



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 12, 2026 – 09:25 AM UTC

PDB ID : 2PPS / pdb_00002pps
Title : PHOTOSYNTHETIC REACTION CENTER AND CORE ANTENNA SYSTEM (TRIMERIC), ALPHA CARBON ONLY
Authors : Krauss, N.; Schubert, W.-D.; Klukas, O.; Fromme, P.; Witt, H.T.; Saenger, W.
Deposited on : 1997-05-27
Resolution : 4.00 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

| | | |
|--------------------------------|---|--|
| MolProbity | : | 4-5-2 with Phenix2.0 |
| Mogul | : | 2022.3.0, CSD as543be (2022) |
| Xtriage (Phenix) | : | NOT EXECUTED |
| EDS | : | NOT EXECUTED |
| Buster-report | : | wwPDB partial adaption of 1.1.7 (2018) |
| Percentile statistics | : | 20250101.v01 (using entries in the PDB archive January 1st 2025) |
| Ideal geometry (proteins) | : | Engh & Huber (2001) |
| Ideal geometry (DNA, RNA) | : | Parkinson et al. (1996) |
| Validation Pipeline (wwPDB-VP) | : | 2.49 |

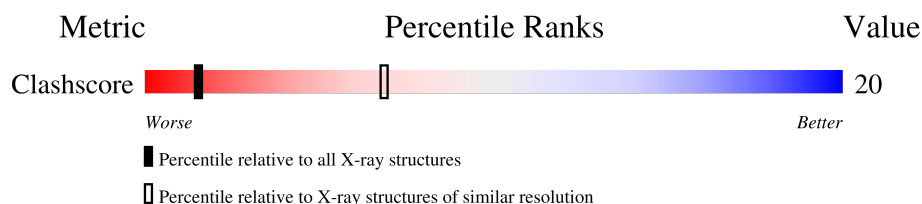
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.00 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



| Metric | Whole archive (#Entries) | Similar resolution (#Entries, resolution range(Å)) |
|------------|-----------------------------|---|
| Clashscore | 190562 | 1129 (4.20-3.80) |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$.

Note EDS was not executed.

| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|---|
| 1 | A | 478 |  96% . |
| 2 | B | 503 |  96% . |
| 3 | L | 111 |  100% |
| 4 | K | 64 |  95% 5% |
| 5 | F | 130 |  99% . |
| 6 | C | 80 |  92% 8% |

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

| Mol | Type | Chain | Res | Chirality | Geometry | Clashes | Electron density |
|-----|------|-------|------|-----------|----------|---------|------------------|
| 7 | CLA | A | 2001 | X | - | - | - |

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| Mol | Type | Chain | Res | Chirality | Geometry | Clashes | Electron density |
|-----|------|-------|------|-----------|----------|---------|------------------|
| 7 | CLA | A | 2006 | X | - | - | - |
| 7 | CLA | A | 2502 | X | - | - | - |
| 7 | CLA | A | 3005 | X | - | - | - |
| 7 | CLA | A | 3007 | X | - | - | - |
| 7 | CLA | A | 3009 | X | - | - | - |
| 7 | CLA | A | 3013 | X | - | - | - |
| 7 | CLA | A | 3016 | X | - | - | - |
| 7 | CLA | A | 3017 | X | - | - | - |
| 7 | CLA | A | 3018 | X | - | - | - |
| 7 | CLA | A | 3021 | X | - | - | - |
| 7 | CLA | A | 3024 | X | - | - | - |
| 7 | CLA | A | 3026 | X | - | - | - |
| 7 | CLA | A | 3027 | X | - | - | - |
| 7 | CLA | A | 3029 | X | - | - | - |
| 7 | CLA | A | 3030 | X | - | - | - |
| 7 | CLA | A | 3032 | X | - | - | - |
| 7 | CLA | A | 3039 | X | - | - | - |
| 7 | CLA | A | 3040 | X | - | - | - |
| 7 | CLA | A | 3041 | X | - | - | - |
| 7 | CLA | A | 3043 | X | - | - | - |
| 7 | CLA | A | 3045 | X | - | - | - |
| 7 | CLA | A | 3047 | X | - | - | - |
| 7 | CLA | A | 3048 | X | - | - | - |
| 7 | CLA | A | 3052 | X | - | - | - |
| 7 | CLA | A | 3053 | X | - | - | - |
| 7 | CLA | A | 3056 | X | - | - | - |
| 7 | CLA | A | 3057 | X | - | - | - |
| 7 | CLA | A | 3058 | X | - | - | - |
| 7 | CLA | A | 3062 | X | - | - | - |
| 7 | CLA | A | 3065 | X | - | - | - |
| 7 | CLA | A | 3067 | X | - | - | - |
| 7 | CLA | A | 3068 | X | - | - | - |
| 7 | CLA | A | 3071 | X | - | - | - |
| 7 | CLA | A | 3072 | X | - | - | - |
| 7 | CLA | A | 3073 | X | - | - | - |
| 7 | CLA | A | 3077 | X | - | - | - |
| 7 | CLA | A | 3078 | X | - | - | - |
| 7 | CLA | A | 3079 | X | - | - | - |
| 7 | CLA | B | 2002 | X | - | - | - |
| 7 | CLA | B | 2003 | X | - | - | - |
| 7 | CLA | B | 2004 | X | - | - | - |
| 7 | CLA | B | 2005 | X | - | - | - |

