

Metal-involving $C \cdots d_z^2$ -Pt^{II} Tetrel Bonding as a Principal Component of Stacking Interaction between Arenes and the Platinum(II) Square-plane

Eugene A. Katlenok,*¹ Maxim L. Kuznetsov,² Anton V. Cherkasov³, Dmitry M. Kryukov,¹
Nadezhda A. Bokach,¹ Vadim Yu. Kukushkin*^{1,4}

¹*Institute of Chemistry, Saint Petersburg State University, Universitetskaya Nab. 7/9, 199034 Saint Petersburg, Russian Federation; e-mail: v.kukushkin@spbu.ru*

²*Centro de Química Estrutural, Institute of Molecular Sciences, Departamento de Engenharia Química, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1049-001 Lisboa, Portugal*

³*G. A. Razuvaev Institute of Organometallic Chemistry of Russian Academy of Sciences, Tropinina Str. 49, 603950 Nizhny Novgorod, Russian Federation*

⁴*Laboratory of Crystal Engineering of Functional Materials, South Ural State University, 76, Lenin Av., 454080 Chelyabinsk, Russian Federation*

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1. Crystal data and structure refinement

Table S1. Crystal data and structure refinement for **1·(OFA)₂**, **1·C₆F₆**, and **2·C₆F₆**.

Identification code	1·(OFA)₂	1·C₆F₆	2·C₆F₆
Empirical formula	C ₅₈ H ₂₈ F ₈ N ₄ O ₂ Pt ₂ S ₄	C ₅₀ H ₂₈ F ₆ N ₄ Pt ₂ S ₄	C ₄₂ H ₂₄ F ₆ N ₄ Pt ₂ S ₄
Formula weight	1483.26	1317.18	1217.07
Temperature/K	100(2)	100.0(5)	100.00(10)
Crystal system	triclinic	monoclinic	monoclinic
Space group	P-1	C2/c	P2/n
a/Å	10.7456(2)	10.02350(10)	10.0312(2)
b/Å	14.0684(2)	29.0365(4)	11.5989(2)
c/Å	16.9039(3)	15.6254(2)	16.5342(3)
α/°	87.4668(13)	90	90
β/°	83.8451(15)	105.9290(10)	98.669(2)
γ/°	70.6288(18)	90	90
Volume/Å ³	2396.78(8)	4373.11(10)	1901.79(6)
Z	2	4	2
ρ _{calc} /cm ³	2.055	2.001	2.125
μ/mm ⁻¹	13.117	14.166	16.211
F(000)	1424.0	2520.0	1156.0
Crystal size/mm ³	0.17 × 0.14 × 0.11	0.07 × 0.06 × 0.03	0.15 × 0.12 × 0.1
Radiation	CuKα (λ = 1.54184)	Cu Kα (λ = 1.54184)	Cu Kα (λ = 1.54184)
2θ range for data collection/°	5.258 to 133.202	6.088 to 141.402	7.622 to 139.996
Index ranges	-12 ≤ h ≤ 12, -16 ≤ k ≤ 11, -20 ≤ l ≤ 19	-12 ≤ h ≤ 11, -35 ≤ k ≤ 33, -18 ≤ l ≤ 19	-12 ≤ h ≤ 12, -9 ≤ k ≤ 14, -20 ≤ l ≤ 20
Reflections collected	16859	14582	15928
Independent reflections	16859 [R _{int} = n/a, R _{sigma} = 0.0209]	4181 [R _{int} = 0.0384, R _{sigma} = 0.0307]	3607 [R _{int} = 0.0394, R _{sigma} = 0.0333]
Data/restraints/parameters	16859/0/704	4181/180/342	3607/0/252
Goodness-of-fit on F ²	1.015	1.034	1.035
Final R indexes [I ≥ 2σ(I)]	R ₁ = 0.0540, wR ₂ = 0.1545	R ₁ = 0.0275, wR ₂ = 0.0719	R ₁ = 0.0298, wR ₂ = 0.0750
Final R indexes [all data]	R ₁ = 0.0626, wR ₂ = 0.1651	R ₁ = 0.0288, wR ₂ = 0.0729	R ₁ = 0.0314, wR ₂ = 0.0762
Largest diff. peak/hole / e Å ⁻³	2.86/-1.51	2.09/-0.81	2.54/-1.24
CCDC Nos	2245750	2245749	2245751

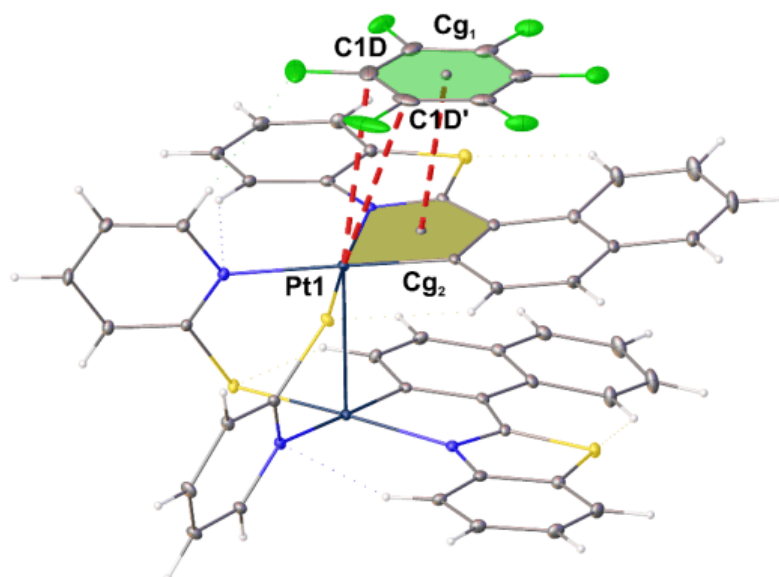


Figure S1. A fragment of the crystal structure of $1 \cdot \text{C}_6\text{F}_6$. Short contacts are given by dotted lines and thermal ellipsoids are shown at the 50% probability level

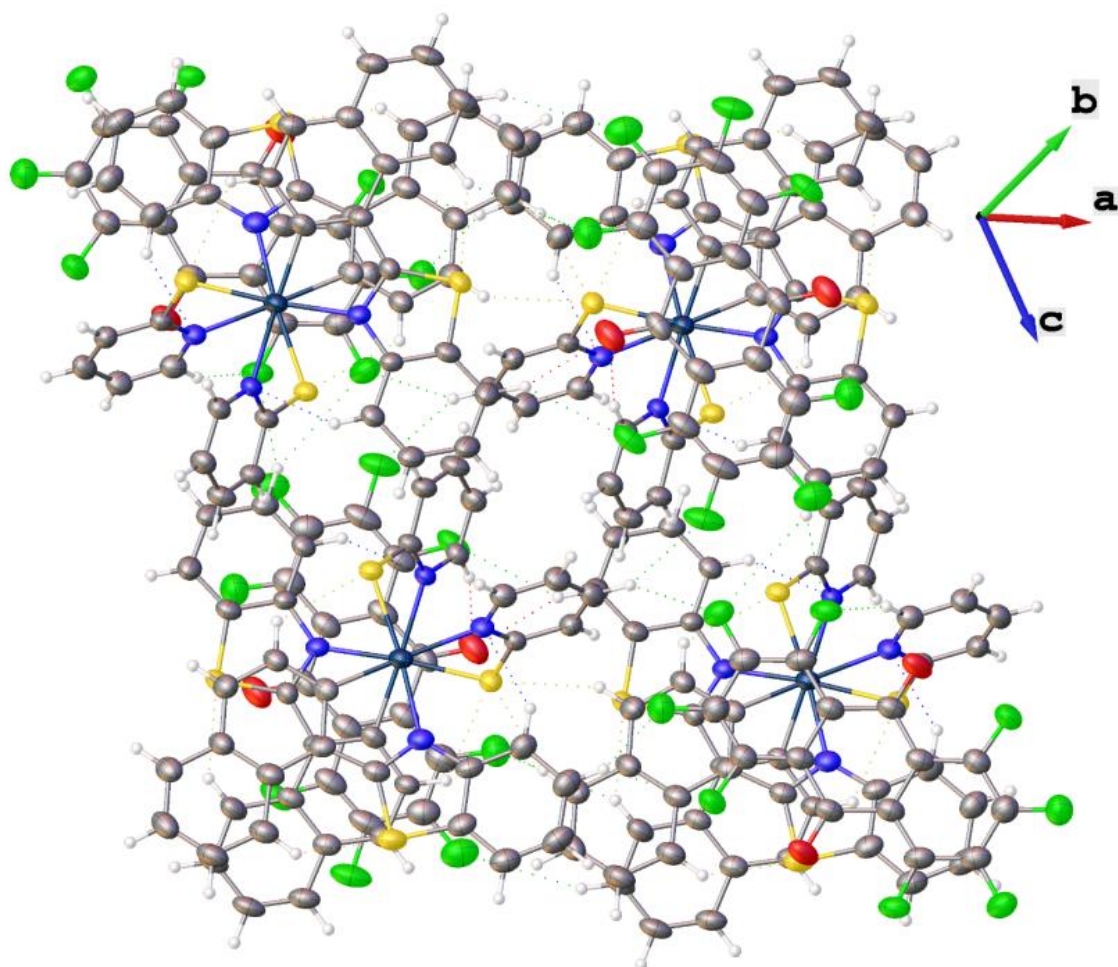


Figure S2. A fragment of the crystal packing of $1 \cdot (\text{OFA})_2$.

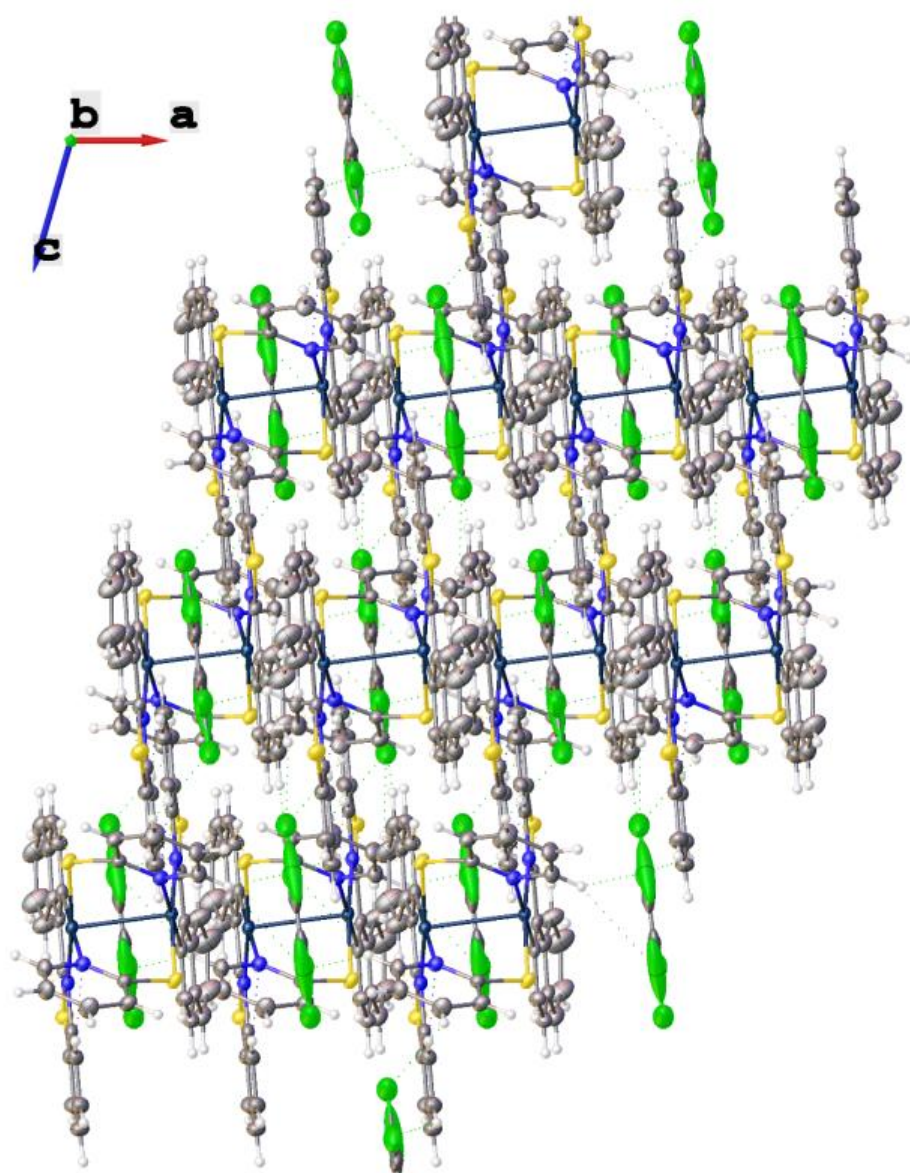


Figure S3. A fragment of the crystal packing of $1 \cdot \text{C}_6\text{F}_6$.

