

## **$\beta$ -disubstituted Phosphorous Corroles**

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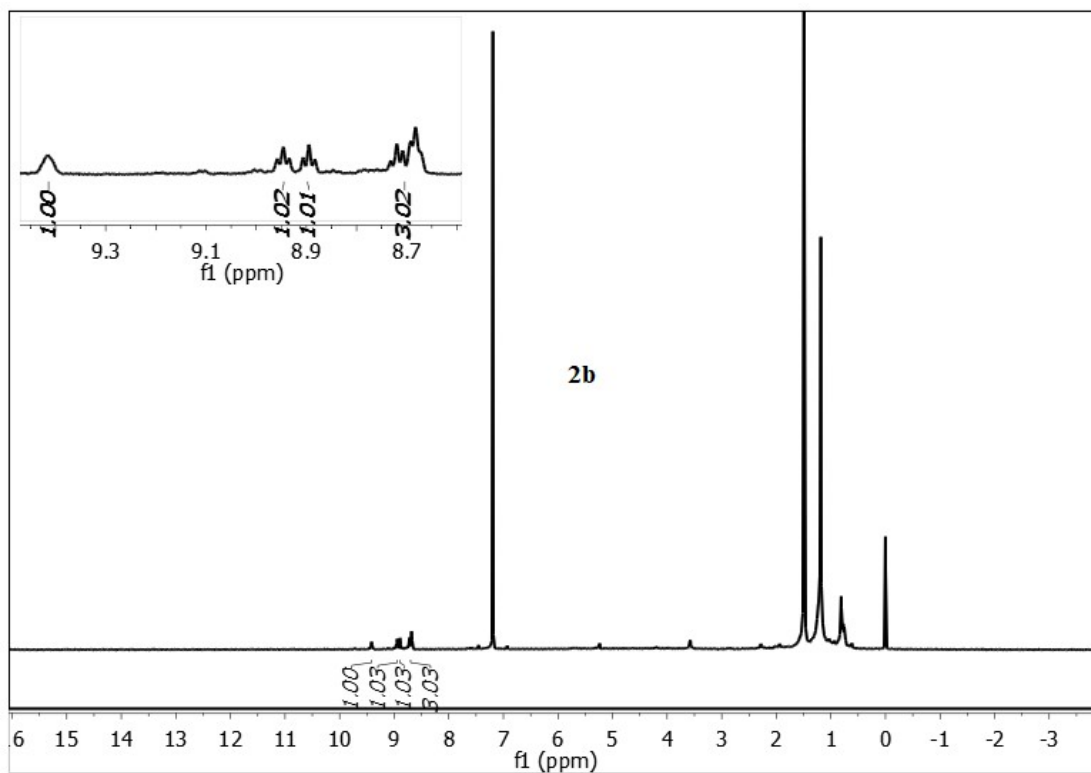


Fig S1. The  $^1\text{H}$ -NMR spectrum of 2b.

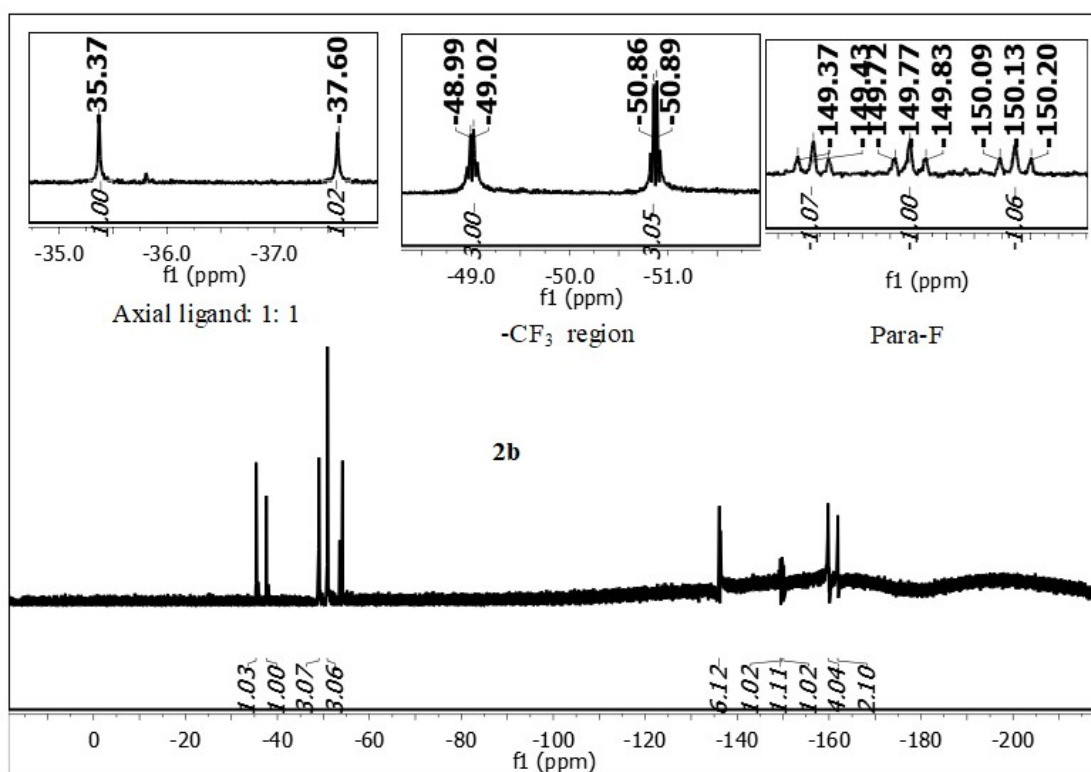
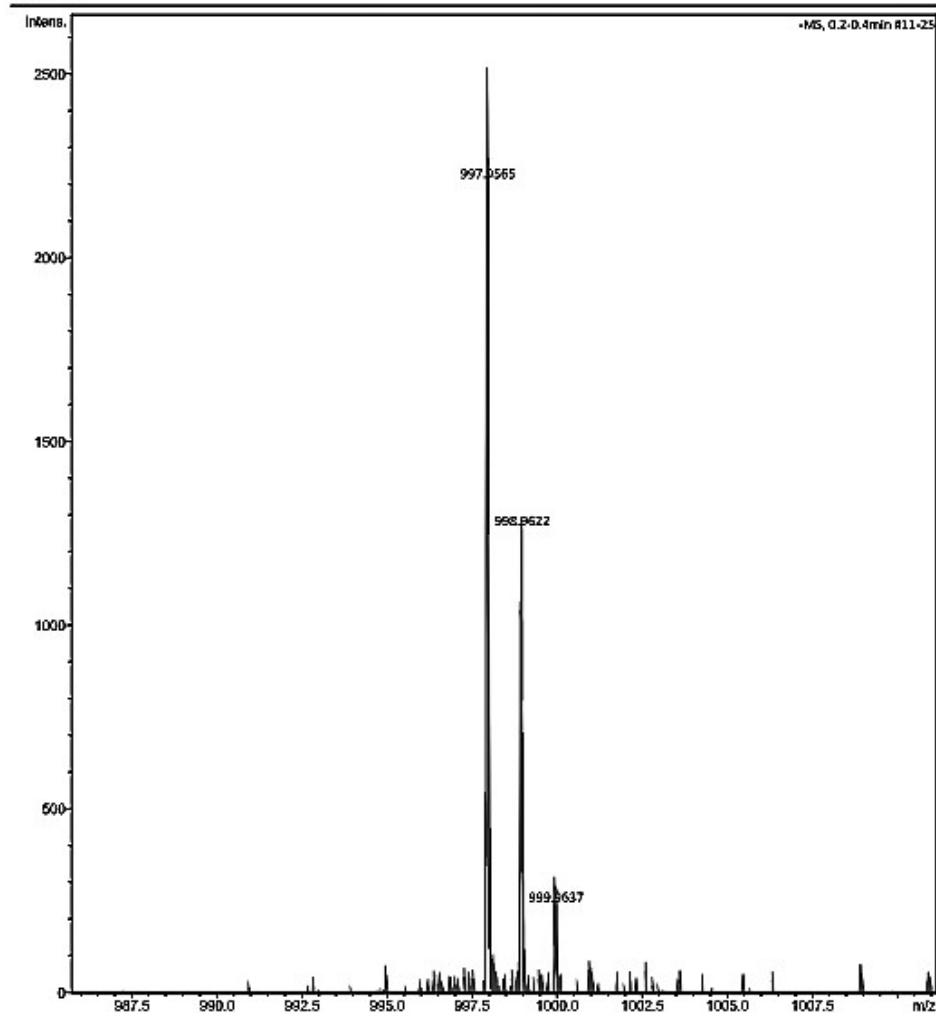


Fig S2. The  $^{19}\text{F}$ -NMR spectrum of 2b

## Generic Display Report

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Acquisition Date 6/25/2017 4:37:47 PM  
Operator Larisa Panz  
Instrument maXis impact



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**Fig S3.** The APCI mass spectrum of **2b**.