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| Mol | Type | Chain | Res | Chirality | Geometry | Clashes | Electron density |
|-----|------|-------|------|-----------|----------|---------|------------------|
| 7 | CLA | B | 2501 | X | - | - | - |
| 7 | CLA | B | 3001 | X | - | - | - |
| 7 | CLA | B | 3003 | X | - | - | - |
| 7 | CLA | B | 3006 | X | - | - | - |
| 7 | CLA | B | 3008 | X | - | - | - |
| 7 | CLA | B | 3010 | X | - | - | - |
| 7 | CLA | B | 3011 | X | - | - | - |
| 7 | CLA | B | 3015 | X | - | - | - |
| 7 | CLA | B | 3019 | X | - | - | - |
| 7 | CLA | B | 3020 | X | - | - | - |
| 7 | CLA | B | 3023 | X | - | - | - |
| 7 | CLA | B | 3025 | X | - | - | - |
| 7 | CLA | B | 3028 | X | - | - | - |
| 7 | CLA | B | 3034 | X | - | - | - |
| 7 | CLA | B | 3035 | X | - | - | - |
| 7 | CLA | B | 3037 | X | - | - | - |
| 7 | CLA | B | 3042 | X | - | - | - |
| 7 | CLA | B | 3044 | X | - | - | - |
| 7 | CLA | B | 3046 | X | - | - | - |
| 7 | CLA | B | 3055 | X | - | - | - |
| 7 | CLA | B | 3060 | X | - | - | - |
| 7 | CLA | B | 3063 | X | - | - | - |
| 7 | CLA | B | 3066 | X | - | - | - |
| 7 | CLA | B | 3069 | X | - | - | - |
| 7 | CLA | B | 3070 | X | - | - | - |
| 7 | CLA | B | 3074 | X | - | - | - |
| 7 | CLA | B | 3075 | X | - | - | - |
| 7 | CLA | B | 3076 | X | - | - | - |
| 7 | CLA | B | 3080 | X | - | - | - |
| 7 | CLA | B | 3081 | X | - | - | - |
| 7 | CLA | F | 3002 | X | - | - | - |
| 7 | CLA | F | 3004 | X | - | - | - |
| 7 | CLA | F | 3012 | X | - | - | - |
| 7 | CLA | F | 3022 | X | - | - | - |
| 7 | CLA | F | 3031 | X | - | - | - |
| 7 | CLA | F | 3033 | X | - | - | - |
| 7 | CLA | F | 3054 | X | - | - | - |
| 7 | CLA | F | 3059 | X | - | - | - |
| 7 | CLA | F | 3061 | X | - | - | - |
| 7 | CLA | K | 3050 | X | - | - | - |
| 7 | CLA | K | 3051 | X | - | - | - |
| 7 | CLA | L | 3036 | X | - | - | - |