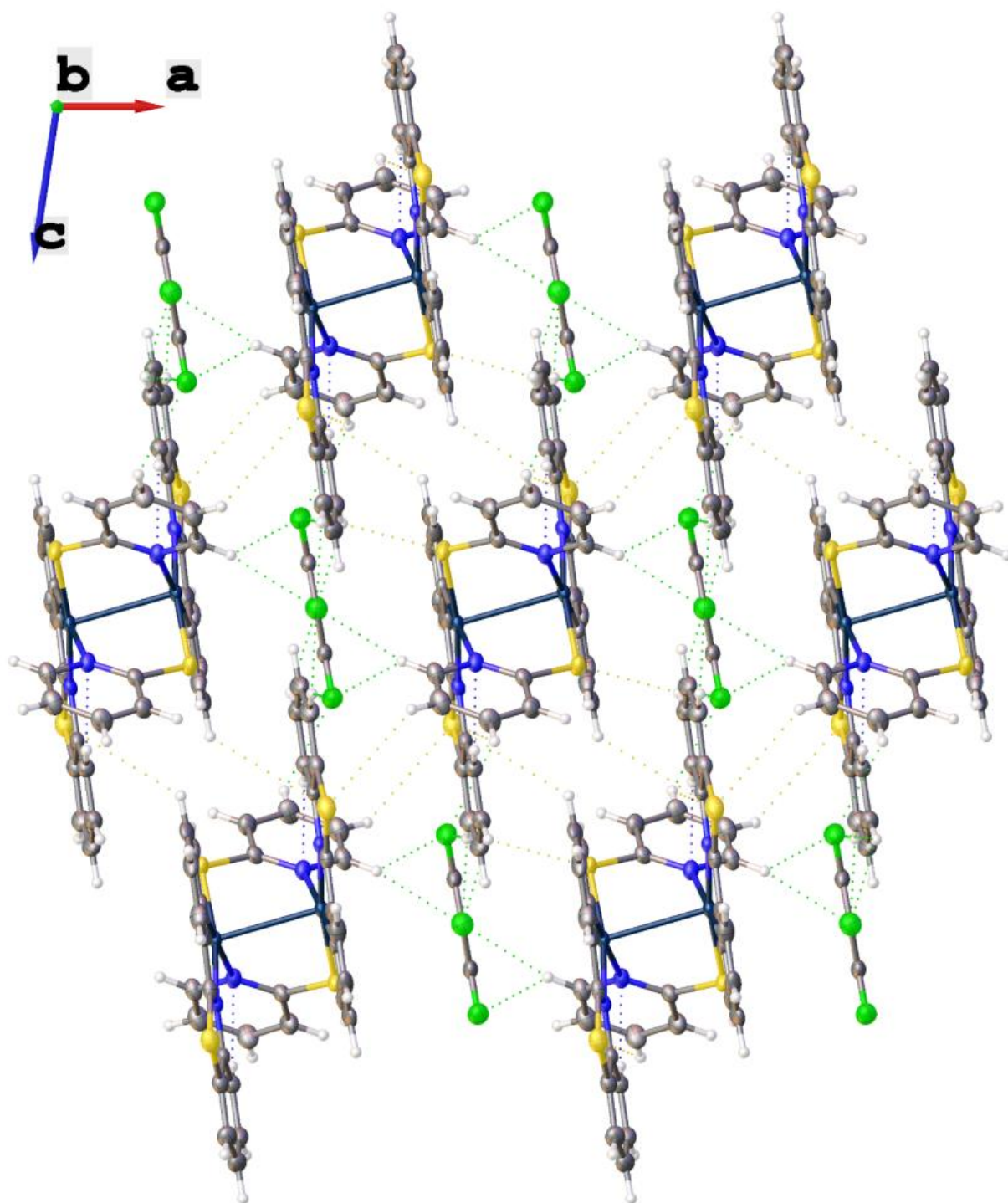


Figure S4. A fragment of the crystal packing of $2 \cdot \text{C}_6\text{F}_6$.

2. CSD search for π -hole···M contacts

We analyzed the Cambridge Structural Database¹ (CSD version 5.43 updates March, 2022; search and processing was carried out in the program ConQuest version 2022.2.0) (Table S2) to demonstrate the occurrence of short contacts between a π -hole and a metal ion. The search was

carried out based on the following three geometrical parameters: (i) $Cg \cdots M$ distances were set in the range from 3.0 to 4.5 Å (where Cg is centroid of an aromatic ring; M is a transition metal in a square-planar environment), (ii) the angle between the normal of the aromatic ring varied from 0 to 45°; (iii) only structures with halogen substituents at an aromatic ring were considered. Notably, C(isocyanide) $\cdots M$ contacts can also be considered as π -hole $\cdots M$ interaction and we found several examples of relevant contacts in CSD (**Table S2**, group 3). We did consider not include these results because of the difference of C(isocyanide) $\cdots M$ contacts from contacts involving aromatic ring π -hole; the latter are closer to structures obtained in this work.

According to these criteria, we revealed 60 structures with π -hole $\cdots M$ short contacts; they were divided into two groups. The first group consists of 33 structures (blue dots, **Figure S5** and **Table S2**, group 1) of cocrystals formed on cocrystallization of perfluoro(het)arenes (including substituted fluorinated derivatives) with mononuclear platinum(II), palladium(II), nickel(II), copper(II), and gold(I) complexes. In this group, typical π -hole $\cdots M$ separations are of 3.2–4.2 Å with the angles in the range 0–35°.

The second group (27 structures, black dots, **Figure S2**) includes contacts in the crystal structures of metal complexes and metalloporphyrins bearing perfluoroaromatic ligands.² These contacts are most likely induced by crystal packing effects as follows from more diffuse character of the scatter in bond lengths and angles (3.3–4.6 Å and 6–44°). All identified contacts include only mononuclear Pt^{II}, Pd^{II}, Ni^{II}, and Au^{III} complexes, while binuclear (or higher) complexes functioning as acceptors of π -hole $\cdots [M-M]$ interactions were not found.

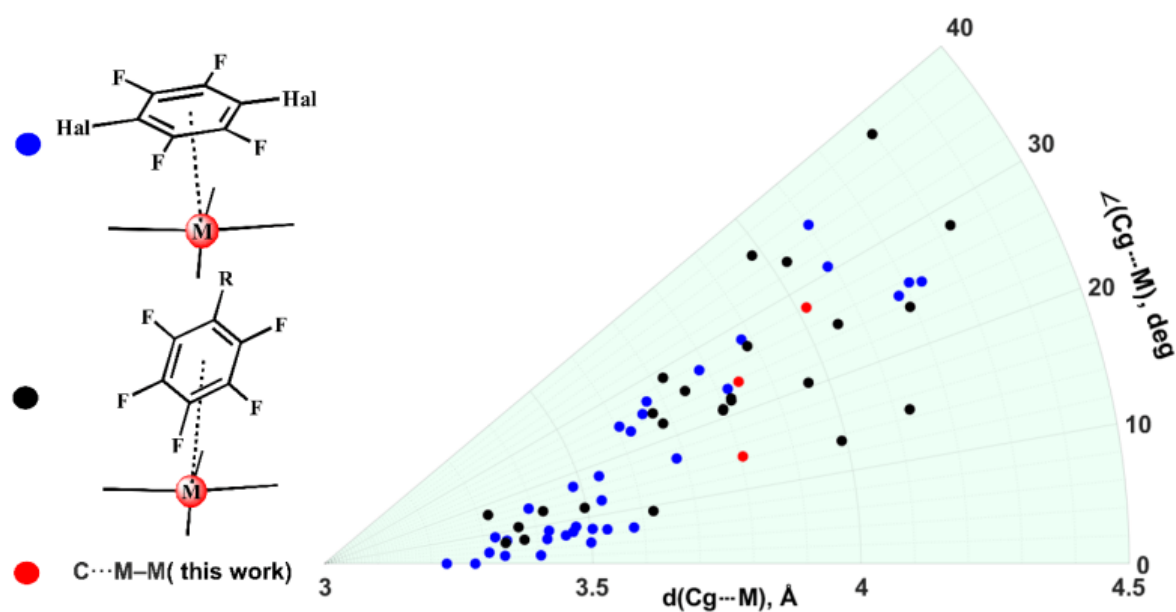
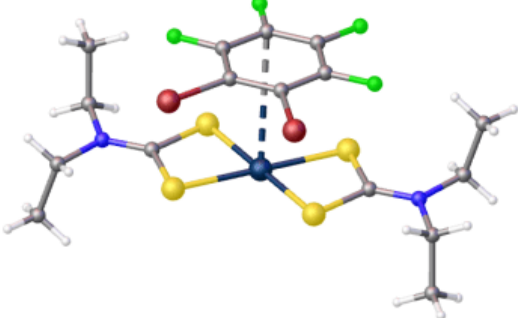
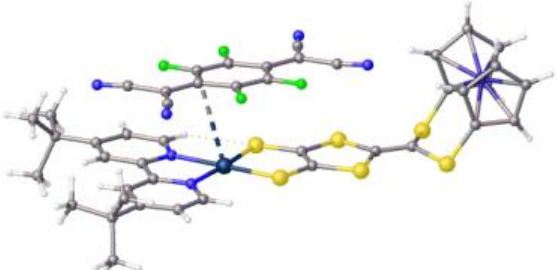
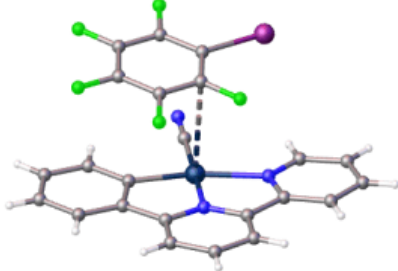
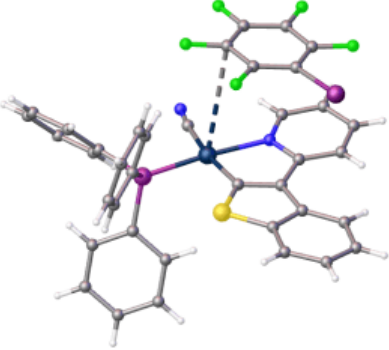
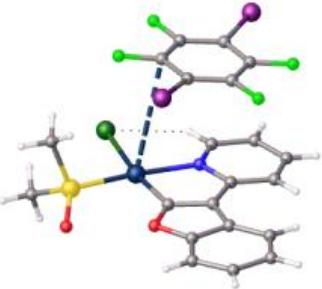
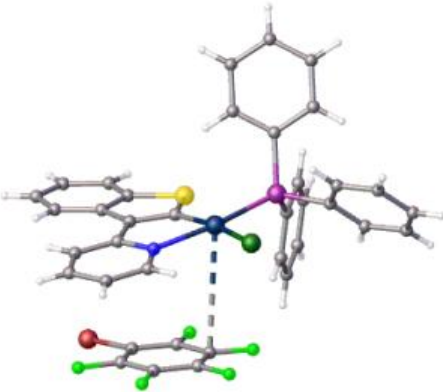


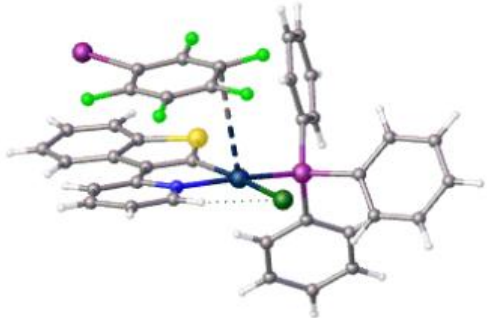
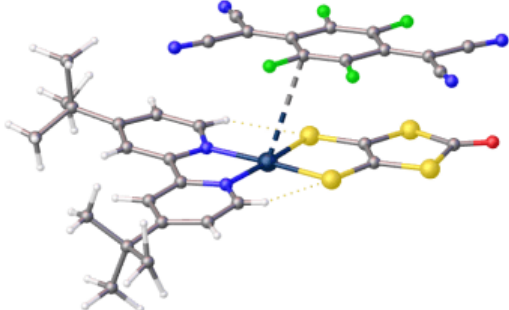
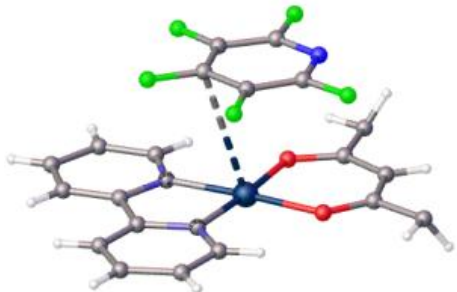
Figure S5. Angular distribution for intermolecular π -hole $\cdots M$ contacts retrieved from the CSD. The distances were set as the range between 3.0 and 4.5 Å, while the angularity was set in the 0–

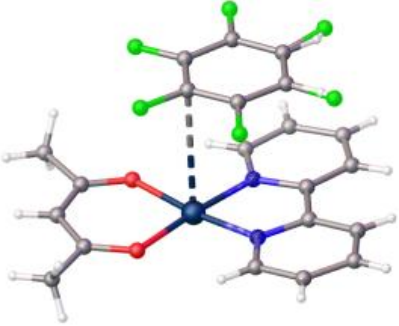
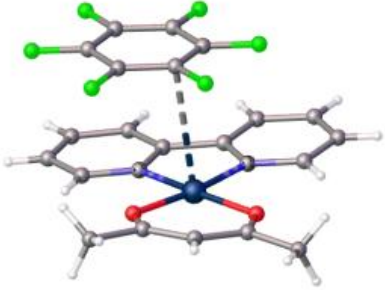
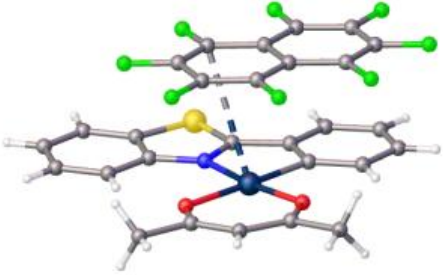
40° range. R factor $\leq 6\%$.

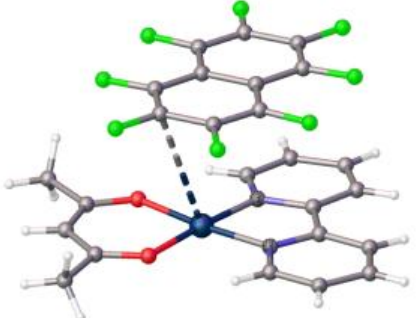
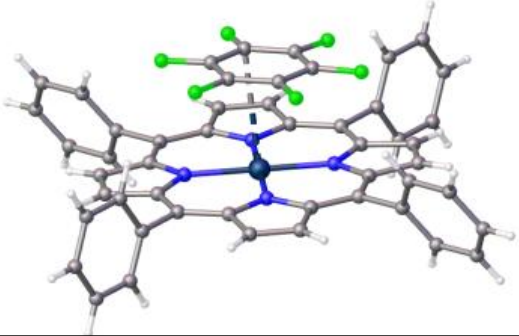
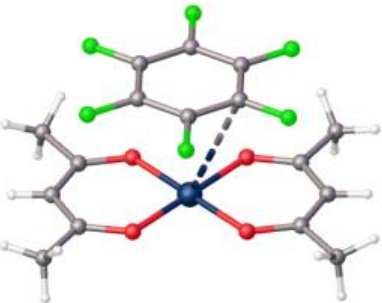
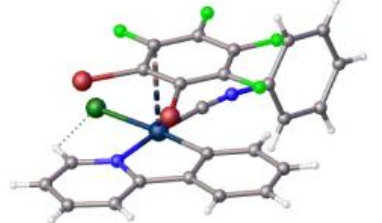
Table S2. Results of CSD search for π -hole \cdots M contacts.