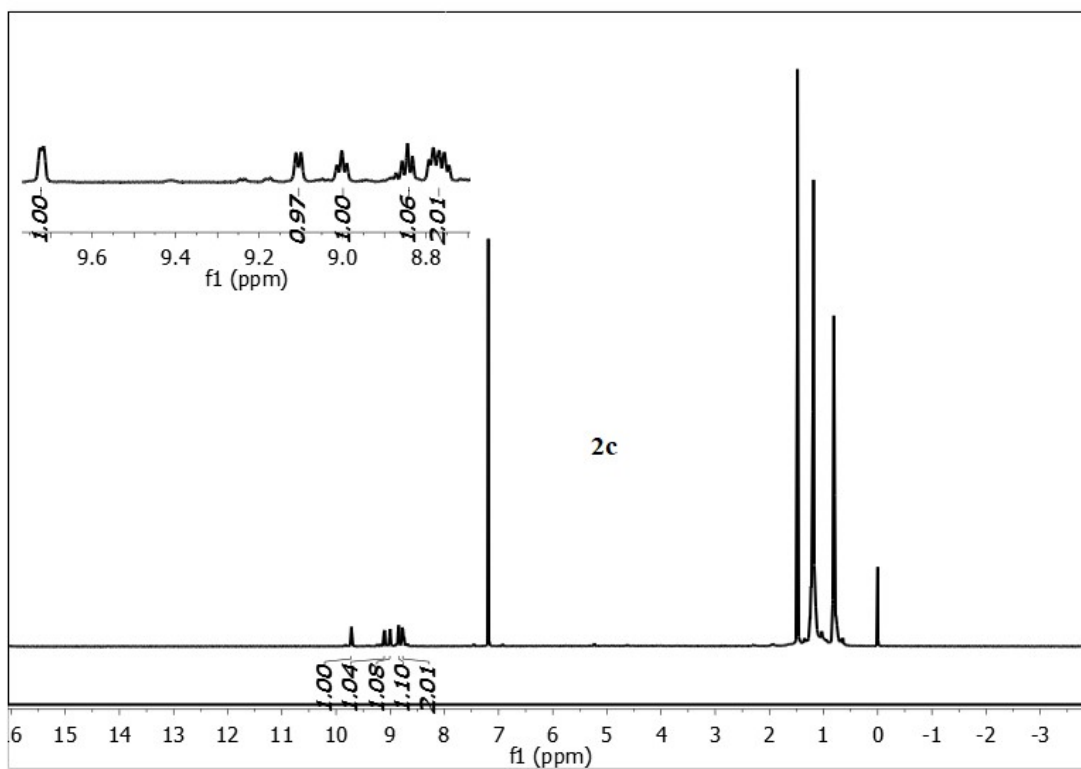


Fig S4. The  $^1\text{H-NMR}$  spectrum of **2c**.

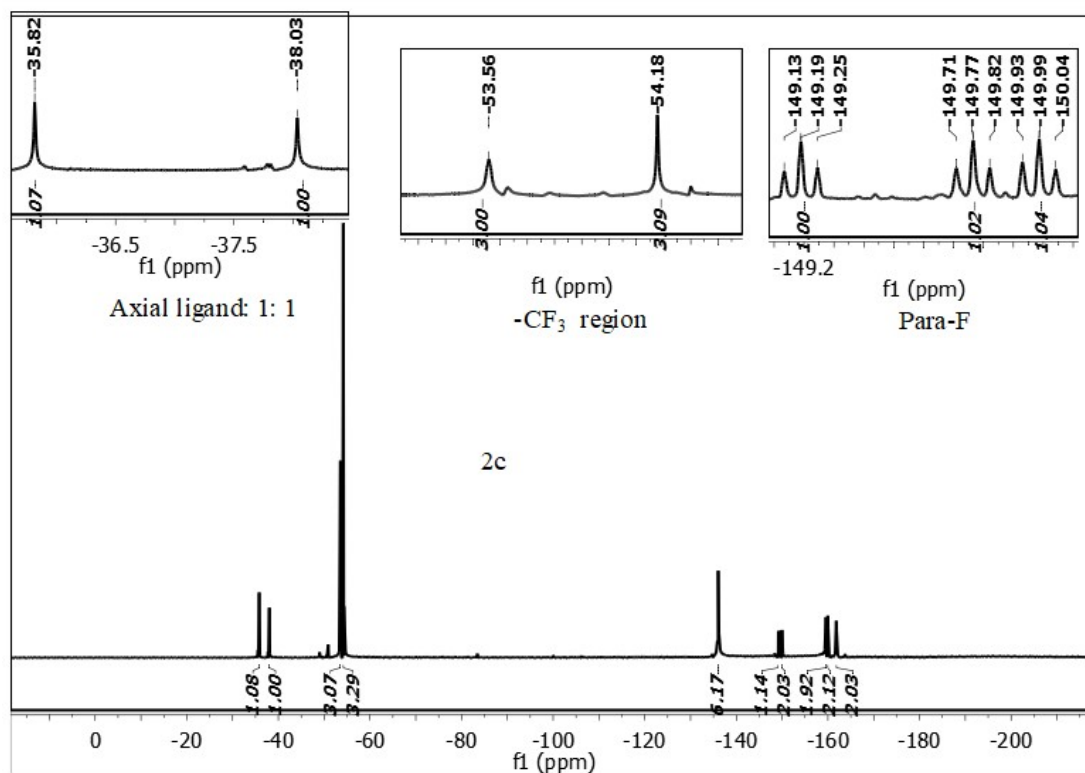
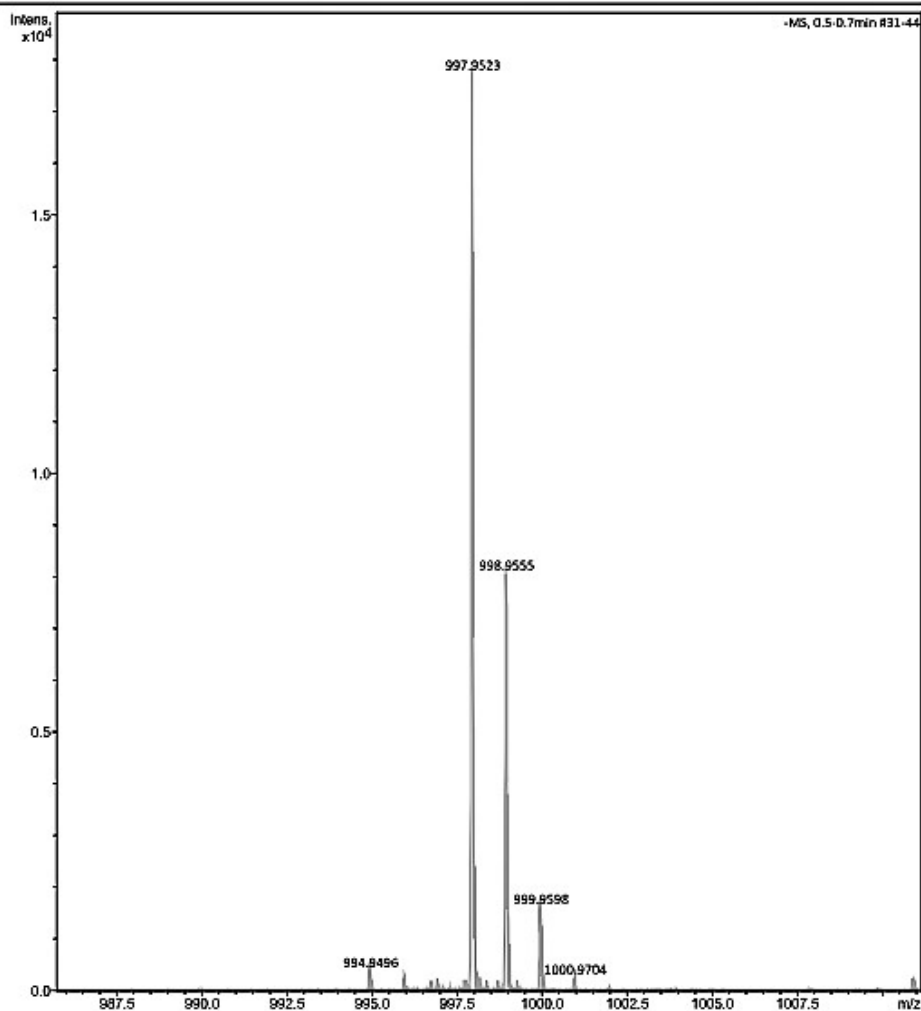


Fig S5. The  $^{19}\text{F-NMR}$  spectrum of **2c**.

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Comment			



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Fig S6. The APCI mass spectrum of 2c.