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| Mol | Type | Chain | Res | Chirality | Geometry | Clashes | Electron density |
|-----|------|-------|------|-----------|----------|---------|------------------|
| 7 | CLA | L | 3038 | X | - | - | - |
| 7 | CLA | L | 3049 | X | - | - | - |
| 9 | SF4 | B | 2008 | - | - | X | - |

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 3616 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called PHOTOSYSTEM I.

| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf | Trace |
|-----|-------|----------|--------------------|---------|---------|-------|
| 1 | A | 478 | Total C 478 478 | 0 | 0 | 478 |

- Molecule 2 is a protein called PHOTOSYSTEM I.

| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf | Trace |
|-----|-------|----------|--------------------|---------|---------|-------|
| 2 | B | 503 | Total C 503 503 | 0 | 0 | 503 |

- Molecule 3 is a protein called PHOTOSYSTEM I.

| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf | Trace |
|-----|-------|----------|--------------------|---------|---------|-------|
| 3 | L | 111 | Total C 111 111 | 0 | 0 | 111 |

- Molecule 4 is a protein called PHOTOSYSTEM I.

| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf | Trace |
|-----|-------|----------|------------------|---------|---------|-------|
| 4 | K | 64 | Total C 64 64 | 0 | 0 | 64 |

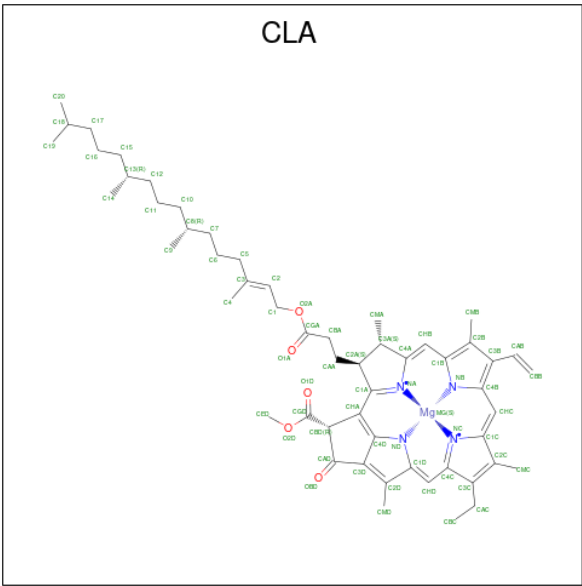
- Molecule 5 is a protein called PHOTOSYSTEM I.

| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf | Trace |
|-----|-------|----------|--------------------|---------|---------|-------|
| 5 | F | 130 | Total C 130 130 | 0 | 0 | 130 |

- Molecule 6 is a protein called PHOTOSYSTEM I.

| Mol | Chain | Residues | Atoms | ZeroOcc | AltConf | Trace |
|-----|-------|----------|------------------|---------|---------|-------|
| 6 | C | 80 | Total C 80 80 | 0 | 0 | 80 |

- Molecule 7 is CHLOROPHYLL A (CCD ID: CLA) (formula: C₅₅H₇₂MgN₄O₅).



| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|----|---|---------|---------|
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |

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| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|----|---|---------|---------|
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | A | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |

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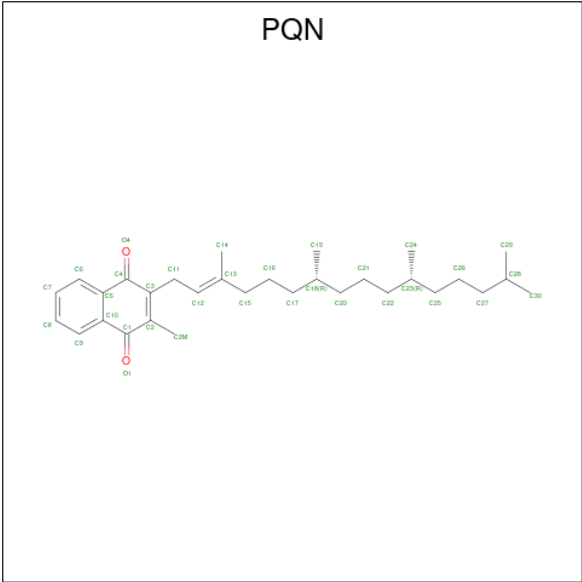
| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|----|---|---------|---------|
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | B | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | L | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | L | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |