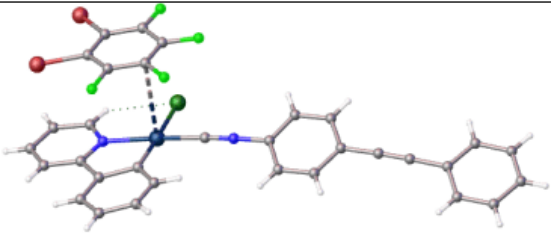
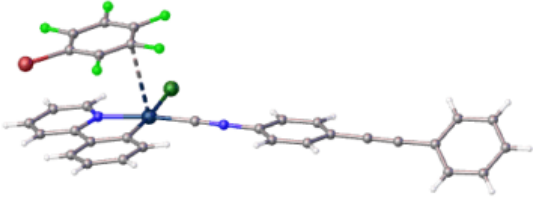
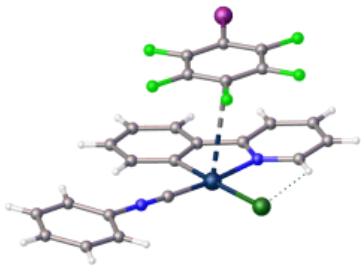
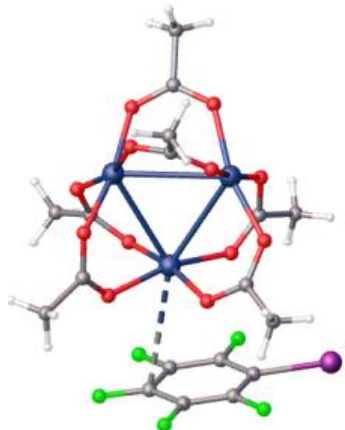
	Refcode	d(C \cdots M), Å	d(Cg \cdots M), Å	Θ (Cg \cdots M), $^\circ$	d(C \cdots M)/ Σ AvdW	Type of interaction	Ref
Group 1 (X-C \cdots M), X= Hal							
M = Pt							
	FEBLAD	3.584(5)	3.4677(16)	7.30	0.883	Classified as π - hole \cdots Pt ^{II} interaction	³
	GEMWUS	3.543(11)	3.418	6.29	0.873	Classified by as π - π stacking	⁴
	JUXBIQ	3.3418(16)	3.622	23.347	0.823	Classified as π - hole \cdots Pt ^{II} interactions	⁵

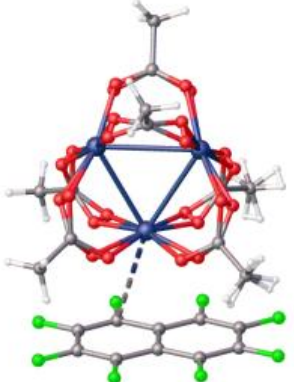
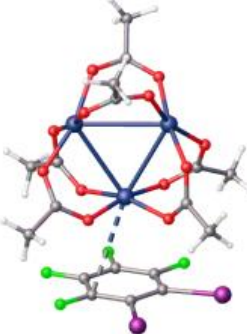
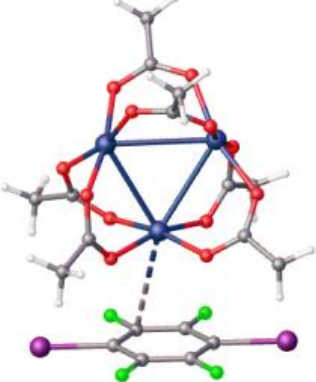
	MIRHIH	3.8456(14)	4.209	25.674	0.947	Classified as π - π stacking	6
	MIRHUT	3.6930(15)	4.089	30.529	0.910	Classified as π - π stacking	6
	NUQTEA	3.863(3)	4.231	25.273	0.951	Classified as π - π stacking	7

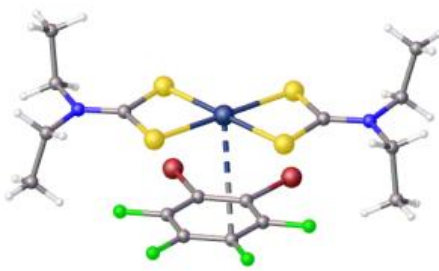
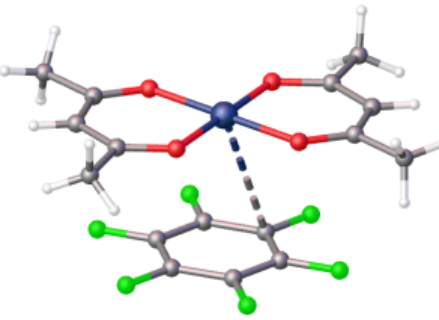
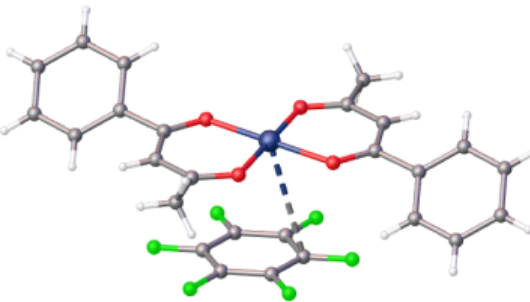
	NUQTIE	3.8332(16)	4.181	24.98	0.944	Classified as π - π stacking	7
	OJIXEK	3.528(8)	4.101	34.97	0.869	Classified as π -interactions	8
	PUNNIY	3.405(3)	3.322	8.78	0.839	Classified as π -hole \cdots Pt ^{II} interaction	9

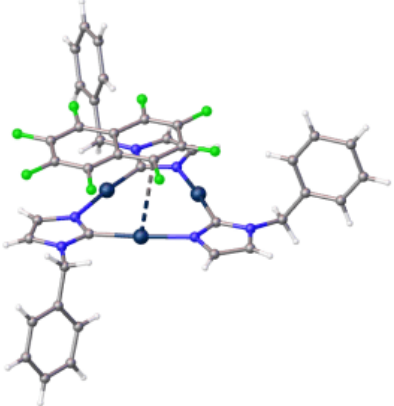
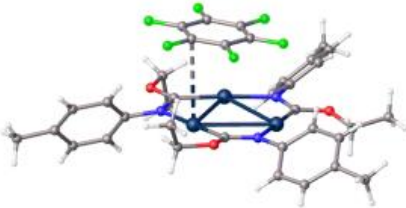
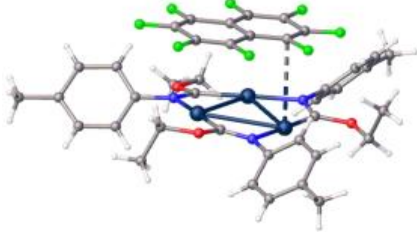
	PUNNUK	3.347(5)	3.655	25.171	0.824	Classified as π -hole \cdots Pt ^{II} interaction	⁹
	PUNPAS	3.316(4)	3.606	24.915	0.817	Classified as π -hole \cdots Pt ^{II} interaction	⁹
	PUNPEW	3.576(9)	3.343(5)	7.18	0.881	Classified as π -hole \cdots Pt ^{II} interaction	⁹

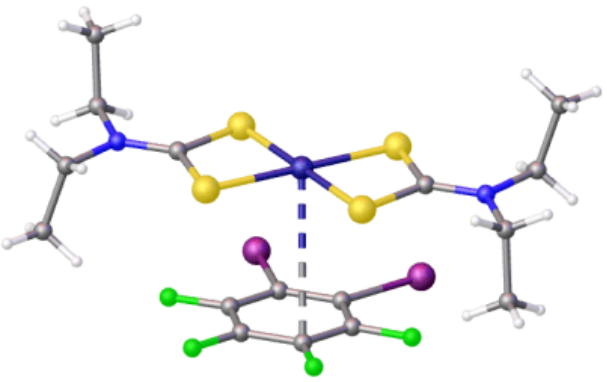
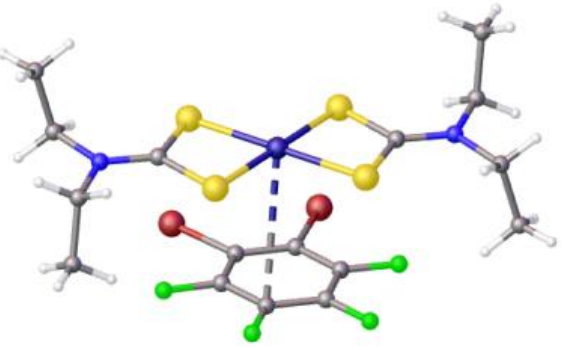
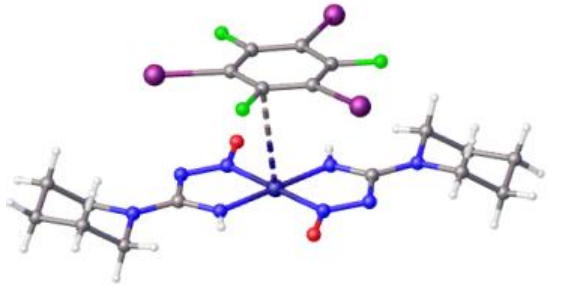
	PUNPIA	3.563(4)	3.3371(14)	2.50	0.878	Classified as π -hole \cdots Pt ^{II} interaction	⁹
	RIRKOV	3.329(5)	3.394	15.075	0.820	Classified as π -hole \cdots Pt ^{II} interaction	¹⁰
	RIRMEN	3.557(2)	3.28125(15)	0	0.876	Classified as π -hole \cdots Pt ^{II} interaction	¹⁰
	ULUZIN	3.555(5)	3.882	28.246	0.876	Classified as π -hole \cdots Pt ^{II} interaction	¹¹

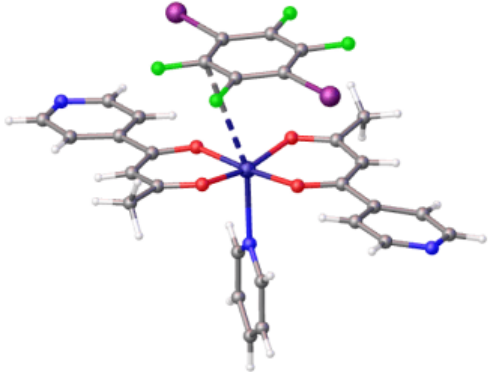
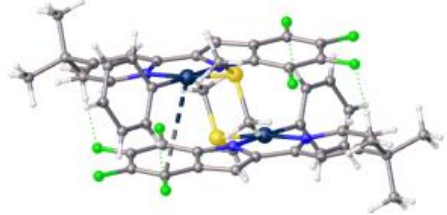
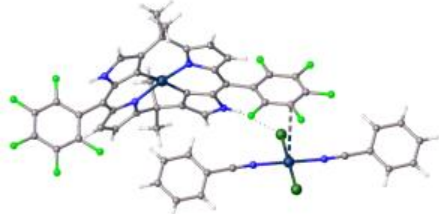
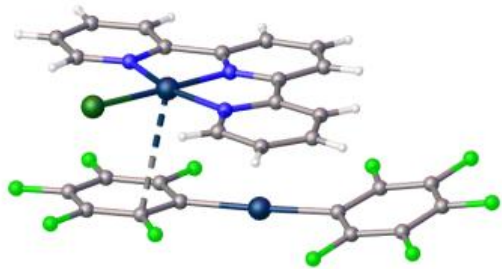
	ULUZOT	3.394(7)	3.537	17.671	0.836	Classified as π -hole \cdots Pt ^{II} interaction	¹¹
	ULUZUZ	3.489(5)	3.53	12.847	0.859	Classified as π -hole \cdots Pt ^{II} interaction	¹¹
	UMACAP	3.456(5)	3.786	27.289	0.851	Classified as π -hole \cdots Pt ^{II} interaction	¹¹
M = Pd							
	CANZEA	3.56(1)	3.474	8.35	0.908	Classified as π -hole \cdots Pd ^{II} interaction	¹²

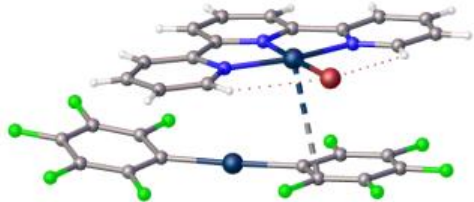
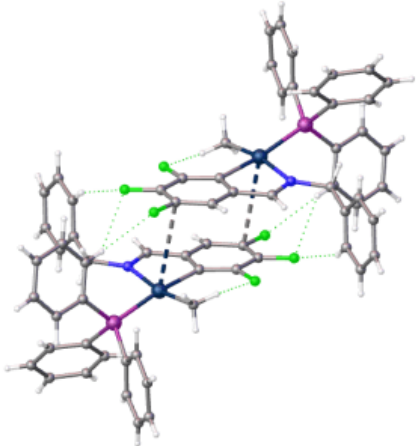
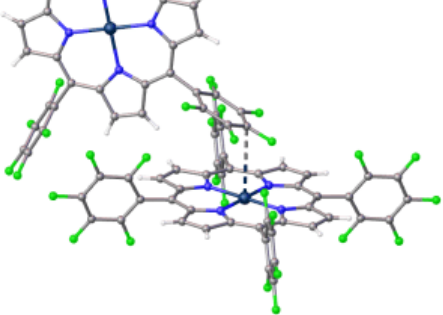
	CANZOK	3.577(3)	3.485	17.17	0.913	Classified as π -hole \cdots Pd ^{II} interaction	12
	CAPBAA	3.507(3)	3.308	3.83	0.895	Classified as π -hole \cdots Pd ^{II} interaction	12
	CAPBEE	3.641(4)	3.404	2.21	0.929	Classified as π -hole \cdots Pd ^{II} interaction	12

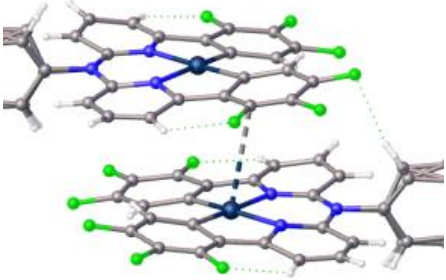
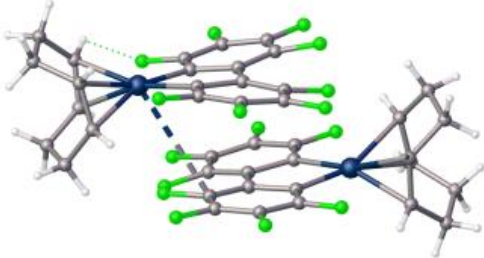
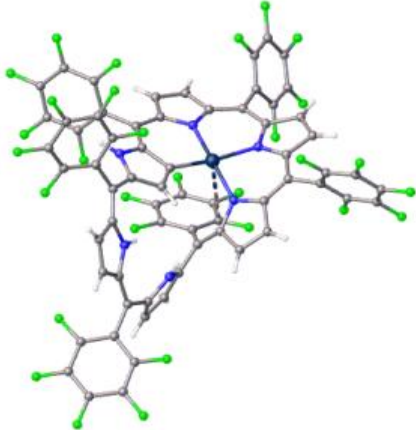
	FEBKUW	3.581(4)	3.4527(13)	6.66	0.914	Classified as π -hole \cdots Pd ^{II} interaction	³
	RIRMAJ	3.5119(8)	3.228(15)	0	0.896	Classified as π -hole \cdots Pd ^{II} interaction	¹⁰
	RIRMIR	3.423(2)	3.32670(7)	8.349	0.873	Classified as π -hole \cdots Pd ^{II} interaction	¹⁰
M = Au							