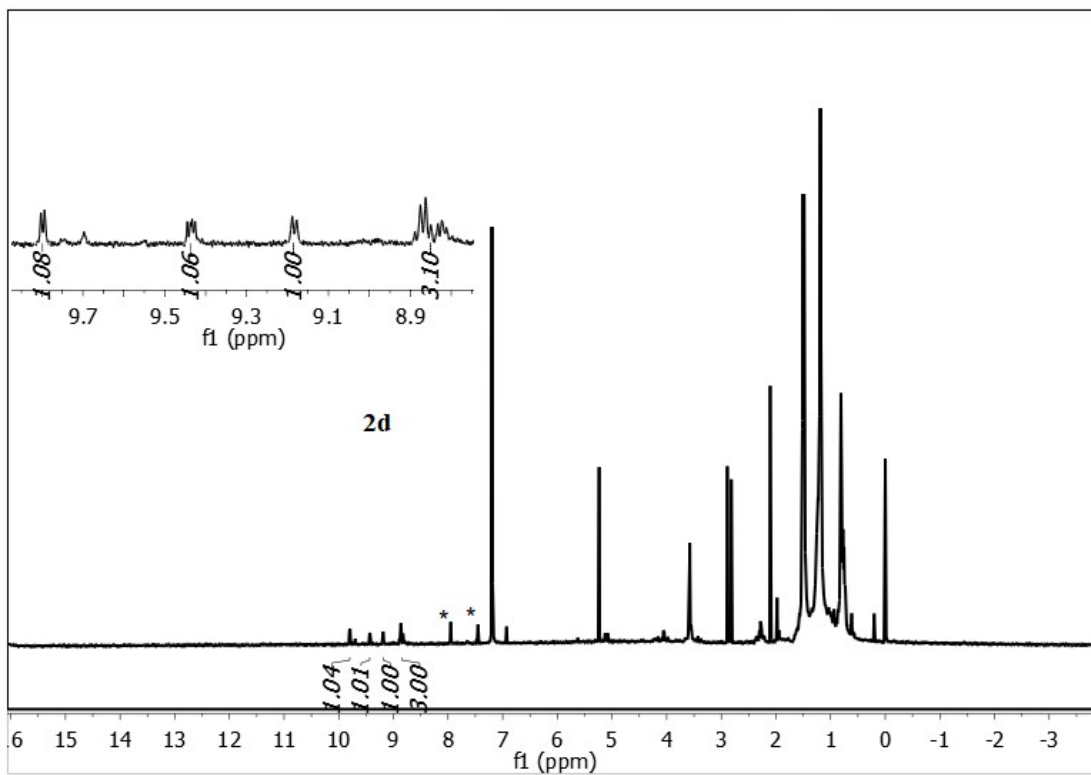


Fig S7. The  $^1\text{H-NMR}$  spectrum of **2d**.

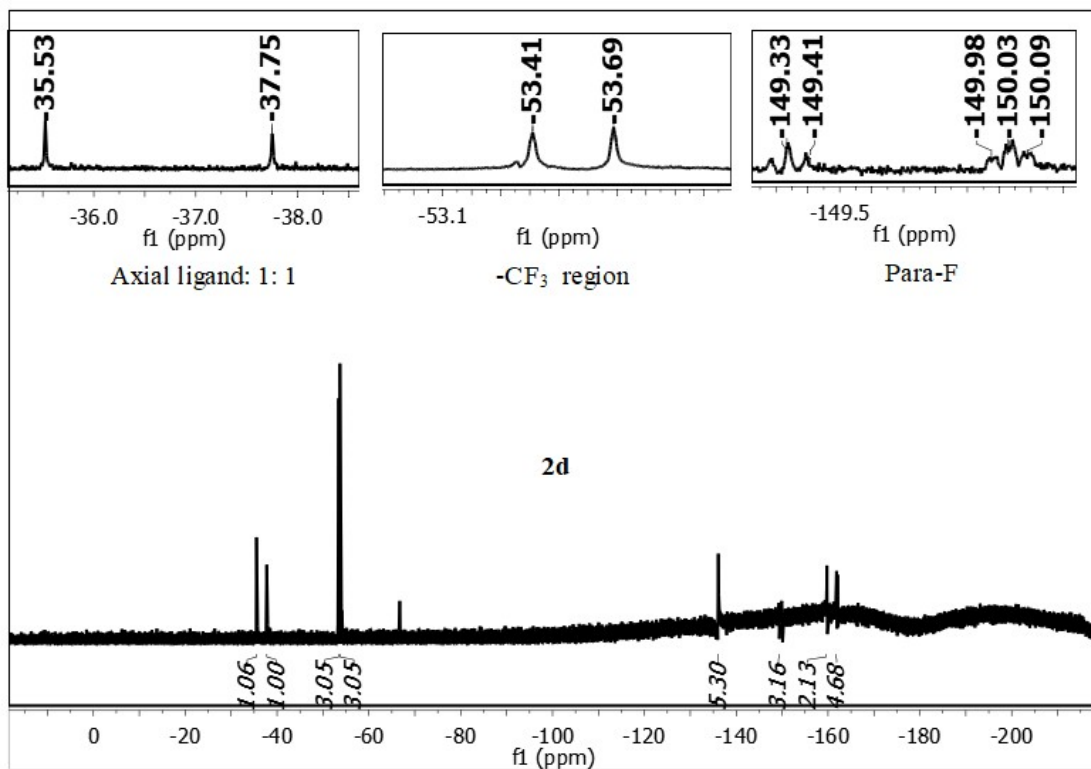
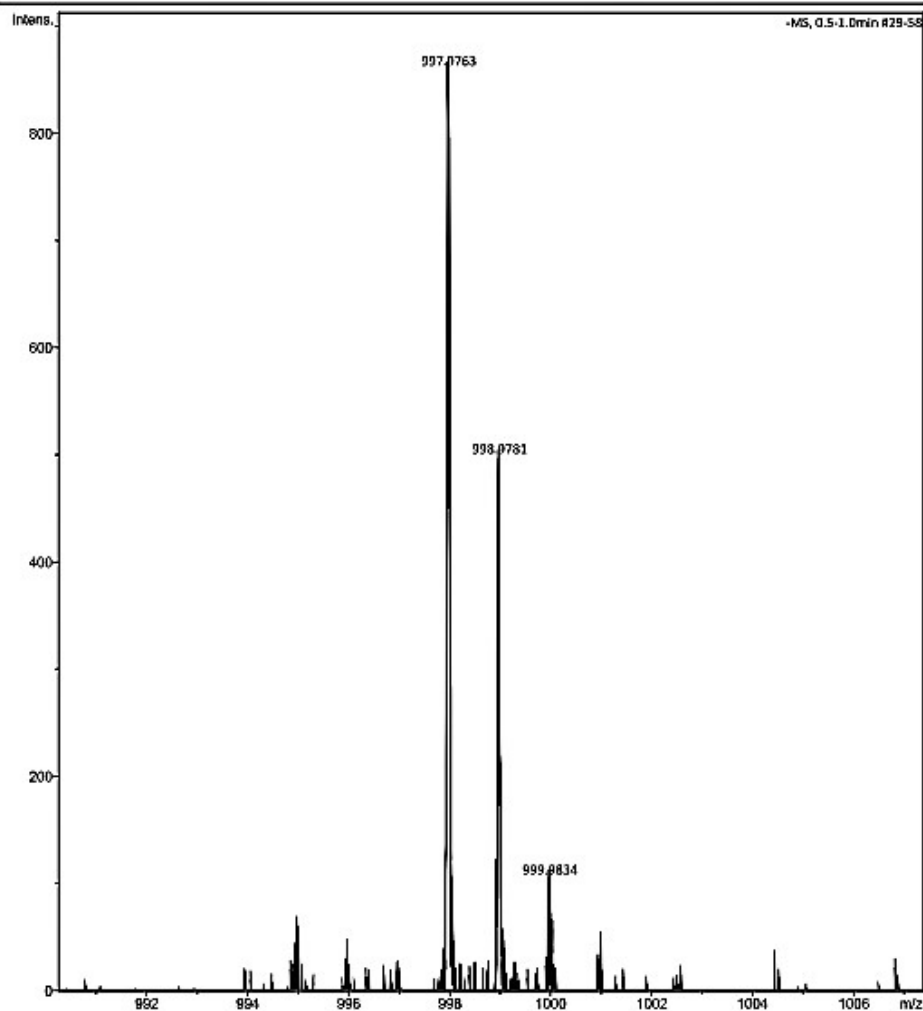


Fig S8. The  $^{19}\text{F-NMR}$  spectrum of **2d**.