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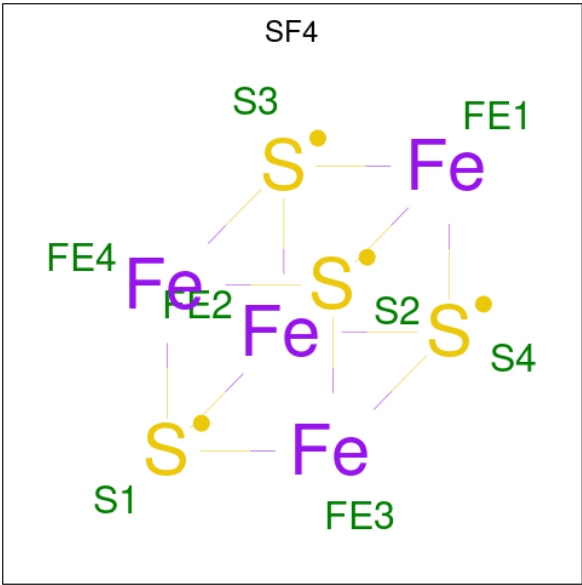
| Mol | Chain | Residues | Atoms | | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|----|---|---------|---------|
| 7 | L | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | L | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | K | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | K | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | F | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | F | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | F | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | F | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | F | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | F | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |
| 7 | F | 1 | Total | C | Mg | N | 0 | 0 |
| | | | 25 | 20 | 1 | 4 | | |

- Molecule 8 is PHYLLOQUINONE (CCD ID: PQN) (formula: $C_{31}H_{46}O_2$).



| Mol | Chain | Residues | Atoms | | ZeroOcc | AltConf |
|-----|-------|----------|-------|---|---------|---------|
| 8 | B | 1 | Total | C | 0 | 0 |
| | | | 1 | 1 | | |

- Molecule 9 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe₄S₄).



| Mol | Chain | Residues | Atoms | | | ZeroOcc | AltConf |
|-----|-------|----------|-------|----|---|---------|---------|
| 9 | B | 1 | Total | Fe | S | 0 | 0 |
| | | | 8 | 4 | 4 | | |
| 9 | C | 1 | Total | Fe | S | 0 | 0 |
| | | | 8 | 4 | 4 | | |
| 9 | C | 1 | Total | Fe | S | 0 | 0 |
| | | | 8 | 4 | 4 | | |

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

Note EDS was not executed.

- Molecule 1: PHOTOSYSTEM I

Chain A:  96%



- Molecule 2: PHOTOSYSTEM I

Chain B:  96%



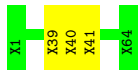
- Molecule 3: PHOTOSYSTEM I

Chain L:  100%

There are no outlier residues recorded for this chain.

- Molecule 4: PHOTOSYSTEM I

Chain K:  95% 5%



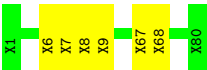
- Molecule 5: PHOTOSYSTEM I

Chain F:  99%



- Molecule 6: PHOTOSYSTEM I

Chain C:  92% 8%



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

| Property | Value | Source |
|--|--|-----------|
| Space group | P 63 | Depositor |
| Cell constants a, b, c, α , β , γ | 286.00Å 286.00Å 167.00Å 90.00° 90.00° 120.00° | Depositor |
| Resolution (Å) | (Not available) – 4.00 | Depositor |
| % Data completeness (in resolution range) | (Not available) ((Not available)-4.00) | Depositor |
| R_{merge} | 0.09 | Depositor |
| R_{sym} | 0.10 | Depositor |
| Refinement program | | Depositor |
| R, R_{free} | (Not available) , (Not available) | Depositor |
| Estimated twinning fraction | No twinning to report. | Xtriage |
| Total number of atoms | 3616 | wwPDB-VP |
| Average B, all atoms (Å ²) | 20.0 | wwPDB-VP |