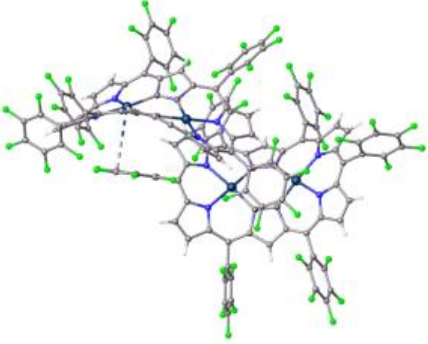
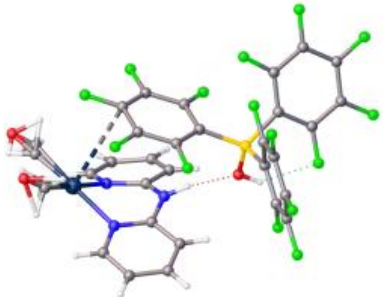
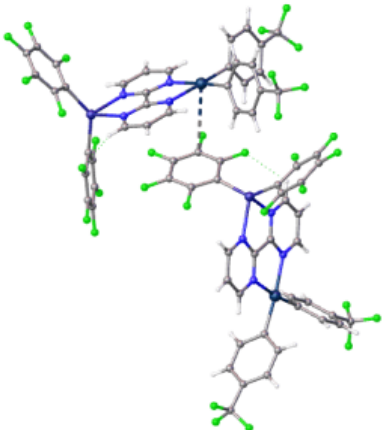
	EKUJAW	3.364(9)	3.672	26.71	0.822	Classified as π -acid–base interactions	¹³
	VOQCAF	3.545(8)	3.685	16.62	0.867	Classified as π -acid–base interactions	¹⁴
	XASNOV	3.516(12)	3.819(5)	23.42	0.860	Classified as π -interactions	¹⁵
M = Ni							

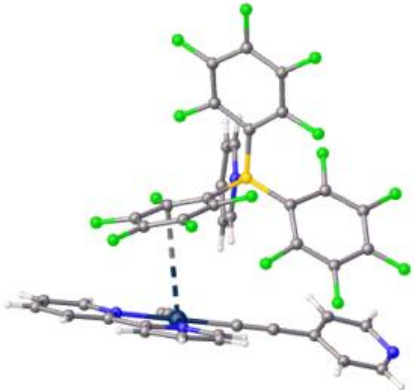
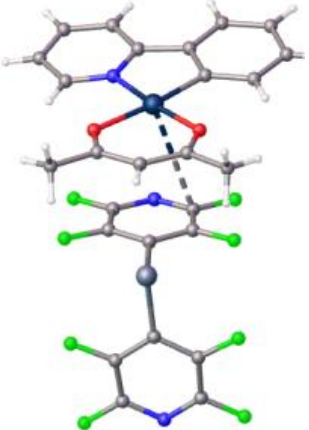
	FEBKIK	3.668(3)	3.4988(10)	4.52	0.880	Classified as π -hole \cdots Ni ^{II} interaction	³
	FEBKOQ	3.576(3)	3.4532(10)	6.67	0.858	Classified as π -hole \cdots Ni ^{II} interaction	³
	LAGHUA	3.591(4)	3.504	7.382	0.861	This contact was not mentioned in the original article	¹⁶
M = Cu							

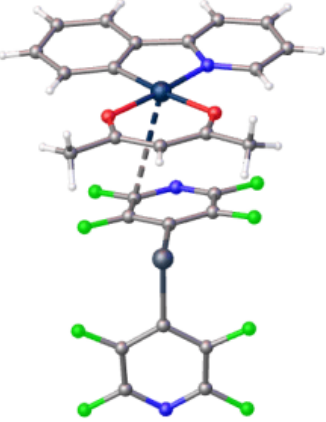
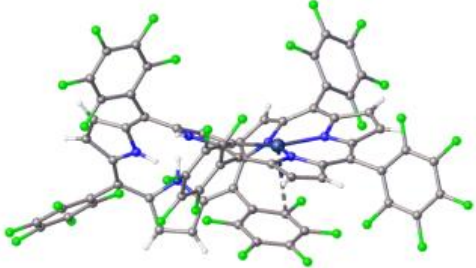
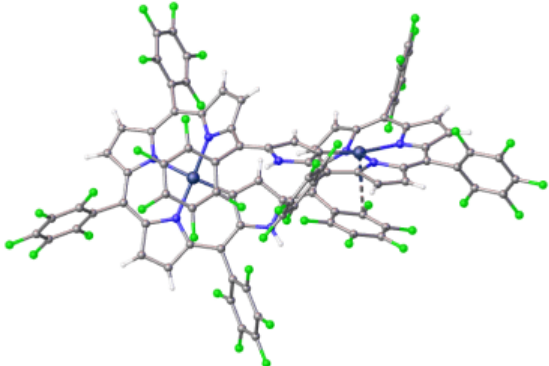
	PEHVEH	3.632(3)	3.5312(11)	6.91	0.875	Classified as π -hole \cdots Cu interaction	17
Group 2 (F-C \cdots M)							
M = Pt							
	ACUZUW	3.930(2)	4.1917(9)	23.66	0.968	This contact was not mentioned in the original article	18
	ADELED	3.493(9)	3.886	27.207	0.860	This contact was not mentioned in the original article	19
	AVEWAA	3.399(3)	3.368	10.65	0.837	Classified as π -stacking and Coulomb forces	20

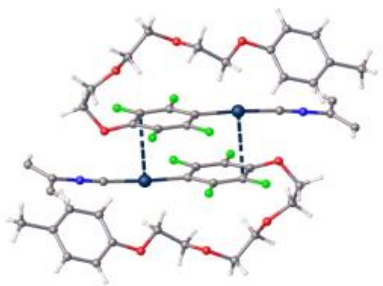
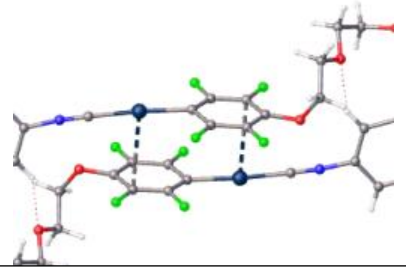
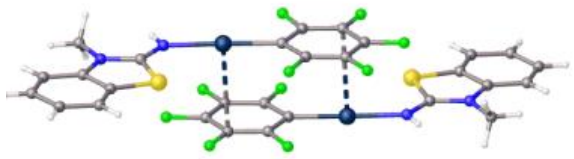
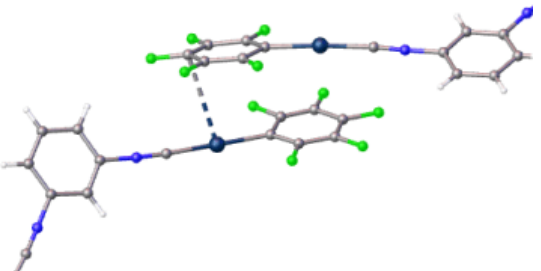
	AVEWEE	3.435(4)	3.419	13.492	0.846	Classified as π -stacking and Coulomb forces	20
	BACXEJ	3.746(6)	4.056(2)	25.0	0.923	These contacts were not mentioned in the original article	21
	BARVEW	3.56(1)	4.357	44.284	0.877	This contact was not mentioned in the original article	2

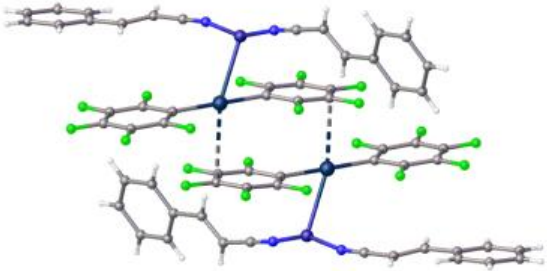
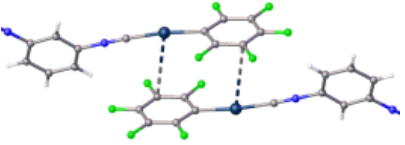
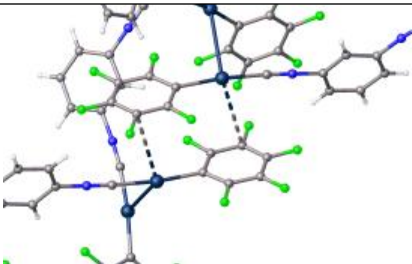
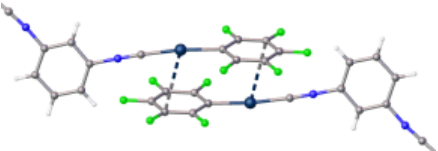
	CIZPAF	3.44(4)	3.982(14)	35.76	0.847	Classified as Pt- π interactions	22
	DIFHIM	3.792(2)	4.577	43.69	0.934	This contact was not mentioned in the original article	23
	KISYER	3.274(7)	4.128	14.764	0.806	This contact was not mentioned in the original article	24

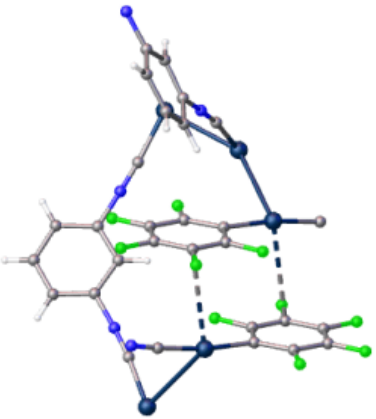
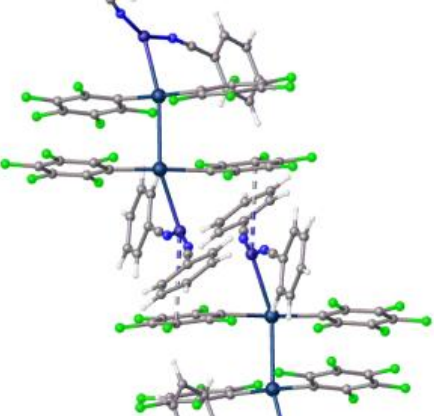
	LURFAI	3.963(11)	4.238(4)	20.49	0.976	This contact was not mentioned in the original article	25
	SAXVAP	3.542(4)	4.029	33.115	0.872	This contact was not mentioned in the original article	26
	ULAYAJ	3.665(13)	4.297	38.079	0.903	This contact was not mentioned in the original article	27

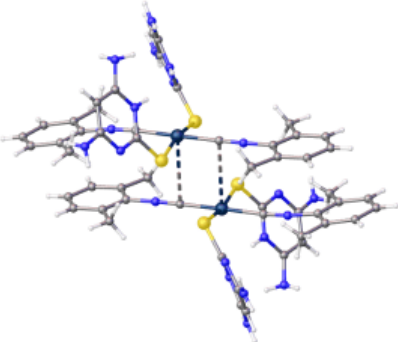
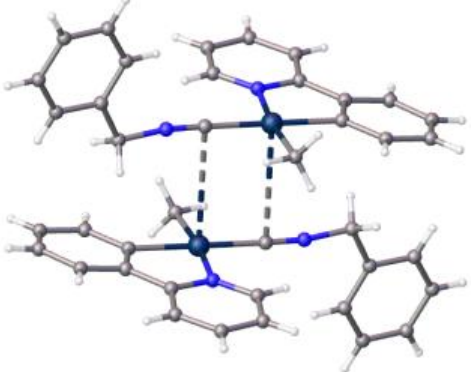
	UWIBIN	3.905(3)	4.326	28.387	0.962	Classified as Pt-Pt and/or π - π interactions	11
	VALVUD	3.512(5)	3.3755(17)	6.81(12)	0.865	This contact was not mentioned in the original article	28

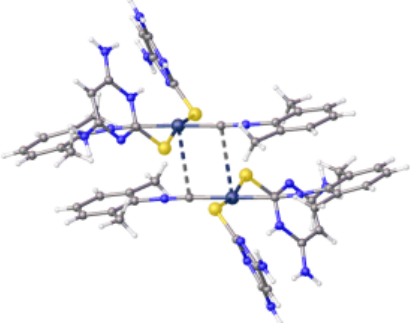
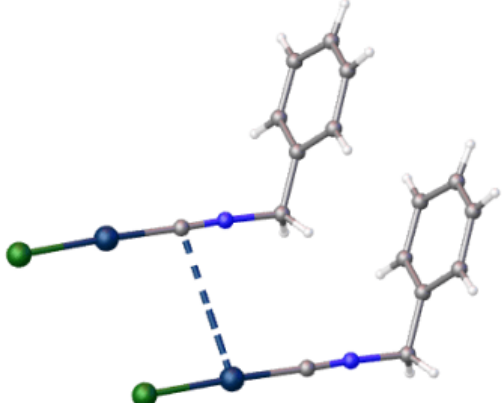
	VALWAK	3.551(7)	3.340(2)	6.54	0.875	This contact was not mentioned in the original article	28
M = Pd							
	KAHLUC	3.289(5)	3.991	13.351	0.839	This contact was not mentioned in the original article	29
	KISXOA	3.389(5)	3.318(2)	16.58	0.865	This contact was not mentioned in the original article	24