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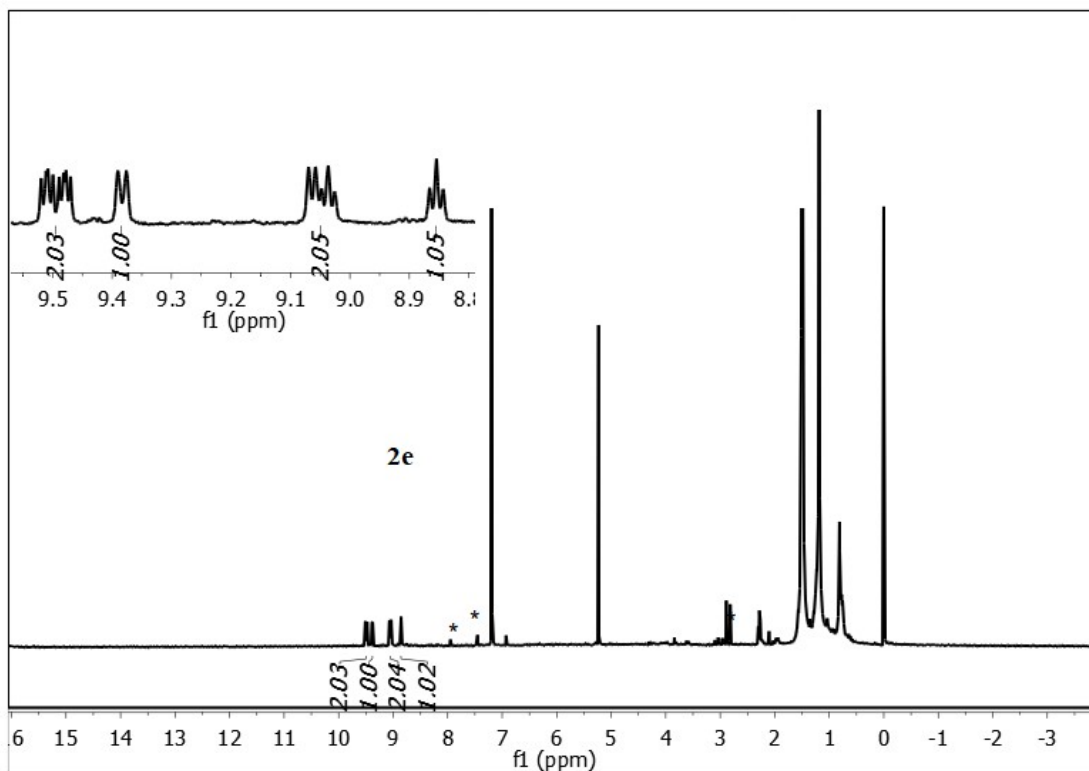
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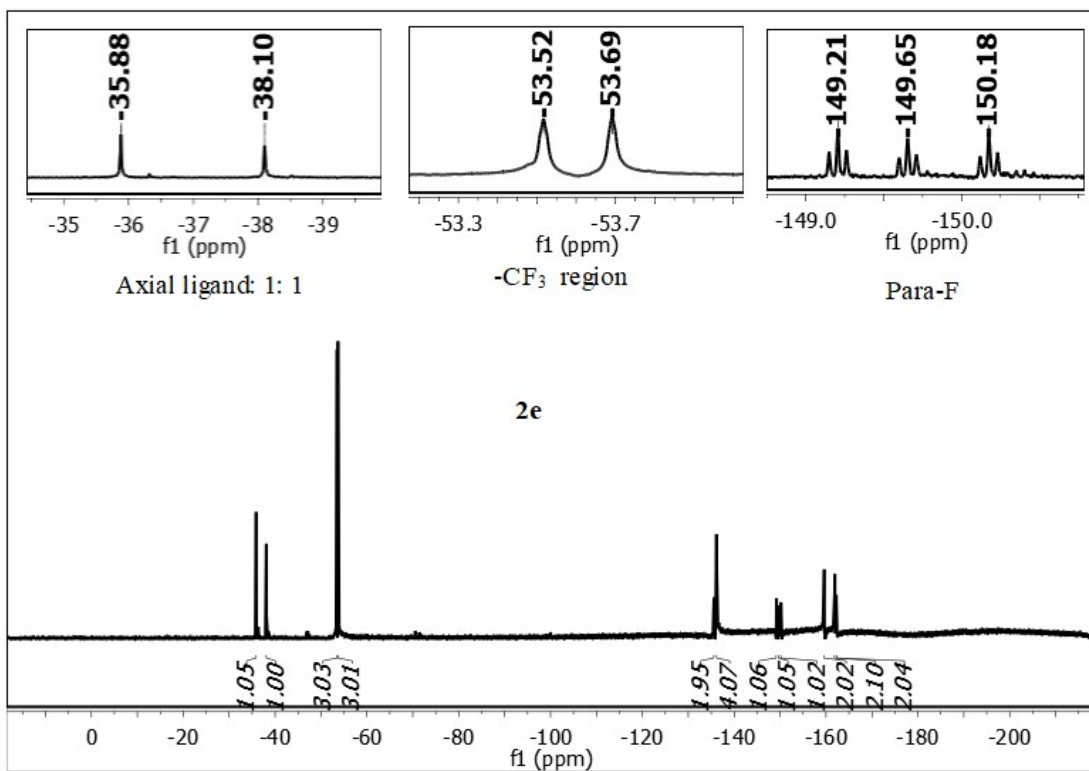
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**Fig S9.** The APCI mass spectrum of **2d**.





**Fig S10.** The  $^1\text{H-NMR}$  spectrum of **2e**.



**Fig S11.** The  $^{19}\text{F-NMR}$  spectrum of **2e**.

## Generic Display Report

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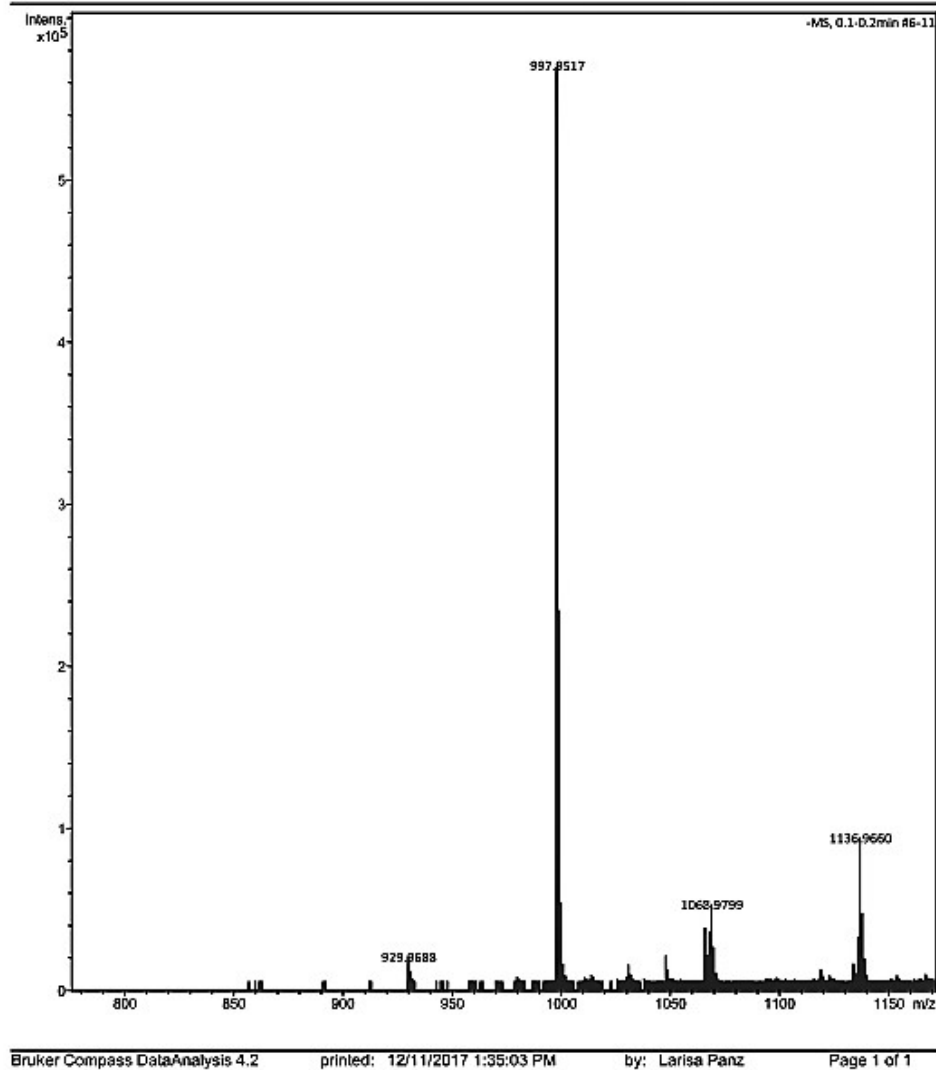


Fig S12. The APCI mass spectrum of 2e.