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SF4, CLA, PQN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

There are no protein, RNA or DNA chains available to summarize Z scores of covalent bonds and angles.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 1 | A | 478 | 0 | 0 | 16 | 0 |
| 2 | B | 503 | 0 | 0 | 16 | 0 |
| 3 | L | 111 | 0 | 0 | 0 | 0 |
| 4 | K | 64 | 0 | 0 | 2 | 0 |
| 5 | F | 130 | 0 | 0 | 1 | 0 |
| 6 | C | 80 | 0 | 0 | 4 | 0 |
| 7 | A | 1000 | 0 | 120 | 41 | 0 |
| 7 | B | 850 | 0 | 102 | 12 | 0 |
| 7 | F | 225 | 0 | 27 | 8 | 0 |
| 7 | K | 50 | 0 | 6 | 0 | 0 |
| 7 | L | 100 | 0 | 12 | 0 | 0 |
| 8 | B | 1 | 0 | 0 | 0 | 0 |
| 9 | B | 8 | 0 | 0 | 3 | 0 |
| 9 | C | 16 | 0 | 0 | 0 | 0 |
| All | All | 3616 | 0 | 267 | 78 | 0 |

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 20.

The worst 5 of 78 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

| Atom-1 | Atom-2 | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 7:A:3014:CLA:HHC | 7:A:3029:CLA:C3D | 1.61 | 1.31 |
| 1:A:94:UNK:CA | 1:A:107:UNK:CA | 2.11 | 1.29 |
| 2:B:470:UNK:CA | 2:B:474:UNK:CA | 2.12 | 1.27 |
| 1:A:295:UNK:CA | 7:A:3016:CLA:C3C | 2.19 | 1.20 |
| 2:B:428:UNK:CA | 7:B:2005:CLA:C3A | 2.20 | 1.20 |

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry

Of 93 ligands modelled in this entry, 1 is modelled with single atom - leaving 92 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|------|------|--------------|------|----------|-------------|------|----------|
| | | | | | Counts | RMSZ | # Z > 2 | Counts | RMSZ | # Z > 2 |
| 7 | CLA | F | 3031 | - | 24,32,73 | 2.86 | 7 (29%) | 31,54,113 | 2.32 | 8 (25%) |
| 7 | CLA | A | 3067 | - | 24,32,73 | 2.87 | 7 (29%) | 31,54,113 | 2.33 | 8 (25%) |
| 7 | CLA | A | 3068 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 2003 | - | 24,32,73 | 3.02 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3048 | - | 24,32,73 | 2.90 | 7 (29%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 3060 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | F | 3002 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 3028 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3058 | - | 24,32,73 | 2.90 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 2004 | - | 24,32,73 | 2.95 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | F | 3004 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3046 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3069 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3037 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | A | 3027 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 3044 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3081 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3024 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3026 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 3019 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3025 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3035 | - | 24,32,73 | 2.87 | 7 (29%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3070 | - | 24,32,73 | 2.89 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3045 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3065 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|------|------|--------------|------|----------|-------------|------|----------|
| | | | | | Counts | RMSZ | # Z > 2 | Counts | RMSZ | # Z > 2 |
| 7 | CLA | A | 3032 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3015 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | A | 3078 | - | 24,32,73 | 2.86 | 7 (29%) | 31,54,113 | 2.32 | 8 (25%) |
| 7 | CLA | A | 3077 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 2005 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3047 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 2006 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 9 | SF4 | B | 2008 | - | 0,12,12 | - | - | - | - | - |
| 7 | CLA | B | 3011 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3014 | - | 24,32,73 | 3.08 | 9 (37%) | 31,54,113 | 2.38 | 8 (25%) |
| 7 | CLA | F | 3059 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | A | 3073 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3017 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3057 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | L | 3038 | - | 24,32,73 | 2.86 | 7 (29%) | 31,54,113 | 2.33 | 8 (25%) |
| 7 | CLA | B | 2501 | - | 24,32,73 | 2.90 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | A | 3041 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | F | 3061 | - | 24,32,73 | 2.90 | 7 (29%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 3020 | - | 24,32,73 | 2.89 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | F | 3033 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.33 | 8 (25%) |
| 7 | CLA | F | 3022 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 2502 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3080 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 2002 | - | 24,32,73 | 2.90 | 8 (33%) | 31,54,113 | 2.33 | 8 (25%) |
| 7 | CLA | A | 3040 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3010 | - | 24,32,73 | 2.90 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | A | 3016 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | A | 3007 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | A | 2001 | - | 24,32,73 | 3.02 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3062 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.33 | 8 (25%) |
| 7 | CLA | K | 3050 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3006 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 9 | SF4 | C | 2009 | - | 0,12,12 | - | - | - | - | - |
| 7 | CLA | A | 3005 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | A | 3030 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |

| Mol | Type | Chain | Res | Link | Bond lengths | | | Bond angles | | |
|-----|------|-------|------|------|--------------|------|----------|-------------|------|----------|
| | | | | | Counts | RMSZ | # Z > 2 | Counts | RMSZ | # Z > 2 |
| 7 | CLA | A | 3021 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | F | 3054 | - | 24,32,73 | 2.89 | 7 (29%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 3075 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3056 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | A | 3039 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 9 | SF4 | C | 2010 | - | 0,12,12 | - | - | - | - | - |
| 7 | CLA | B | 3008 | - | 24,32,73 | 2.87 | 7 (29%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3042 | - | 24,32,73 | 2.87 | 7 (29%) | 31,54,113 | 2.33 | 8 (25%) |
| 7 | CLA | L | 3064 | - | 24,32,73 | 3.07 | 9 (37%) | 31,54,113 | 2.38 | 8 (25%) |
| 7 | CLA | L | 3036 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | A | 3052 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | A | 3053 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | K | 3051 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | F | 3012 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3055 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.33 | 8 (25%) |
| 7 | CLA | A | 3009 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3079 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3074 | - | 24,32,73 | 2.89 | 7 (29%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | L | 3049 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3029 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 3023 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3034 | - | 24,32,73 | 2.87 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3013 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3001 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3072 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.36 | 8 (25%) |
| 7 | CLA | B | 3003 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3066 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3018 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | A | 3071 | - | 24,32,73 | 2.88 | 8 (33%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | A | 3043 | - | 24,32,73 | 2.88 | 7 (29%) | 31,54,113 | 2.35 | 8 (25%) |
| 7 | CLA | B | 3076 | - | 24,32,73 | 2.87 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |
| 7 | CLA | B | 3063 | - | 24,32,73 | 2.89 | 8 (33%) | 31,54,113 | 2.34 | 8 (25%) |