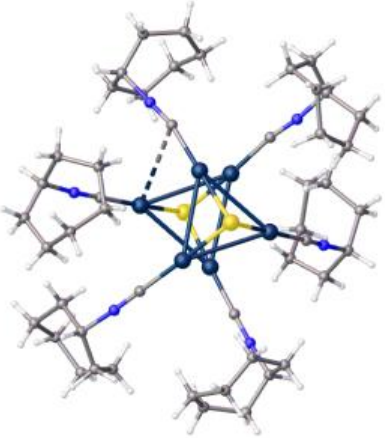
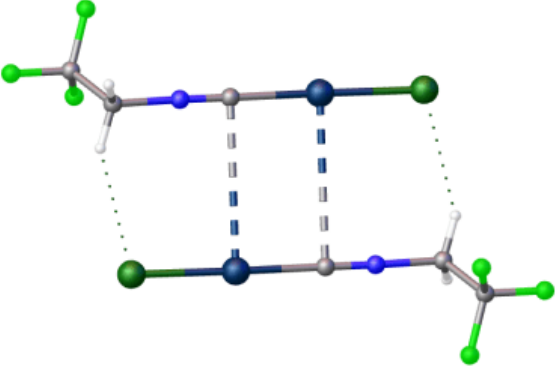
	DEFRUE01	3.403(6)	3.745	25.58	0.832	Classified as π -hole \cdots Au interactions	³⁰
	DEFSEP	3.404(13)	3.683	22.47	0.832	Classified as π -hole \cdots Au interactions	³⁰
	OLIKUQ	3.346(6)	3.673(2)	24.59	0.818	This contact was not mentioned in the original article	³¹
	TEDSID	3.501(11)	3.496(4)	12.11	0.856	Classified by the authors as Au- π interactions, π - π stacking	³²

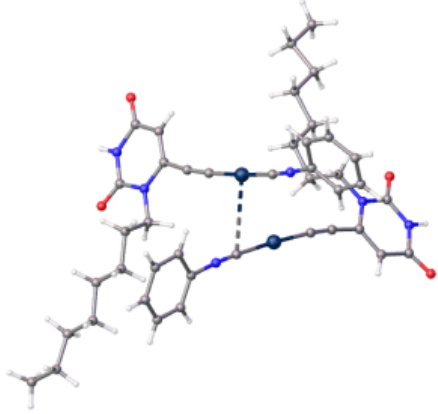
	TUDCEB	3.329(4)	3.7196(17)	28.75	0.814	These contacts were not mentioned in the original article	33
	WUHJUH	3.603(5)	3.818	22.1	0.881	These contacts were not mentioned in the original article	34
	WUHKAO	3.606(5)	3.796	21.03	0.882	These contacts were not mentioned in the original article	34
	WUHKES	3.609(12)	3.817	21.84	0.882	These contacts were not mentioned in the original article	34

	WUHKUI	3.578(10)	3.797	21.16	0.875	These contacts were not mentioned in the original article	34
M = Cu							
	TUDCAX	3.688(9)	3.621(4)	9.09	0.889	These contacts were not mentioned in the original article	33
Group 3 (N-C...M)							
M = Pt							

	BOJKIX	3.537(9)	-	88.0	0.871	Classified as π -hole \cdots Pt ^{II} interactions	35
	KEJGUE	3.573(14)	-	85.5	0.880	These contacts were not mentioned in the original article; no π - π interactions observed; classified by the authors as C-H- π or C-H-Pt interactions	36
M = Pd							

	BOJJIW	3.527(3)	-	90.23°	0.900	Classified as π -hole···Pd ^{II} interactions	35
M = Au							
	BESYOQ	3.729(17)	-	100.1	0.912	This contact was not mentioned in the original article	37

	CAVMUI01	3.489(19)	-	71.1	0.853	This contact was not mentioned in the original article	38
	HUDMEY	3.644(15)	-	92.1	0.891	These contacts were not mentioned in the original article	39

	XORGES	3.556(10)	-	89.2	0.869	Classified as π - π interactions	40
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3. Computational details

3.1. Geometry

The optimization of [1·OFA·1] led to a negligible geometry distortion: the distance $Q_{Pt(A)}$ was reduced, while the $Q_{Pt(C)}$ separations increased by 0.1 Å (for $Q_{Pt(A)}$) and 0.5 Å (for $Q_{Pt(C)}$) (**Figure S5**). A similar trend was also verified for the distances, which reflect the π - π stacking between cyclometalated ligands and perfluoroarenes. Indeed, the distance between the centroids of the naphthyl fragment in complex **A** and the perfluoroarene decreases (by 0.2 Å), while the separation between- the benzothiazole fragment in complex **C** and the perfluoroarene increases (by 0.2 Å) (**Table S3**). Notably, when the optimization was performed for [1·OFA], OFA undergoes the greatest distortion of the molecular plane: two planes involving the terminal aromatic rings intersect along the central C–C direction with the torsion angle 17.6° (**Figure S7**).

The geometry parameters of the [1·OFA·1] most closely matched the geometry of the X-ray structure. The optimized geometry for [1·C₆F₆·1] exhibits a shift of the perfluoroarene toward the naphthyl fragment, as follows from an increased Q_{Pt} distance (by 0.1 Å) and π - π stacking (by 0.3 Å) between the naphthyl fragments and the C₆F₆ fragment. Considering the optimized geometries of the bimolecular and trimolecular models, it can be concluded that, in general, the geometries are similar (**Figure S6**). However, a comparison of the geometry of the bimolecular and trimolecular models with X-ray diffraction analysis shows that the geometry in the binuclear model agrees best with the experimental geometry. Finally, in the optimized structure of 2·C₆F₆, we did not observe significant changes in the geometric position of the perfluoroarene in both the bimolecular and trimolecular models. Thus, the optimized structures of the trinuclear for (1–2)·Ar^F are in a good agreement with the geometry obtained from the XRD experiments.

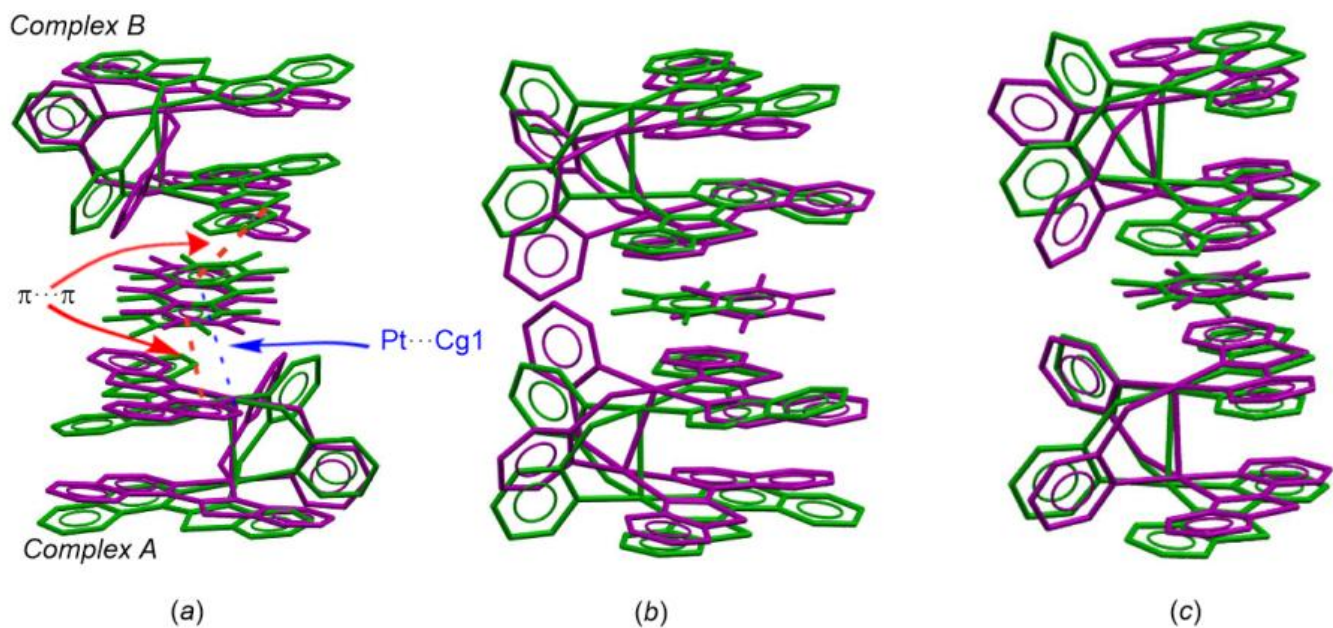


Figure S6. Overlaid images of [1·OFA·1] (a), [1·C₆F₆·1] (b), [2·C₆F₆·2] (c) in X-ray (green) and optimized (purple) geometries (hydrogen atoms were omitted for the sake of simplicity).

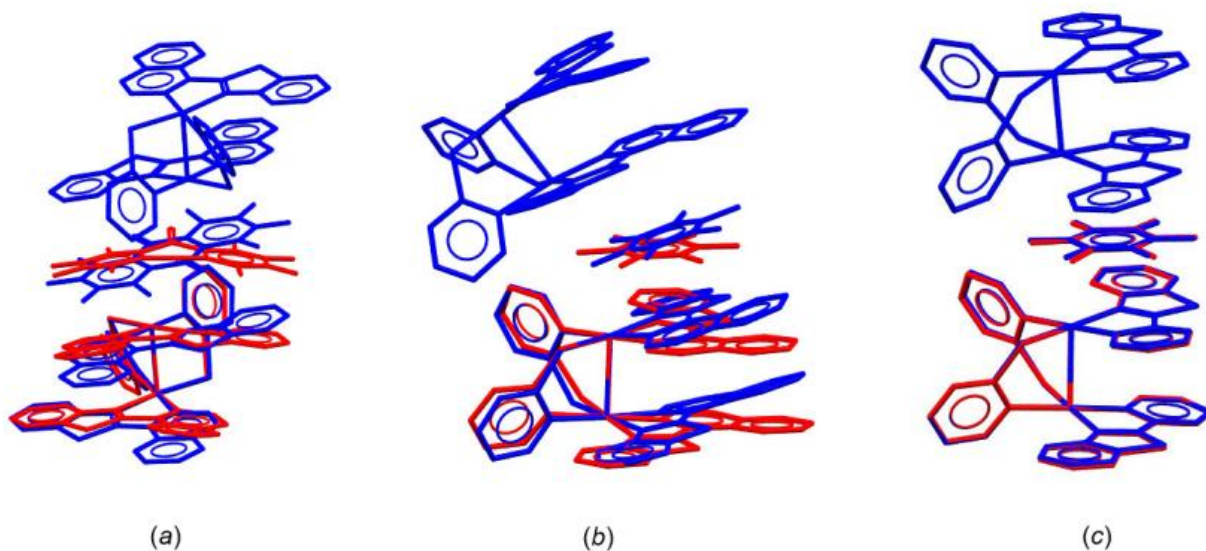


Figure S7. Overlaid images of [1·OFA·1] (a), [1·C₆F₆·1] (b), and [2·C₆F₆·2] (c) in trimolecular (blue) and bimolecular (red) optimized geometries (hydrogen atoms were omitted for the sake of simplicity).

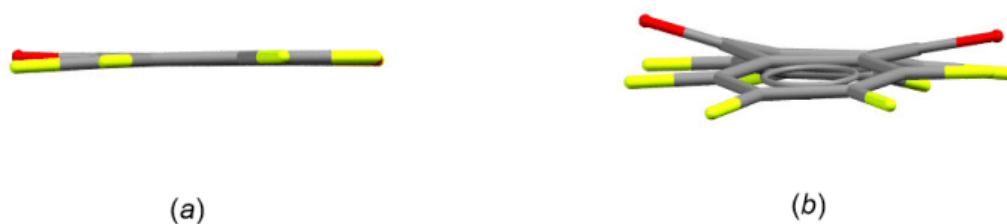


Figure S8. X-ray (a) and optimized structures (b) of OFA.

Table S3. Intermolecular distances of optimized and X-ray structures for the trimolecular and bimolecular models [(1/2)·Ar^F]

	Pt(A, B)···Cg1, Å	M···C, Å	Q _{Pt} , Å	π-π, Å
[1·OFA·1] (X-ray)	3.805	3.755	3.653	3.548* 3.548**
[1·OFA·1]	3.817 3.852	3.474 3.487	3.507 3.520	3.309* 3.720**
[1·OFA]	4.163	3.727	3.501	3.327* 3.323**
[1·C ₆ F ₆ ·1] (X-ray)	3.996 3.996	3.642 3.642	3.412	3.695* 3.695*
[1·C ₆ F ₆ ·1]	4.301 4.289	3.541 3.548	3.296 3.206	3.387* 3.374*
[1·C ₆ F ₆ ·]	3.747	3.354	3.231	3.501*
[2·C ₆ F ₆ ·2] (X-ray)	3.843 3.843	3.351	3.6122	3.458** 3.457**
[2·C ₆ F ₆ ·2]	3.682 3.682	3.357 3.364	3.305 3.294	3.520** 3.516**
[2·C ₆ F ₆ ·]	3.668	3.346	3.264	3.553**

* – the distance between the centroids of the naphthyl fragment of the C^N ligand and Ar^F

** – the distance between the centroids of the benzothiazole fragment of the C^N ligand and Ar^F

3.2. QTAIM

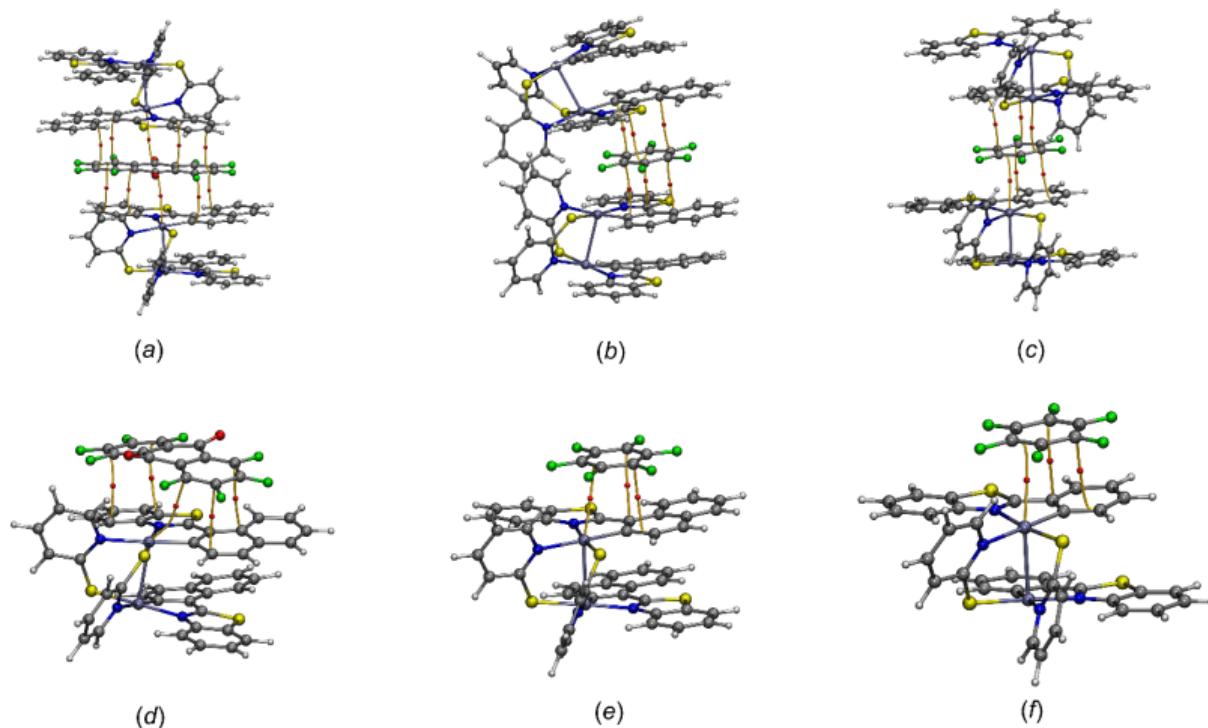


Figure S9. QTAIM distribution of bond critical points (red) and bond paths for (a) [1·OFA·1]; (b) [1·C₆F₆·1]; (c) [2·C₆F₆·2]; (d) [1·OFA]; (e) [1·C₆F₆]; (f) [2·C₆F₆].