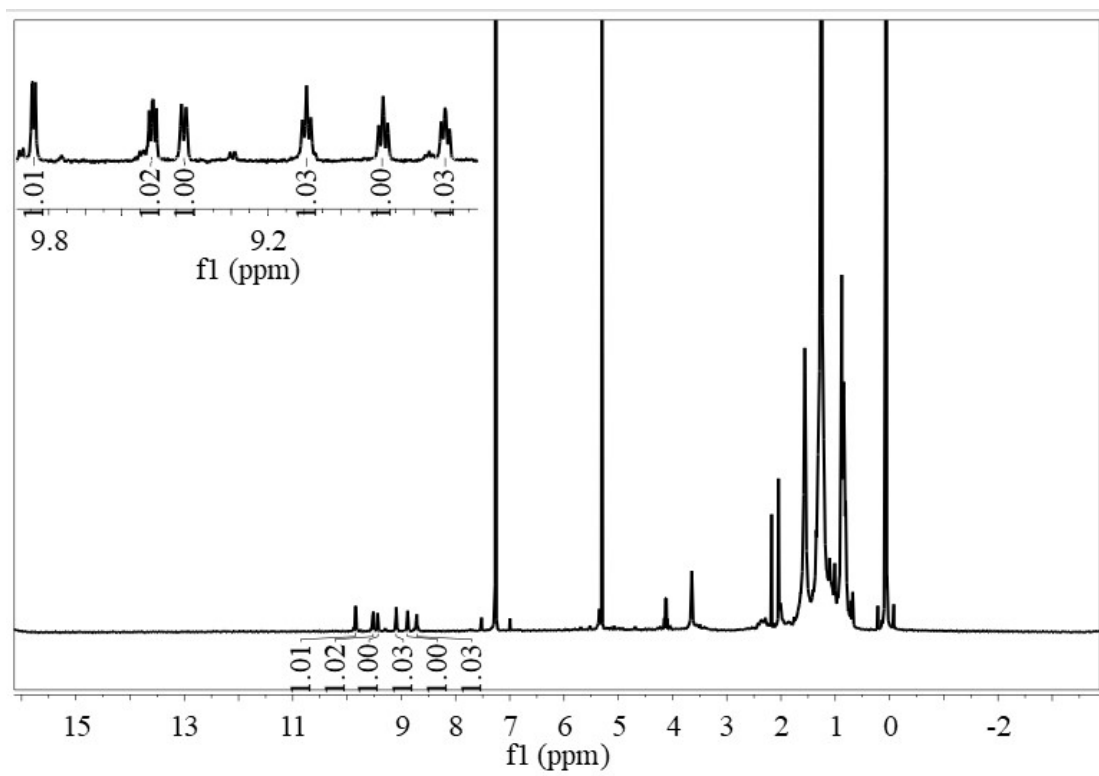


Fig S13. The  $^1\text{H-NMR}$  spectrum of **2f**.

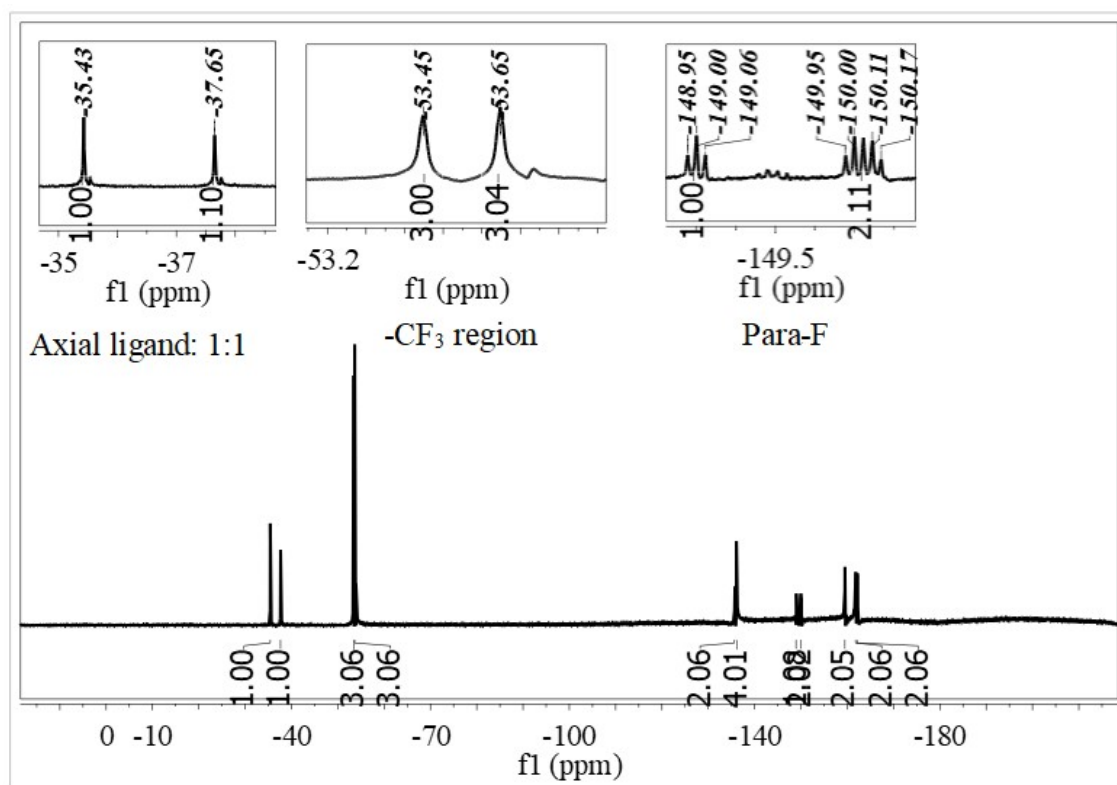


Fig S14. The  $^{19}\text{F-NMR}$  spectrum of **2f**.

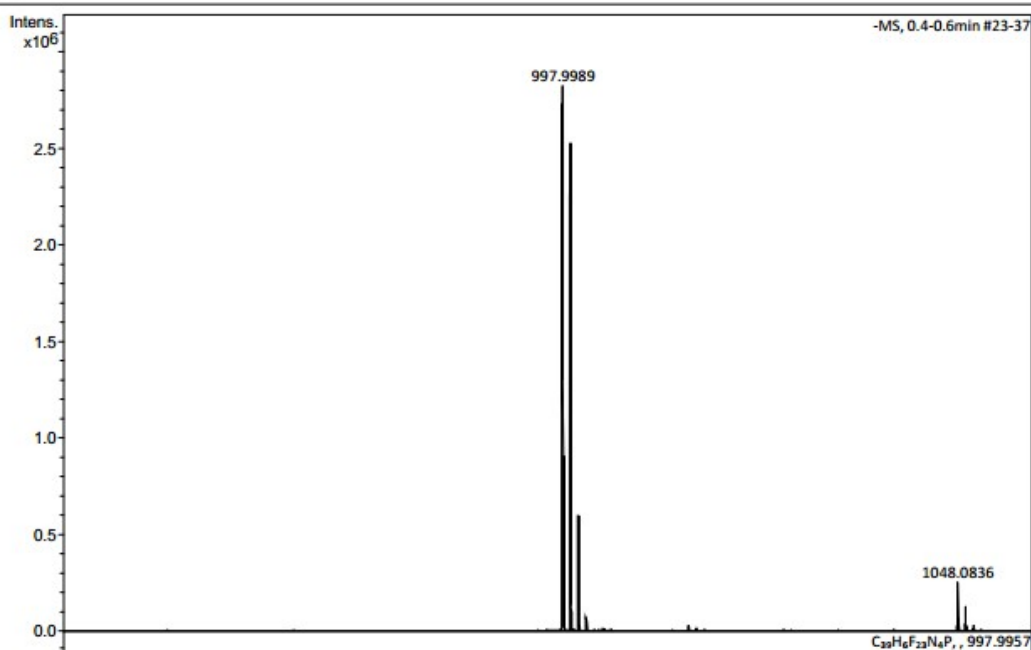
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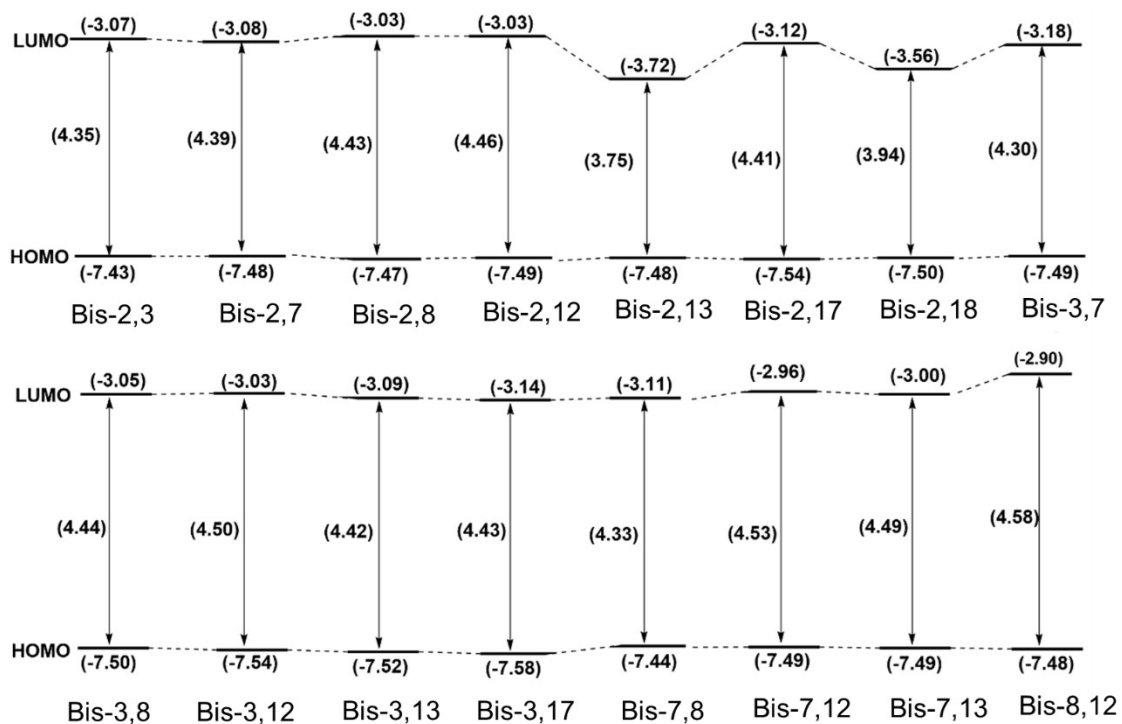
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Acquisition Date 20/02/2019 18:59:25