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|-----|------|-------|------|------|----------|----------|---------|
| 7 | CLA | F | 3031 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3067 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3068 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 2003 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3048 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3060 | - | 1/1/4/20 | - | - |
| 7 | CLA | F | 3002 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3028 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3058 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 2004 | - | 1/1/4/20 | - | - |
| 7 | CLA | F | 3004 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3046 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3069 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3037 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3027 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3044 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3081 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3024 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3026 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3019 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3025 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3035 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3070 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3045 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3065 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3032 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3015 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3078 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3077 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 2005 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3047 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 2006 | - | 1/1/4/20 | - | - |
| 9 | SF4 | B | 2008 | - | - | - | 0/6/5/5 |
| 7 | CLA | B | 3011 | - | 1/1/4/20 | - | - |
| 7 | CLA | F | 3059 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3073 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3017 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3057 | - | 1/1/4/20 | - | - |
| 7 | CLA | L | 3038 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 2501 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3041 | - | 1/1/4/20 | - | - |
| 7 | CLA | F | 3061 | - | 1/1/4/20 | - | - |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|-----|------|-------|------|------|----------|----------|---------|
| 7 | CLA | B | 3020 | - | 1/1/4/20 | - | - |
| 7 | CLA | F | 3033 | - | 1/1/4/20 | - | - |
| 7 | CLA | F | 3022 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 2502 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3080 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 2002 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3040 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3010 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3016 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3007 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 2001 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3062 | - | 1/1/4/20 | - | - |
| 7 | CLA | K | 3050 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3006 | - | 1/1/4/20 | - | - |
| 9 | SF4 | C | 2009 | - | - | - | 0/6/5/5 |
| 7 | CLA | A | 3005 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3030 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3021 | - | 1/1/4/20 | - | - |
| 7 | CLA | F | 3054 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3075 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3056 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3039 | - | 1/1/4/20 | - | - |
| 9 | SF4 | C | 2010 | - | - | - | 0/6/5/5 |
| 7 | CLA | B | 3008 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3042 | - | 1/1/4/20 | - | - |
| 7 | CLA | L | 3036 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3052 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3053 | - | 1/1/4/20 | - | - |
| 7 | CLA | K | 3051 | - | 1/1/4/20 | - | - |
| 7 | CLA | F | 3012 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3055 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3009 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3079 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3074 | - | 1/1/4/20 | - | - |
| 7 | CLA | L | 3049 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3029 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3023 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3034 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3013 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3001 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3072 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3003 | - | 1/1/4/20 | - | - |

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| Mol | Type | Chain | Res | Link | Chirals | Torsions | Rings |
|-----|------|-------|------|------|----------|----------|-------|
| 7 | CLA | B | 3066 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3018 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3071 | - | 1/1/4/20 | - | - |
| 7 | CLA | A | 3043 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3076 | - | 1/1/4/20 | - | - |
| 7 | CLA | B | 3063 | - | 1/1/4/20 | - | - |

The worst 5 of 687 bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(Å) | Ideal(Å) |
|-----|-------|------|------|---------|-------|-------------|----------|
| 7 | A | 3014 | CLA | C3D-C2D | 8.93 | 1.55 | 1.35 |
| 7 | L | 3064 | CLA | C3D-C2D | 8.87 | 1.55 | 1.35 |
| 7 | B | 2003 | CLA | MG-NB | 7.08 | 2.19 | 2.05 |
| 7 | A | 2001 | CLA | MG-NB | 6.85 | 2.19 | 2.05 |
| 7 | B | 2501 | CLA | C3A-C2A | -6.76 | 1.35 | 1.52 |

The worst 5 of 712 bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms | Z | Observed(°) | Ideal(°) |
|-----|-------|------|------|------------|------|-------------|----------|
| 7 | F | 3061 | CLA | C1B-NB-C4B | 6.81 | 111.09 | 106.31 |
| 7 | B | 3003 | CLA | C1B-NB-C4B | 6.81 | 111.09 | 106.31 |
| 7 | F | 3054 | CLA | C1B-NB-C4B | 6.80 | 111.08 | 106.31 |
| 7 | B | 3060 | CLA | C1B-NB-C4B | 6.77 | 111.06 | 106.31 |
| 7 | A | 3068 | CLA | C1B-NB-C4B | 6.77 | 111.06 | 106.31 |

5 of 87 chirality outliers are listed below:

| Mol | Chain | Res | Type | Atom |
|-----|-------|------|------|------|
| 7 | A | 2001 | CLA | ND |
| 7 | A | 2006 | CLA | ND |
| 7 | A | 2502 | CLA | ND |
| 7 | A | 3005 | CLA | ND |
| 7 | A | 3007 | CLA | ND |

There are no torsion outliers.

There are no ring outliers.