Table S4. Electron density (ρ_b), its Laplacian ($\nabla^2\rho_b$), potential and kinetic energy densities (V_b and G_b), second eigenvalue of the Hessian matrix (λ_2), elliptical bond index (ε), electron localization function at BCPs (in a.u.) calculated at the PBE0-D3BJ/ZORA-def2-TZVP level of theory.

Contact	Clusters	ρ_b	$\nabla^2\rho_b$	V_b	G_b	H	ε	λ_2	ELF
C··Pt	[1·OFA·1]	0.0084	0.0211	-0.0040	0.0047	0.0006	2.18	-0.0014	0.04
C··Pt	[1·OFA]	0.0076	0.0210	-0.0036	0.0045	0.0008	8.1	-0.0003	0.03
C··Pt	[1·C ₆ F ₆]	0.0122	0.0305	-0.0066	0.0071	0.0005	1.30	-0.0032	0.06
C··Pt	[2·C ₆ F ₆ ·2]	0.0128	0.0317	-0.0069	0.0074	0.0005	1.34	-0.0035	0.067
C··Pt	[2·C ₆ F ₆]	0.0128	0.0318	-0.0069	0.0074	0.0005	1.47	-0.0033	0.07
C··C ^{naph}	[1·OTA·1]	0.0082	0.0245	-0.0040	0.0051	0.0011	1.06	-0.0019	0.03
C··C ^{naph}	[1·OTA·1]	0.0073	0.0232	-0.0035	0.0047	0.0011	5.99	-0.0006	0.03
C··C ^{naph}	[1·OTA]	0.0081	0.0254	-0.0041	0.0052	0.0011	3.15	-0.0012	0.03
C··C ^{naph}	[1·OTA]	0.0084	0.0267	-0.0043	0.0055	0.0012	0.66	-0.0021	0.03
C··C ^{naph}	[1·C ₆ F ₆ ·1]	0.0098	0.0309	-0.0053	0.0065	0.0012	0.11	-0.0029	0.04
C··C ^{naph}	[1·C ₆ F ₆ ·1]	0.0083	0.0263	-0.0043	0.0055	0.0011	0.80	-0.0017	0.03
C··C ^{naph}	[1·C ₆ F ₆ ·1]	0.0090	0.0290	-0.0047	0.0060	0.0013	2.17	-0.0015	0.03
C··C ^{naph}	[1·C ₆ F ₆]	0.0082	0.0256	-0.0042	0.0053	0.0011	0.84	-0.0018	0.03
C··C ^{naph}	[1·C ₆ F ₆]	0.0090	0.0281	-0.0047	0.0059	0.0012	1.49	-0.0020	0.04
C··C ^{ph}	[2·C ₆ F ₆ ·2]	0.0082	0.0245	-0.0040	0.0050	0.0011	0.37	-0.0024	0.03
C··C ^{ph}	[2·C ₆ F ₆ ·2]	0.0091	0.0282	-0.0047	0.0059	0.0012	0.99	-0.0024	0.036
C··C ^{ph}	[2·C ₆ F ₆]	0.0081	0.0246	-0.0040	0.0050	0.0011	0.19	-0.0025	0.033
C··C ^{ph}	[2·C ₆ F ₆]	0.0089	0.0280	-0.0046	0.0058	0.0012	0.76	-0.0025	0.034
C··C ^{bt}	[1·OTA·1]	0.0081	0.0253	-0.0041	0.0052	0.0011	9.30	-0.0004	0.02
C··C ^{bt}	[1·OTA·1]	0.0093	0.0297	-0.0050	0.0062	0.0012	2.56	-0.0014	0.03
C··C ^{bt}	[1·OTA]	0.0090	0.0273	-0.0046	0.0057	0.0011	3.12	-0.0013	0.04
C··C ^{bt}	[1·OTA]	0.0083	0.0259	-0.0041	0.0053	0.0012	9.71	-0.0005	0.03

3.3 ETS–NOCV–CDF

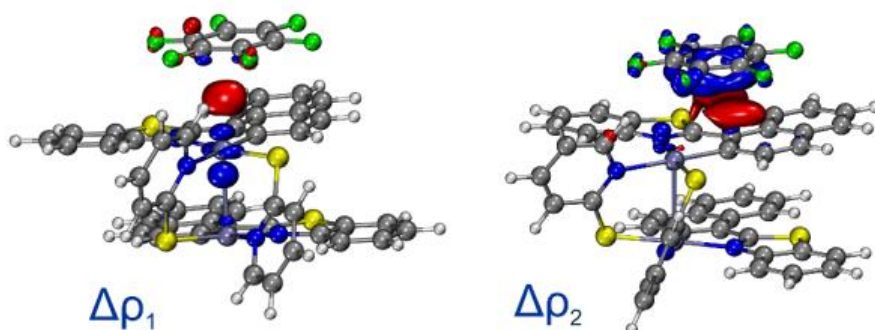


Figure S10 ETS–NOCV deformation densities for [1·C₆F₆] (isovalues 0.0005 a.u., electrons transfer occurs from the decreased electron density regions (blue) to the increased electron density regions (red)).

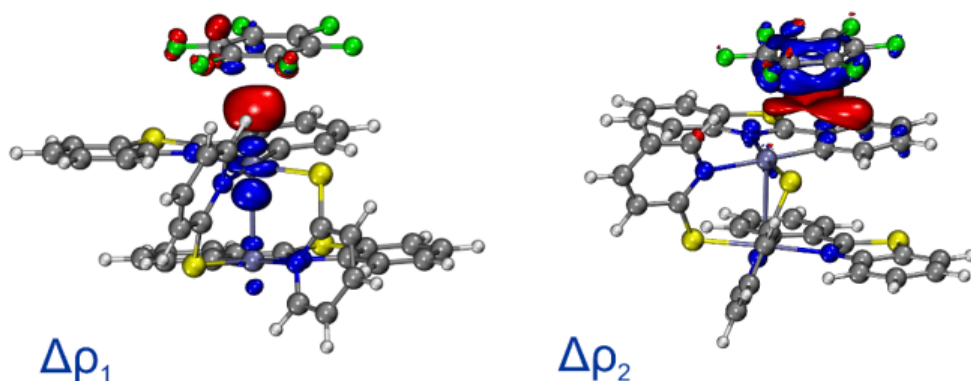


Figure S11 ETS–NOCV deformation densities for [2·C₆F₆·2] (isovalues 0.0005 a.u., electrons transfer occurs from the decreased electron density regions (blue) to the increased electron density regions (red), the second molecule of the Pt complex in trimolecular clusters was omitted for clarity).

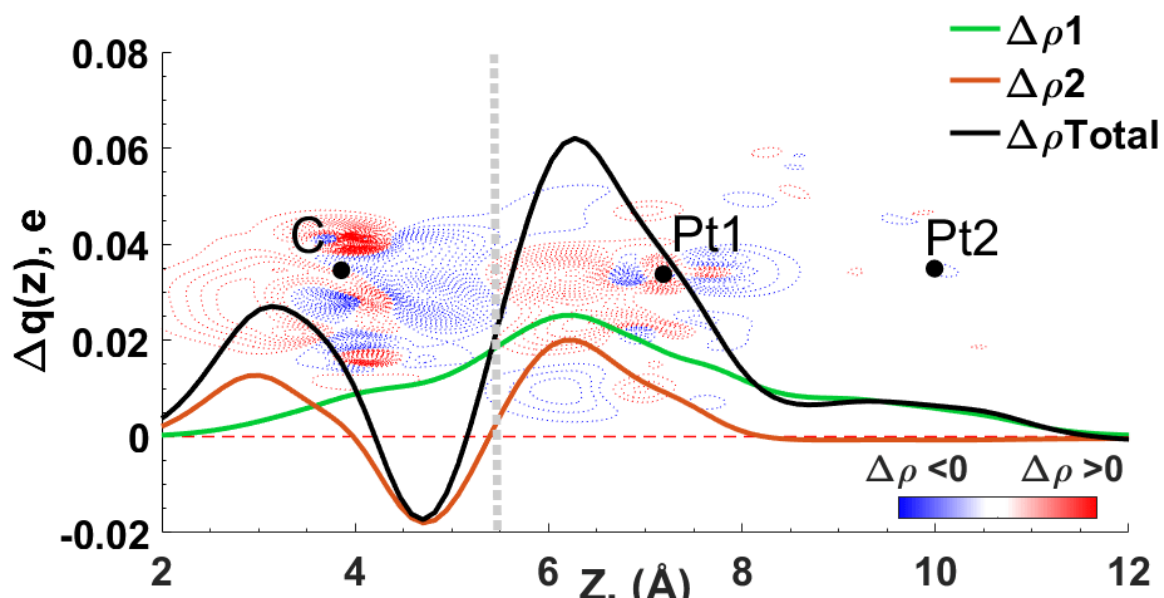


Figure S12. EDD contour plot (red – charge concentration, blue – charge depletion, range – 0.01 to 0.01 a.u., step 0.0005 a.u.) and CDF functions for the C···Pt interaction in $[1 \cdot C_6F_6]$ (black dots indicate positions of the atomic nuclei, grey vertical lines identify the boundaries between the C, Pt2 and Pt1 atoms, which are placed along the z axis).

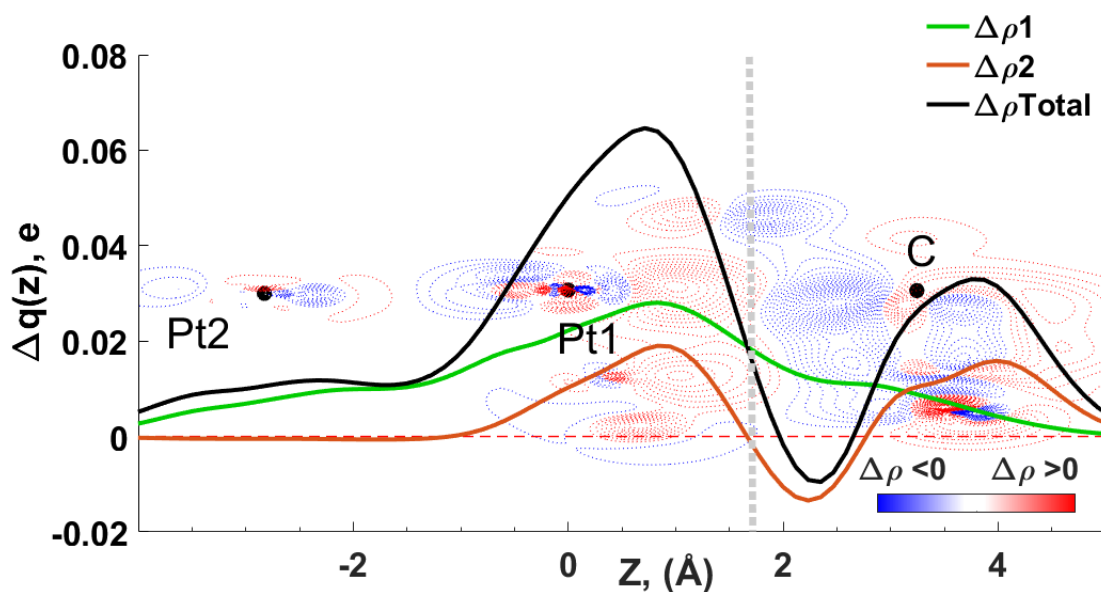


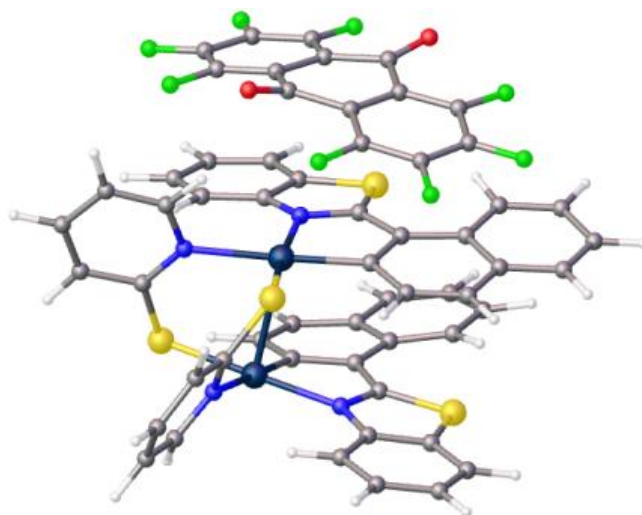
Figure S13. EDD contour plot (red – charge concentration, blue – charge depletion, range – 0.01 to 0.01 a.u., step 0.0005 a.u.) and CDF functions for the C···Pt interaction in $[2 \cdot C_6F_6 \cdot 2]$ (black dots indicate positions of the atomic nuclei, grey vertical lines identify the boundaries between the C, Pt2 and Pt1 atoms, which are placed along the z axis).