Operator Larisa Panz  
 Instrument maXis impact



**Fig S15.** The APCI mass spectrum of **2f**.



**Fig S16.** Calculated HOMO, LUMO and HOMO – LUMO band gap energies (eV).

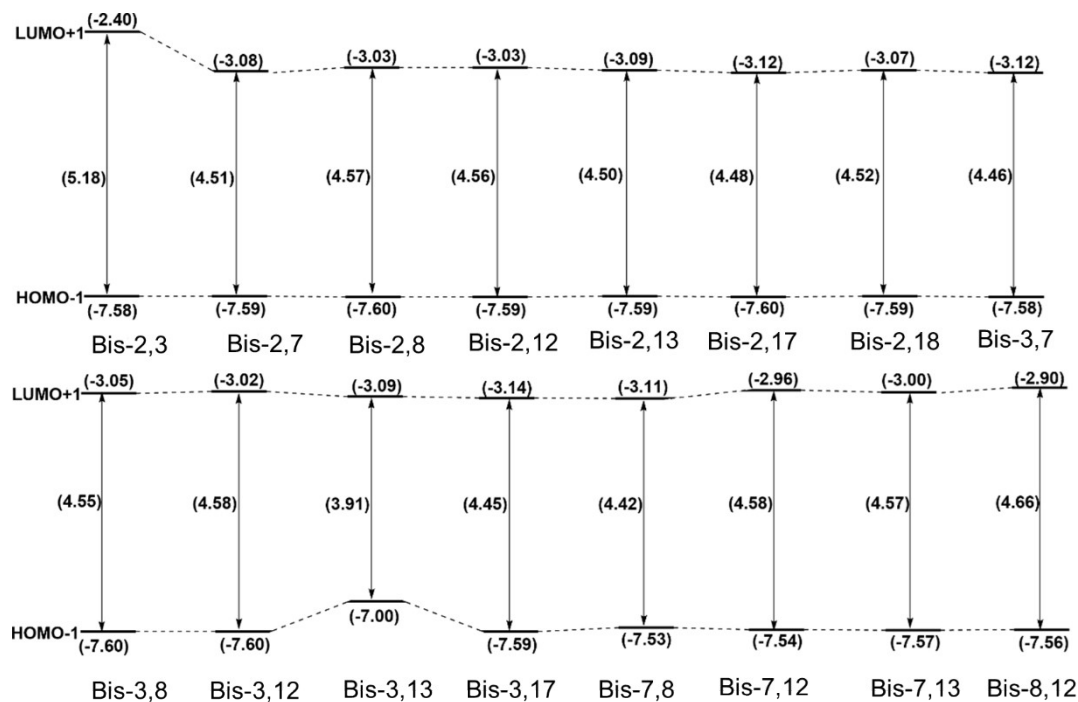


Fig S17. Calculated HOMO-1, LUMO+1 and their band gap energies (eV).

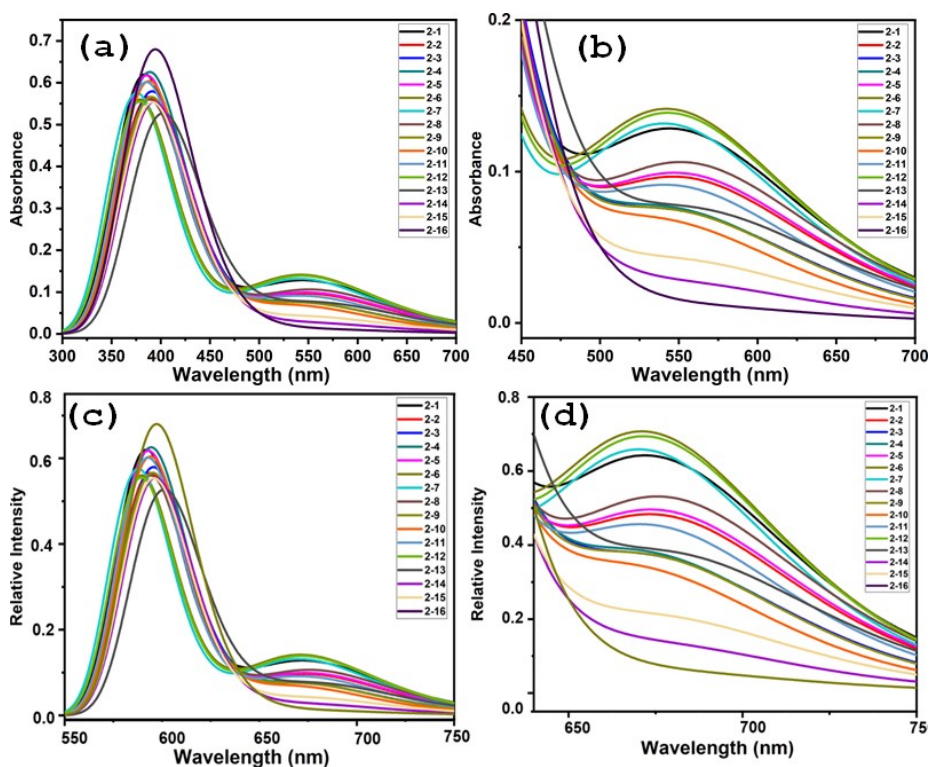
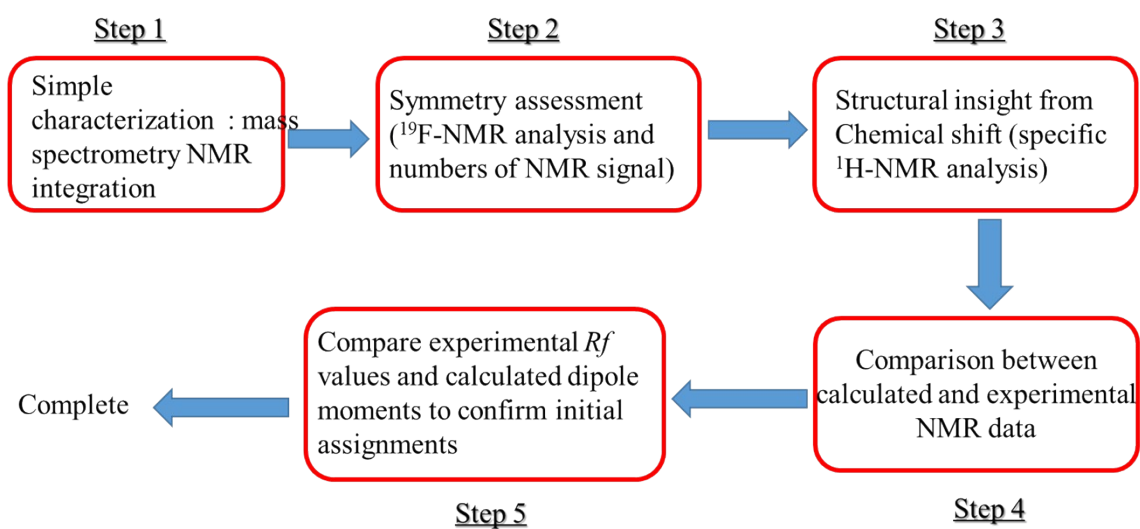


Fig S18. Calculated UV-vis and fluorescence emission spectra of all 16 bi-CF<sub>3</sub> isomers. Compounds 2-X here can be corresponded into the compounds Bis-XX in Fig S20.

