.47

C6a–C5a–H1c5a	109.47	C6a–C5a–H2c5a	109.47
H1c5a–C5a–H2c5a	106.02	C5a–C6a–H1c6a	109.47
C5a–C6a–H2c6a	109.47	C5a–C6a–H3c6a	109.47
H1c6a–C6a–H2c6a	109.47	H1c6a–C6a–H3c6a	109.47
H2c6a–C6a–H3c6a	109.47	C4b–N2b–C5b	135(7)
Pt1b–C4b–Pt2b	79.2(12)	Pt1b–C4b–N2b	137(4)
Pt2b–C4b–N2b	144(4)	N2b–C5b–C6b	113(8)
N2b–C5b–H1c5b	109.47	N2b–C5b–H2c5b	109.47
C6b–C5b–H1c5b	109.47	C6b–C5b–H2c5b	109.47
H1c5b–C5b–H2c5b	106.02	C5b–C6b–H1c6b	109.47
C5b–C6b–H2c6b	109.47	C5b–C6b–H3c6b	109.47
H1c6b–C6b–H2c6b	109.47	H1c6b–C6b–H3c6b	109.47
H2c6b–C6b–H3c6b	109.47	C4c–N2c–C5c	135(7)
Pt1a–C4c–Pt2a	80.7(14)	Pt1a–C4c–N2c	137(4)
Pt2a–C4c–N2c	142(4)	N2c–C5c–C6c	113(8)
N2c–C5c–H1c5c	109.47	N2c–C5c–H2c5c	109.47
C6c–C5c–H1c5c	109.47	C6c–C5c–H2c5c	109.47
H1c5c–C5c–H2c5c	106.02	C5c–C6c–H1c6c	109.47
C5c–C6c–H2c6c	109.47	C5c–C6c–H3c6c	109.47
H1c6c–C6c–H2c6c	109.47	H1c6c–C6c–H3c6c	109.47
H2c6c–C6c–H3c6c	109.47	C4d–N2d–C5d	135(8)
Pt1a–C4d–Pt2a	77.7(13)	Pt1a–C4d–N2d	142(4)
Pt2a–C4d–N2d	140(4)	N2d–C5d–C6d	113(9)
N2d–C5d–H1c5d	109.47	N2d–C5d–H2c5d	109.47
C6d–C5d–H1c5d	109.47	C6d–C5d–H2c5d	109.47
H1c5d–C5d–H2c5d	106.02	C5d–C6d–H1c6d	109.47
C5d–C6d–H2c6d	109.47	C5d–C6d–H3c6d	109.47
H1c6d–C6d–H2c6d	109.47	H1c6d–C6d–H3c6d	109.47
H2c6d–C6d–H3c6d	109.47		

Symmetry operations for equivalent atoms
' x+2,y+1,z+1