4. Cartesian coordinates for the studied molecules

Optimized geometries

Cartesian coordinates for [1·OFA] (in Å)

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Pt	-0.107045000	-2.997332000	10.148798000
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S	-4.584068000	-2.870447000	10.085239000
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N	0.784886000	-4.920201000	9.868014000
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H	1.316728000	-7.491395000	7.773661000
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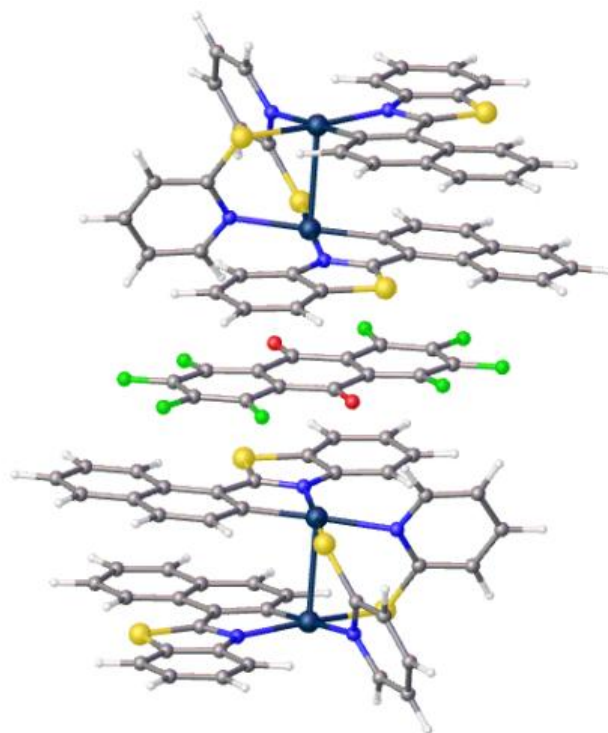


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C	1.392009000	2.487516000	4.622403000

Cartesian coordinates for [1·OFA·1] (in Å)

Pt	11.222619000	10.406770000	5.957781000
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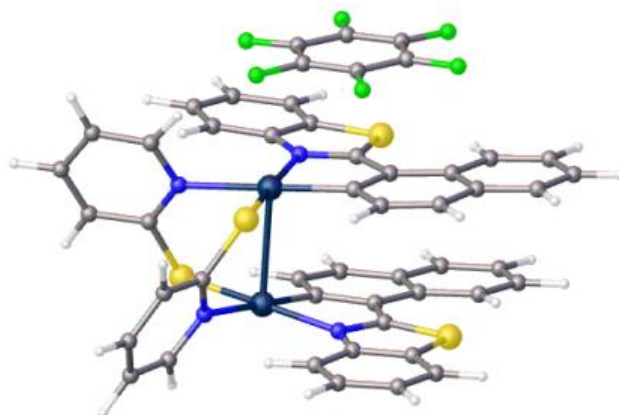
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H	15.662747000	15.919852000	3.330185000
C	13.914367000	15.632136000	2.082012000
H	14.189575000	16.408458000	1.370038000
C	9.616028000	9.752657000	-0.595629000
H	8.914256000	9.881644000	-1.417553000
C	10.785850000	10.501637000	-0.565775000
H	11.019487000	11.213412000	-1.355346000
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F	8.483642000	13.364194000	5.657623000
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F	11.753027000	16.461706000	4.569378000
O	13.303857000	14.608604000	8.949960000
C	10.269910000	13.669833000	7.194341000
C	11.490846000	14.326370000	7.474399000
C	12.250293000	14.046483000	8.718020000
C	9.591772000	13.959435000	6.010779000
C	12.004454000	15.231413000	6.544789000
C	11.281313000	15.563595000	5.400184000
C	10.079106000	14.931438000	5.137352000
F	8.784356000	10.898295000	10.169398000
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F	12.561257000	11.471722000	12.784856000
F	10.214560000	10.239471000	12.268650000
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C	12.365731000	12.754324000	10.834948000
C	9.959219000	11.472864000	10.295303000
C	10.682637000	11.141337000	11.439888000
C	11.880915000	11.779285000	11.706211000
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S	6.989616000	13.837705000	10.084678000
S	8.716723000	15.621497000	15.999600000
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N	11.227689000	19.279188000	12.331902000
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N	9.508879000	17.332595000	14.255302000
C	7.615569000	17.283039000	12.476899000
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H	9.516455000	17.162221000	7.852102000
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H	11.402063000	13.371276000	15.035637000
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C	10.322317000	14.848425000	12.146581000
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H	8.040214000	17.320892000	5.881226000
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C	10.205770000	18.989525000	9.350191000
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C	12.240867000	18.554638000	7.516126000
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C	13.529280000	20.826448000	12.460251000
H	14.437681000	21.424854000	12.516051000
C	4.150243000	14.798581000	12.665761000
H	3.425330000	14.879835000	11.855929000
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H	6.011673000	15.903728000	5.695142000
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C	4.916749000	13.813874000	14.716452000
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C	9.236462000	11.808334000	14.935358000
H	9.903067000	11.634498000	15.779860000
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H	6.865909000	12.450919000	11.947500000
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H	6.753217000	14.484217000	15.508176000
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C	7.252408000	11.308842000	13.679558000
H	6.337042000	10.733281000	13.551889000
C	8.091790000	11.059519000	14.781413000
H	7.836479000	10.283782000	15.501384000
C	12.267036000	17.015311000	17.366236000
H	12.973025000	16.900255000	18.186614000
C	11.108577000	16.248624000	17.342871000
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Cartesian coordinates for [1·C₆F₆] (in Å)

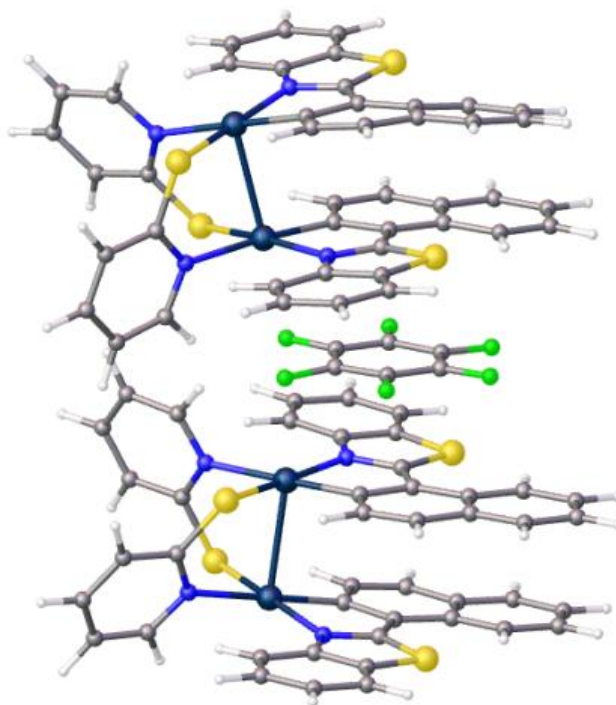
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C	-2.353705000	0.922349000	6.506946000
H	-1.749662000	0.971657000	5.604239000
C	2.022310000	-1.102859000	6.812599000
C	-1.328553000	-3.197458000	7.235508000
C	2.177611000	-2.504473000	6.785666000
C	0.921820000	-3.183226000	6.990697000
C	3.449342000	-3.125845000	6.533758000
C	-3.643561000	1.415387000	6.545276000
H	-4.077123000	1.872351000	5.659755000
C	4.570280000	-2.273805000	6.286705000
C	-2.650010000	-2.741759000	7.314011000
H	-2.864219000	-1.683333000	7.246270000
C	-3.735660000	0.736083000	8.843814000
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C	5.843930000	-2.832520000	6.029619000
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C	-2.413343000	0.250152000	8.742677000
C	4.391738000	-0.866619000	6.316881000
H	5.256243000	-0.229063000	6.129991000
C	-3.671716000	-3.667812000	7.462704000
H	-4.699198000	-3.314678000	7.528384000
C	-3.407792000	-5.044822000	7.526704000
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C	6.033374000	-4.195657000	6.013972000
H	7.017566000	-4.616147000	5.814435000
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H	-5.372617000	1.680468000	7.828244000
C	3.683914000	-4.522659000	6.508761000
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H	6.536156000	3.173019000	9.322969000
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H	-1.107942000	-2.924094000	10.559032000
C	5.942554000	1.114138000	9.468653000
H	6.945893000	0.714986000	9.332457000
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H	3.474843000	-7.837376000	10.198845000
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H	-0.498637000	5.626650000	9.731754000
C	3.950537000	-4.479825000	9.869754000
H	4.756001000	-3.801647000	9.607734000
C	4.239436000	-5.828310000	9.895983000
H	5.254413000	-6.158578000	9.680489000
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C	0.410890000	-2.737029000	3.931672000
C	-0.178607000	-1.482903000	4.019764000
F	3.835727000	-1.805810000	3.273145000
F	2.692521000	0.637013000	3.509680000
F	0.038418000	0.851006000	3.980454000
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C	1.956052000	-0.447089000	3.610885000
C	0.593031000	-0.339029000	3.857384000

Cartesian coordinates for [1·C₆F₆·1] (in Å)

Pt	1.920502000	1.585118000	-2.891887000
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C	2.964435000	3.954927000	-1.435432000
H	2.345591000	3.417833000	-0.720187000
C	0.871651000	-0.088675000	-3.062063000
C	4.815398000	0.297524000	-2.757116000
C	1.607680000	-1.287740000	-3.166474000
C	3.026544000	-1.050545000	-3.081494000
C	0.965978000	-2.566791000	-3.304122000
C	3.656950000	5.094443000	-1.076278000
H	3.579724000	5.472601000	-0.059480000
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C	5.571126000	1.445112000	-2.490974000
H	5.075554000	2.393360000	-2.325554000
C	4.490421000	5.176869000	-3.324176000
H	5.066848000	5.642866000	-4.120928000
C	-1.146632000	-3.829164000	-3.438675000
H	-2.237174000	-3.817320000	-3.433243000
C	5.479100000	-0.935881000	-2.916223000
C	3.759171000	4.007147000	-3.629237000
C	-1.184348000	-1.379954000	-3.199793000
H	-2.274706000	-1.418416000	-3.205018000
C	6.952789000	1.340197000	-2.428411000
H	7.541681000	2.233507000	-2.224480000
C	7.602561000	0.110963000	-2.618960000
H	8.689212000	0.057381000	-2.567164000
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H	7.358059000	-2.006744000	-2.993857000
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C	4.449666000	5.712439000	-2.051598000
H	5.012580000	6.616970000	-1.820921000
C	1.637669000	-3.806172000	-3.439692000
H	2.721357000	-3.853558000	-3.463311000
C	0.948394000	-4.993314000	-3.571874000
H	1.506575000	-5.922398000	-3.684290000
Pt	2.003621000	2.156831000	-5.659013000
S	0.075121000	2.948771000	-2.763151000
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N	0.966138000	3.971750000	-5.121543000
C	1.066203000	4.966790000	-6.023465000
H	1.703169000	4.747818000	-6.879124000
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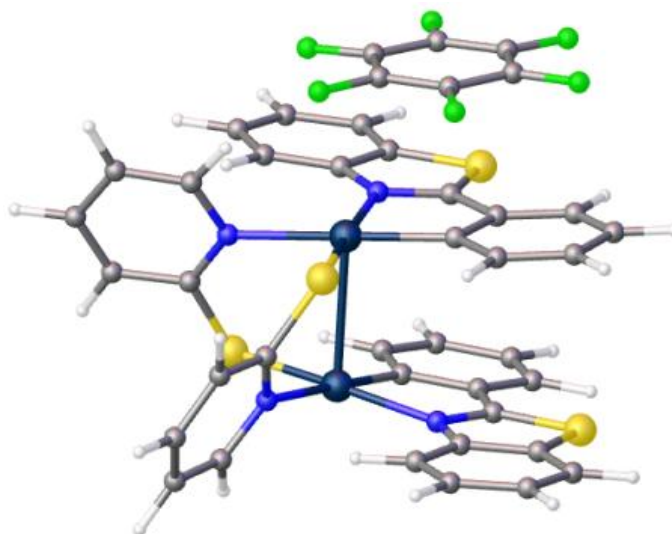
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F	2.733556000	1.354858000	0.239717000
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C	2.730644000	-0.971257000	-0.013526000
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Pt	0.865768000	1.688234000	3.158165000
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H	-2.355632000	2.395375000	2.943053000
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H	5.297417000	-3.502250000	2.829240000
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C	-1.004209000	4.087991000	4.016188000
C	4.114261000	-1.126319000	3.075942000
H	5.204957000	-1.109574000	3.102992000
C	-4.173067000	1.237661000	3.001209000
H	-4.814112000	2.118010000	2.979678000
C	-4.751655000	-0.039966000	3.039093000
H	-5.835713000	-0.145189000	3.050495000
C	3.411784000	0.046321000	3.163511000
H	3.946989000	0.987518000	3.273676000
C	-3.949915000	-1.175380000	3.051734000
H	-4.384971000	-2.173578000	3.073056000
C	3.588318000	-4.790047000	2.655596000
H	4.174380000	-5.702916000	2.556250000
C	-1.776903000	5.789562000	2.470959000
H	-2.350910000	6.693606000	2.267370000
C	1.428326000	-3.694494000	2.754430000
H	0.349563000	-3.796644000	2.698495000
C	2.181712000	-4.842607000	2.629253000
H	1.675909000	-5.798007000	2.492114000
Pt	0.774333000	2.154912000	5.917341000
S	2.659074000	3.122944000	3.050259000
S	3.269974000	-1.526954000	6.439139000
N	2.335110000	0.860173000	6.277581000
N	1.866742000	3.959041000	5.514327000
C	1.827474000	4.872163000	6.503847000
H	1.206245000	4.599252000	7.355617000
C	-0.235176000	0.484422000	6.262463000
C	3.700521000	1.018129000	6.357055000
C	0.534492000	-0.697045000	6.282183000
C	1.946993000	-0.411857000	6.303990000
C	-0.074486000	-1.997170000	6.270272000
C	2.524971000	6.062977000	6.465597000
H	2.466225000	6.756952000	7.300669000
C	-1.495610000	-2.067738000	6.418809000
C	4.426503000	2.215711000	6.363112000
H	3.905551000	3.165603000	6.322430000
C	3.295775000	5.426429000	4.285675000

H	3.851265000	5.611825000	3.368343000
C	-2.146051000	-3.323551000	6.398483000
H	-3.229651000	-3.346686000	6.521253000
C	4.395685000	-0.205969000	6.444149000
C	2.561174000	4.221366000	4.386925000
C	-2.242629000	-0.863894000	6.506474000
H	-3.325889000	-0.932608000	6.618711000
C	5.811585000	2.160370000	6.426326000
H	6.378825000	3.090282000	6.425607000
C	6.492161000	0.934681000	6.489994000
H	7.580247000	0.919853000	6.536113000
C	-1.642525000	0.363561000	6.388892000
H	-2.255623000	1.262902000	6.379134000
C	5.786983000	-0.263152000	6.505053000
H	6.303629000	-1.220386000	6.560230000
C	-1.440194000	-4.486924000	6.187812000
H	-1.952856000	-5.447867000	6.158063000
C	3.289763000	6.335832000	5.322394000
H	3.858441000	7.262227000	5.241669000
C	0.613974000	-3.210543000	6.024324000
H	1.677779000	-3.208945000	5.802447000
C	-0.049668000	-4.419307000	5.976146000
H	0.513557000	-5.326490000	5.758858000