**Assignment work flow  
(6 out 16 possibilities)**

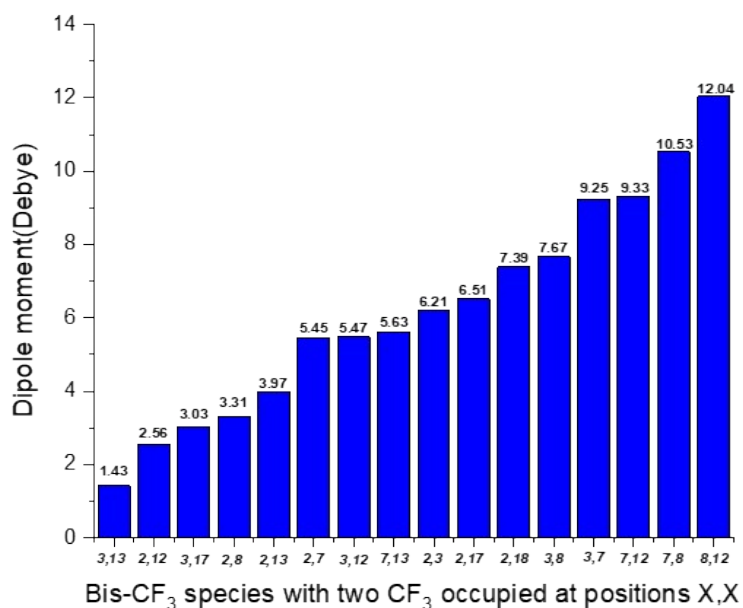


**Fig S19.** Assignment work flow of 6 bis- $\text{CF}_3$  isomers from 16 possible species.

substitution	name	2a (REF)	2b	2c	2d	2e	2f
2,3	2-1	N/A	Assigned from NMR data – no doublets in <sup>1</sup> H NMRs; one C <sub>2</sub> H atom is available; Starting material was 1b bearing a CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: already assigned to compound 2b; symmetrical condition is not compliant	N/A: already assigned to compound 2b; presence of at least one doublet in <sup>1</sup> H NMR	N/A: no doublets are predicted in <sup>1</sup> H-NMRs; symmetrical condition is not compliant
2,7	2-2	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: No signal of C <sub>12</sub> H in the <sup>1</sup> H-NMR	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; no CF <sub>3</sub> group at C <sub>2</sub> H or C <sub>12</sub> H
2,8	2-3	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H; C <sub>2</sub> H is occupied	N/A: No signal of C <sub>12</sub> H in the <sup>1</sup> H-NMR	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H
2,12	2-4	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; C <sub>12</sub> H is occupied	N/A: No signal of C <sub>12</sub> H in the <sup>1</sup> H-NMR	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H
2,13	2-5	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: No signal of C <sub>12</sub> H in the <sup>1</sup> H-NMR	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; no CF <sub>3</sub> group at C <sub>2</sub> H or C <sub>12</sub> H
2,17	2-6	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	Assigned from NMR data: matched symmetrical condition; broad C <sub>2</sub> H doublet signal and also one CF <sub>3</sub> occupy at C <sub>12</sub> H	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: No signal of C <sub>12</sub> H in the <sup>1</sup> H-NMR; symmetrical condition is not compliant	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; no CF <sub>3</sub> group at C <sub>2</sub> H or C <sub>12</sub> H
2,18	2-7	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant	N/A: symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H; no available C <sub>2</sub> H or C <sub>12</sub> H	N/A: symmetrical condition is not compliant	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H or C <sub>12</sub> H
3,7	2-8	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: symmetrical condition is not compliant	N/A: symmetrical condition is not compliant; has C <sub>2</sub> H and C <sub>12</sub> H	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H or C <sub>12</sub> H
3,8	2-9	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: symmetrical condition is not compliant; C <sub>2</sub> H is occupied	N/A: symmetrical condition is not compliant; has C <sub>2</sub> H and C <sub>12</sub> H	Assigned from NMR data: not C <sub>2v</sub> symmetry; should have C <sub>2</sub> H or C <sub>12</sub> H (showed chemical shift at 9.85 ppm); should have available C <sub>2</sub> H or C <sub>12</sub> H; the shape of <sup>1</sup> H-NMR looks like the superimposition of 1b and 1d. Starting material was 1b bearing a CF <sub>3</sub> group at C <sub>2</sub> H
3,12	2-10	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: symmetrical condition is not compliant; C <sub>12</sub> H is occupied	N/A: symmetrical condition is not compliant; has C <sub>2</sub> H and C <sub>12</sub> H	N/A: symmetrical condition is not compliant
3,13	2-11	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H but it did not	Assigned from NMR data: should have available C <sub>2</sub> H or C <sub>12</sub> H (showed chemical shift at 9.80 ppm); should contain C <sub>2</sub> H and C <sub>12</sub> H (showed chemical shift from 8.89-8.84 ppm); Starting material was 1b bearing a CF <sub>3</sub> group at C <sub>2</sub> H; near C <sub>2v</sub> symmetry from <sup>19</sup> F-NMR.	N/A: symmetrical condition is not compliant; has C <sub>2</sub> H and C <sub>12</sub> H	N/A: already assigned to compound 2d; no CF <sub>3</sub> group at C <sub>2</sub> H or C <sub>12</sub> H; symmetrical condition is not compliant
3,17	2-12	Structurally characterized, symmetrical NMR spectrum	N/A: already structurally characterized as compound 2a	N/A: already structurally characterized as compound 2a	N/A: already structurally characterized as compound 2a	N/A: already structurally characterized as compound 2a	N/A: already structurally characterized as compound 2a
7,8	2-13	N/A	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: presence of at least one doublet in <sup>1</sup> H NMR	N/A: symmetrical condition is not compliant; C <sub>2</sub> H is occupied; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; has C <sub>2</sub> H and C <sub>12</sub> H; presence of at least one doublet in <sup>1</sup> H NMR	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; symmetrical condition is not compliant
7,12	2-14	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H and another CF <sub>3</sub> should at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: C <sub>12</sub> H is occupied; no CF <sub>3</sub> group at C <sub>2</sub> H	Assigned from NMR data showing NMR that has C <sub>2</sub> H or C <sub>12</sub> H signal and C <sub>12</sub> H or C <sub>12</sub> H signal and not C <sub>2v</sub> symmetry	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; symmetrical condition is not compliant
7,13	2-15	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H and another CF <sub>3</sub> should at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; has C <sub>2</sub> H and C <sub>12</sub> H	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; symmetrical condition is not compliant
8,12	2-16	N/A	N/A: doublets are predicted in <sup>1</sup> H NMRs; symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H	N/A: symmetrical condition is not compliant; one CF <sub>3</sub> should occupy at C <sub>2</sub> H or C <sub>12</sub> H and another CF <sub>3</sub> should at C <sub>2</sub> H or C <sub>12</sub> H but it did not	N/A: symmetrical condition is not compliant; no CF <sub>3</sub> group at C <sub>2</sub> H; no available C <sub>2</sub> H and C <sub>12</sub> H	N/A: symmetrical condition is not compliant; has C <sub>2</sub> H and C <sub>12</sub> H	N/A: no CF <sub>3</sub> group at C <sub>2</sub> H; symmetrical condition is not compliant

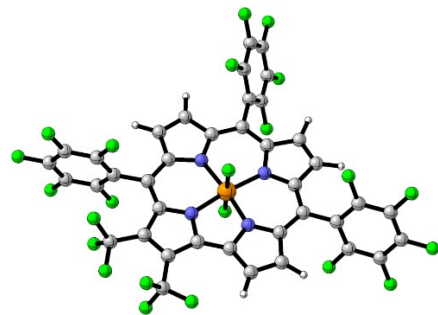
Fig S20. NMR assignments of all 6 isomers in table form with individual reasons for assignments clarified.





**Figure 21.** DFT calculated dipole moments of all 16 bis-isomers with incrementally increased dipole moment from left to right.