Cartesian coordinates for [2·C₆F₆] (in Å)

Pt	2.148326000	-1.733597000	-9.606171000
S	4.471488000	-2.923203000	-11.982574000
S	0.130269000	-5.736624000	-9.390396000
N	1.773103000	-3.753940000	-9.312663000
N	4.280792000	-1.762140000	-9.527964000
C	-0.451276000	-2.977950000	-9.617178000
C	0.163498000	-1.700312000	-9.676013000
C	0.492794000	-4.050680000	-9.459266000
C	1.815344000	-6.076492000	-9.133925000
C	4.825884000	-1.249483000	-8.408273000
H	4.117477000	-0.838888000	-7.693916000
C	2.554482000	-4.873360000	-9.107904000
C	3.931195000	-4.921656000	-8.863436000
H	4.502473000	-4.003740000	-8.802632000
C	2.425049000	-7.318537000	-8.961613000
H	1.840814000	-8.236222000	-8.990894000
C	6.184280000	-1.259196000	-8.156737000
H	6.567472000	-0.844875000	-7.228042000
C	5.081275000	-2.255747000	-10.499122000
C	6.478925000	-2.296877000	-10.298287000
H	7.099751000	-2.701430000	-11.094230000
C	4.537585000	-6.156917000	-8.688589000
H	5.609109000	-6.199221000	-8.502356000
C	-0.700319000	-0.599579000	-9.790320000
H	-0.283809000	0.404044000	-9.860561000
C	-2.083412000	-0.766682000	-9.813153000
H	-2.723084000	0.112605000	-9.885411000
C	3.797459000	-7.347892000	-8.745344000
H	4.299103000	-8.304137000	-8.608570000
C	7.028303000	-1.812607000	-9.127939000
H	8.106380000	-1.844090000	-8.975506000
C	-2.662926000	-2.039254000	-9.743565000
H	-3.744940000	-2.153872000	-9.759654000
C	-1.841185000	-3.152501000	-9.654533000
H	-2.270325000	-4.152943000	-9.596245000
Pt	2.477844000	-1.889994000	-12.412589000
S	2.334724000	0.533870000	-9.810894000
S	-1.913760000	-1.538752000	-13.263620000
N	0.613061000	-1.144268000	-12.937807000
N	3.536892000	-0.043038000	-12.180881000
C	0.124956000	-3.471077000	-12.937487000
C	1.510888000	-3.607095000	-12.662437000
C	-0.294973000	-2.100307000	-13.036225000
C	-1.337981000	0.101035000	-13.225642000
C	4.388894000	0.243829000	-13.182915000
H	4.470768000	-0.522900000	-13.950847000
C	0.064037000	0.118561000	-13.053859000
C	0.731553000	1.348388000	-13.037035000
H	1.809655000	1.378454000	-12.942541000

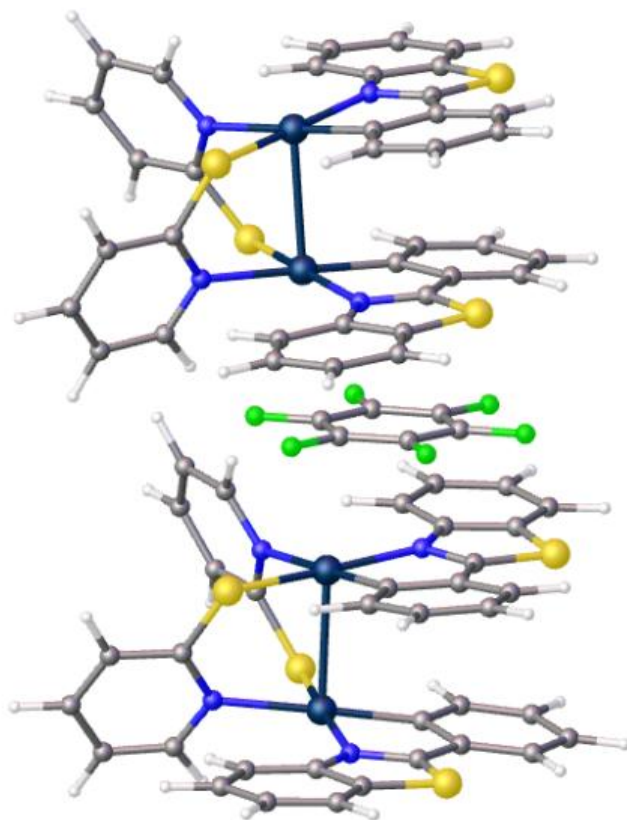


C	-2.082292000	1.274350000	-13.340430000
H	-3.162922000	1.239487000	-13.464512000
C	5.102993000	1.424145000	-13.257127000
H	5.766596000	1.607820000	-14.097873000
C	3.401198000	0.820731000	-11.149658000
C	4.103731000	2.046516000	-11.167621000
H	3.976625000	2.722804000	-10.325526000
C	-0.008031000	2.516789000	-13.152465000
H	0.509067000	3.474318000	-13.132727000
C	1.994500000	-4.920221000	-12.548433000
H	3.044341000	-5.086727000	-12.312443000
C	1.152030000	-6.017805000	-12.714852000
H	1.565169000	-7.022335000	-12.622679000
C	-1.403438000	2.486188000	-13.294059000
H	-1.960336000	3.417650000	-13.377616000
C	4.940938000	2.353581000	-12.221424000
H	5.482462000	3.298588000	-12.232620000
C	-0.212556000	-5.853911000	-12.982984000
H	-0.860068000	-6.720809000	-13.100760000
C	-0.730067000	-4.571505000	-13.088080000
H	-1.791269000	-4.418700000	-13.288104000
F	0.712792000	-4.502177000	-6.376810000
F	2.768880000	-2.746188000	-6.354999000
C	0.471329000	-3.207652000	-6.410701000
C	1.527105000	-2.306079000	-6.394405000
F	2.282388000	-0.088908000	-6.496875000
F	-1.837328000	-3.600321000	-6.523683000
F	-2.323973000	-0.938842000	-6.669828000
F	-0.258907000	0.809628000	-6.710698000
C	-0.838061000	-2.743878000	-6.493967000
C	1.276589000	-0.941866000	-6.474506000
C	-1.088455000	-1.378710000	-6.574295000
C	-0.028263000	-0.477445000	-6.576864000

Cartesian coordinates for $[2 \cdot C_6F_6 \cdot 2]$ (in Å)

Pt	5.232705000	4.093024000	4.326219000
S	8.193486000	5.221721000	5.915677000
S	5.525096000	0.055493000	6.264188000
F	2.455152000	1.230936000	6.379352000
F	2.422202000	3.934373000	6.374899000
N	5.323569000	2.567487000	5.730790000
N	5.540893000	5.765635000	5.619215000
C	5.026501000	1.273944000	3.760526000
C	4.920617000	2.539805000	3.128320000
C	5.290495000	1.369952000	5.170743000
C	2.167238000	1.882198000	5.270466000
C	5.657693000	1.186056000	7.576943000
C	4.440969000	6.497577000	5.881078000
H	3.539148000	6.186407000	5.361284000
C	5.509799000	2.506420000	7.097321000
C	5.535891000	3.569502000	8.006418000

H	5.384238000	4.583650000	7.659039000
C	5.870056000	0.912332000	8.927448000
H	5.988787000	-0.111307000	9.277439000
C	4.430376000	7.554605000	6.770389000
H	3.506933000	8.096623000	6.955825000
C	6.720157000	6.099256000	6.189980000
C	6.772476000	7.170586000	7.109741000
H	7.733059000	7.415745000	7.556744000
C	5.742880000	3.297270000	9.350857000
H	5.767084000	4.122596000	10.060006000
C	2.158263000	3.270080000	5.267559000
C	4.612776000	2.527548000	1.759071000
H	4.538565000	3.469243000	1.217370000
C	4.391833000	1.331701000	1.078863000
H	4.132436000	1.362809000	0.020971000
C	5.917699000	1.983297000	9.811564000
H	6.081586000	1.797916000	10.871563000
C	5.631471000	7.887463000	7.409479000
H	5.674176000	8.711707000	8.120384000
C	4.492632000	0.096990000	1.730588000
H	4.312114000	-0.829140000	1.188510000
C	4.823342000	0.067668000	3.077070000
H	4.900578000	-0.882311000	3.606278000
F	1.885153000	5.280743000	4.091093000
F	1.888630000	-0.133775000	4.105779000
F	1.319241000	1.217896000	1.825336000
F	1.352925000	3.921283000	1.814530000
C	1.887511000	1.183742000	4.102429000
C	1.886140000	3.957203000	4.094960000
C	1.607003000	1.875446000	2.930514000
C	1.614977000	3.263101000	2.926040000
Pt	8.021214000	4.236659000	3.859920000
S	4.971983000	5.621018000	2.647258000
S	7.905301000	0.916486000	0.846559000
N	8.014214000	3.182208000	2.071629000
N	7.590100000	6.195500000	3.108663000
C	8.431070000	1.395925000	3.583466000
C	8.459900000	2.428742000	4.557020000
C	8.138629000	1.879807000	2.262442000
C	7.622382000	2.361945000	-0.076196000
C	8.644547000	7.032199000	3.090698000
H	9.561369000	6.625048000	3.512669000
C	7.736235000	3.498011000	0.755659000
C	7.583780000	4.770568000	0.194003000
H	7.706981000	5.652796000	0.809492000
C	7.322664000	2.468555000	-1.433570000
H	7.231329000	1.580501000	-2.055978000
C	8.591725000	8.308778000	2.565370000
H	9.479473000	8.935543000	2.565187000
C	6.389206000	6.621442000	2.656217000
C	6.270853000	7.917285000	2.104462000
H	5.294097000	8.234751000	1.746991000



C	7.285607000	4.877822000	-1.156990000
H	7.158690000	5.866551000	-1.594001000
C	8.739596000	2.031264000	5.874171000
H	8.749169000	2.776367000	6.668002000
C	8.987791000	0.696638000	6.189446000
H	9.203651000	0.426978000	7.223379000
C	7.146282000	3.740197000	-1.966025000
H	6.907684000	3.852146000	-3.022105000
C	7.367800000	8.752935000	2.047650000
H	7.273505000	9.751776000	1.623547000
C	8.951096000	-0.301900000	5.208417000
H	9.137567000	-1.341439000	5.471739000
C	8.663860000	0.050015000	3.898064000
H	8.621989000	-0.711292000	3.118148000
Pt	-1.465545000	4.072038000	3.837660000
S	-4.429690000	5.214716000	2.260502000
S	-1.754548000	0.031149000	1.906182000
N	-1.558570000	2.544180000	2.436623000
N	-1.772299000	5.743525000	2.542472000
C	-1.256222000	1.253856000	4.408089000
C	-1.153144000	2.520988000	5.038440000
C	-1.521268000	1.347389000	2.997895000
C	-1.893530000	1.160085000	0.592643000
C	-0.669376000	6.468553000	2.274339000
H	0.236613000	6.139894000	2.775564000
C	-1.749254000	2.481389000	1.070789000
C	-1.785028000	3.543889000	0.161345000
H	-1.638909000	4.559088000	0.507992000
C	-2.109553000	0.884513000	-0.756884000
H	-2.225268000	-0.139860000	-1.105709000
C	-0.660459000	7.535223000	1.396566000
H	0.265377000	8.071161000	1.205611000
C	-2.954557000	6.089701000	1.985550000
C	-3.008837000	7.171614000	1.078494000
H	-3.972150000	7.427973000	0.643833000
C	-1.995939000	3.269815000	-1.182152000
H	-2.027841000	4.094631000	-1.891583000
C	-0.846267000	2.511311000	6.407864000
H	-0.774040000	3.454023000	6.948076000
C	-0.623576000	1.316906000	7.090152000
H	-0.365048000	1.350253000	8.148185000
C	-2.165487000	1.954698000	-1.641486000
H	-2.332562000	1.767887000	-2.700738000
C	-1.866225000	7.884772000	0.775626000
H	-1.910858000	8.717796000	0.075148000
C	-0.721327000	0.081053000	6.440246000
H	-0.539338000	-0.843918000	6.983807000
C	-1.051026000	0.049077000	5.093523000
H	-1.126052000	-0.901869000	4.565719000
Pt	-4.252846000	4.223372000	4.313166000
S	-1.198289000	5.602953000	5.513529000
S	-4.133468000	0.898319000	7.321163000

N	-4.242238000	3.165847000	6.099541000
N	-3.818074000	6.180387000	5.065863000
C	-4.663807000	1.382306000	4.585860000
C	-4.693598000	2.416714000	3.614012000
C	-4.368795000	1.863913000	5.907143000
C	-3.846765000	2.342125000	8.245338000
C	-4.871591000	7.018109000	5.089785000
H	-5.791130000	6.611967000	4.672790000
C	-3.960536000	3.479456000	7.415220000
C	-3.803682000	4.750998000	7.977927000
H	-3.926363000	5.634187000	7.363716000
C	-3.543314000	2.446443000	9.602048000
H	-3.452015000	1.557434000	10.223095000
C	-4.814514000	8.294542000	5.614990000
H	-5.701602000	8.922218000	5.620323000
C	-2.614258000	6.604940000	5.511617000
C	-2.491402000	7.900725000	6.062654000
H	-1.512266000	8.217153000	6.414563000
C	-3.501593000	4.855962000	9.328244000
H	-3.371132000	5.843870000	9.766068000
C	-4.974329000	2.021355000	2.296458000
H	-4.984687000	2.767826000	1.503922000
C	-5.222317000	0.687158000	1.979149000
H	-5.438585000	0.419098000	0.944887000
C	-3.362726000	3.717063000	10.135560000
H	-3.120974000	3.827205000	11.191112000
C	-3.587156000	8.737439000	6.125727000
H	-3.489426000	9.736171000	6.549313000
C	-5.185023000	-0.312911000	2.958602000
H	-5.371553000	-1.352045000	2.693732000
C	-4.897044000	0.036924000	4.269346000
H	-4.854587000	-0.725644000	5.048000000