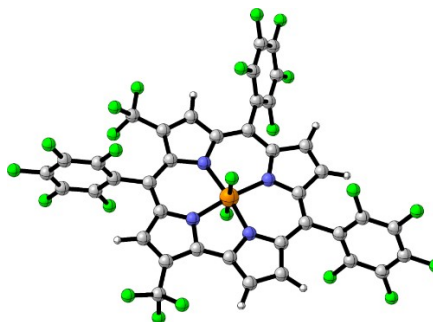
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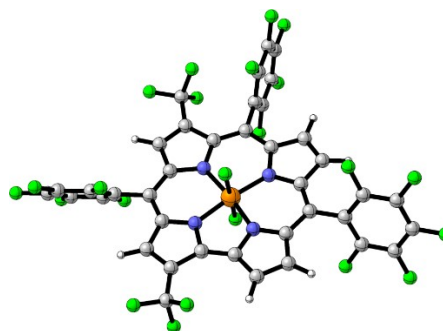
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F	8.56600	1.35314	0.01351
F	-1.25282	7.25780	-2.05948
F	-2.44956	8.34073	0.18576
N	0.71924	1.13956	0.02007
N	1.20486	-1.47235	-0.00411
N	-1.18171	-2.04149	-0.01101
N	-1.97056	0.49003	0.00777
P	-0.32521	-0.40038	0.00352
F	-0.32848	-0.40200	1.74701
F	-0.32366	-0.37507	-1.73980
F	-5.30347	-0.96520	-2.24851
F	-8.91877	-3.30227	-0.19627
F	-7.89085	-1.84823	-2.31194
F	-4.74275	-2.96799	2.08285
F	-7.32710	-3.85839	1.99574
F	4.53983	0.45533	-2.38501
F	-2.34332	4.07467	2.31756
F	-0.60945	4.59793	-2.12944
C	-0.38061	-3.16439	-0.02340
C	2.56181	-1.21038	-0.00330
C	0.23916	2.45166	0.05142
C	-2.50940	-2.42446	-0.03704
C	0.98318	-2.83741	-0.01633
C	-3.25294	-0.10608	-0.01508
C	-3.53560	-1.47508	-0.04217
C	-2.14354	1.87511	0.03681
C	-1.21425	-4.30958	-0.05527
C	-2.52744	-3.85519	-0.06588



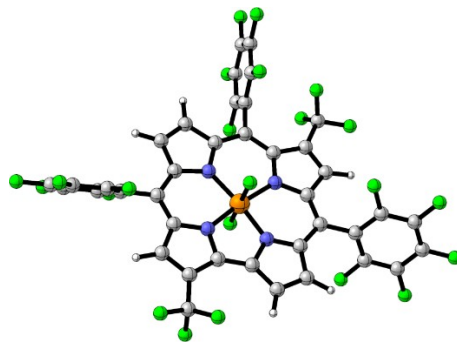
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C	-4.94891	-1.93781	-0.07904				
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C	-1.10717	2.81363	0.05971				
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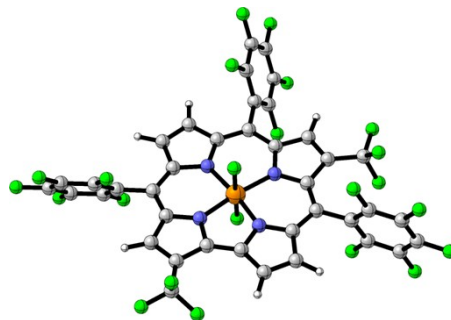
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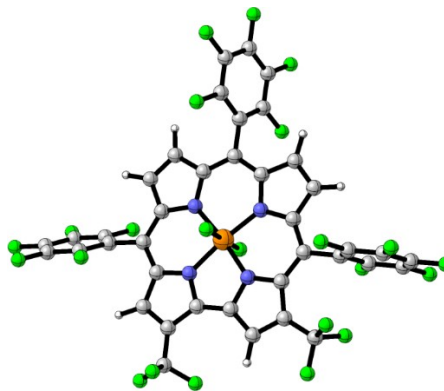
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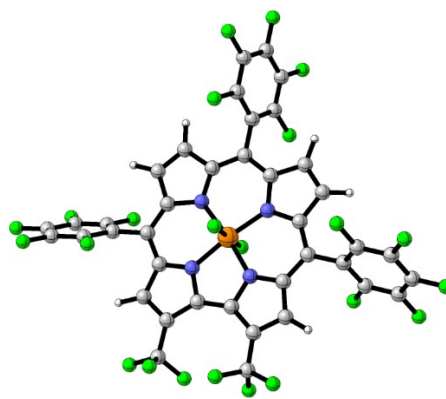
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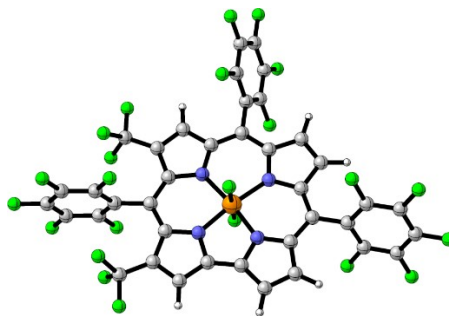
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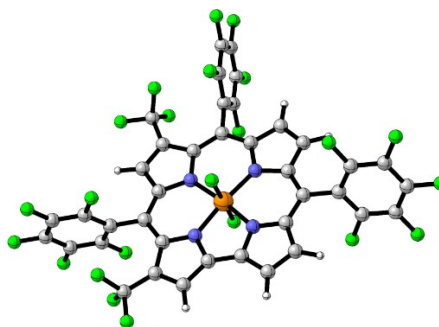
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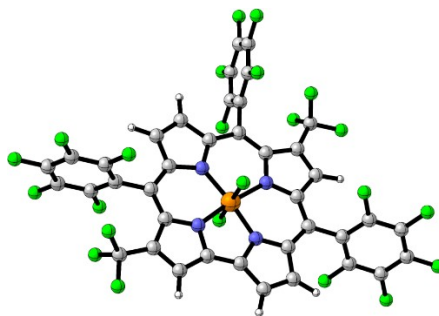


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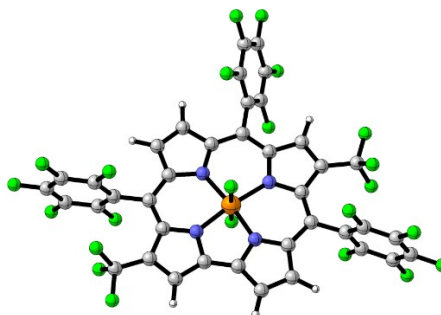




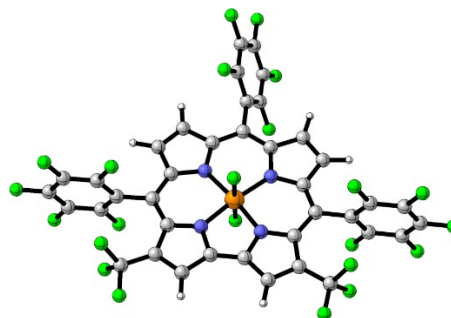
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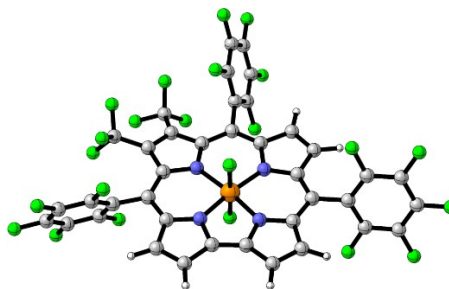
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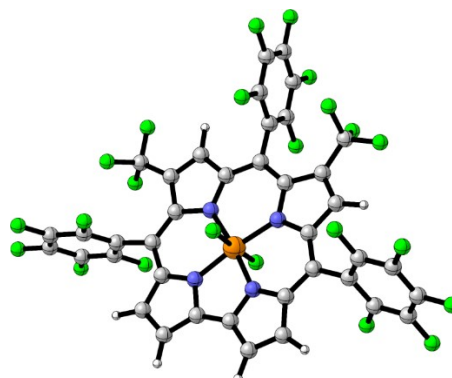
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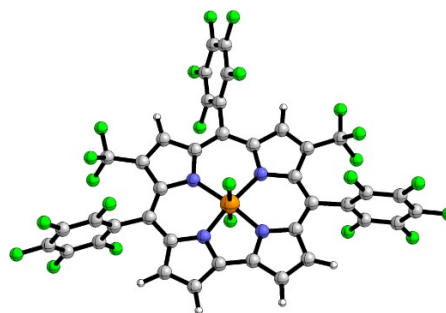
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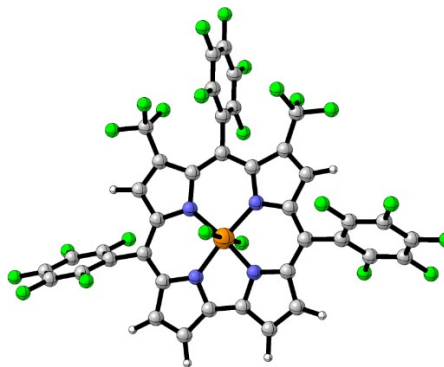
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