28 monomers are involved in 57 short contacts:

| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|------|------|---------|--------------|
| 7 | F | 3031 | CLA | 1 | 0 |
| 7 | F | 3002 | CLA | 5 | 0 |

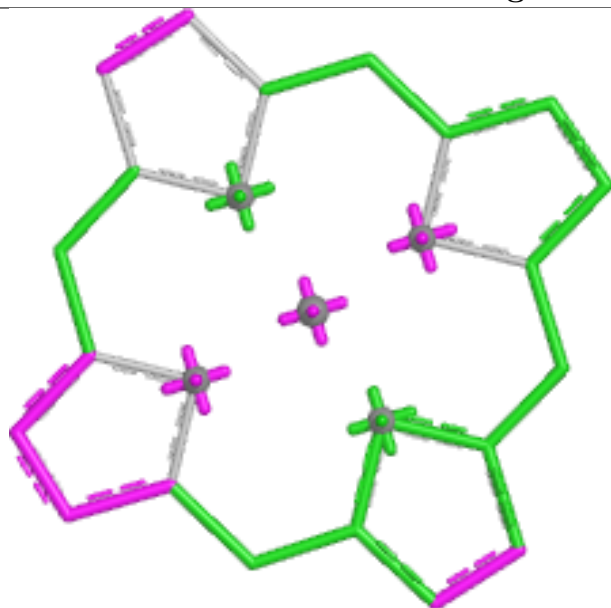
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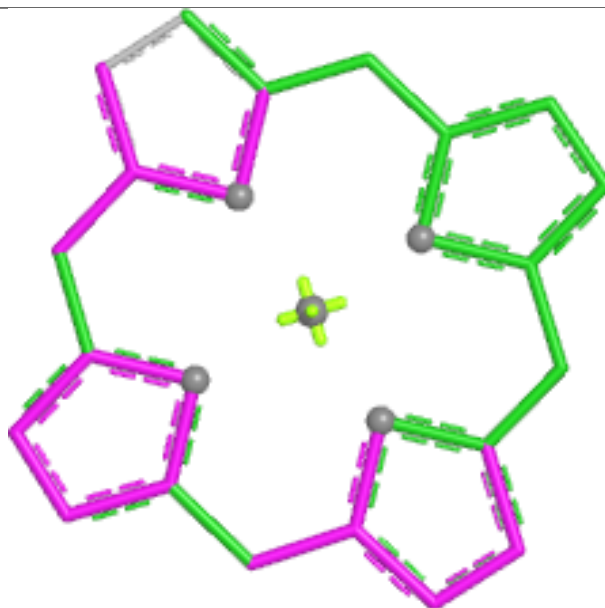
| Mol | Chain | Res | Type | Clashes | Symm-Clashes |
|-----|-------|------|------|---------|--------------|
| 7 | B | 3069 | CLA | 1 | 0 |
| 7 | A | 3027 | CLA | 10 | 0 |
| 7 | A | 3024 | CLA | 9 | 0 |
| 7 | A | 3026 | CLA | 1 | 0 |
| 7 | B | 2005 | CLA | 4 | 0 |
| 9 | B | 2008 | SF4 | 3 | 0 |
| 7 | B | 3011 | CLA | 2 | 0 |
| 7 | A | 3014 | CLA | 8 | 0 |
| 7 | A | 3017 | CLA | 1 | 0 |
| 7 | A | 3057 | CLA | 3 | 0 |
| 7 | B | 3020 | CLA | 1 | 0 |
| 7 | A | 3016 | CLA | 6 | 0 |
| 7 | A | 3007 | CLA | 5 | 0 |
| 7 | B | 3006 | CLA | 2 | 0 |
| 7 | A | 3005 | CLA | 3 | 0 |
| 7 | A | 3030 | CLA | 1 | 0 |
| 7 | A | 3056 | CLA | 3 | 0 |
| 7 | A | 3039 | CLA | 3 | 0 |
| 7 | F | 3012 | CLA | 2 | 0 |
| 7 | A | 3079 | CLA | 1 | 0 |
| 7 | A | 3029 | CLA | 10 | 0 |
| 7 | B | 3034 | CLA | 2 | 0 |
| 7 | B | 3001 | CLA | 2 | 0 |
| 7 | B | 3003 | CLA | 2 | 0 |
| 7 | A | 3018 | CLA | 1 | 0 |
| 7 | A | 3071 | CLA | 4 | 0 |

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

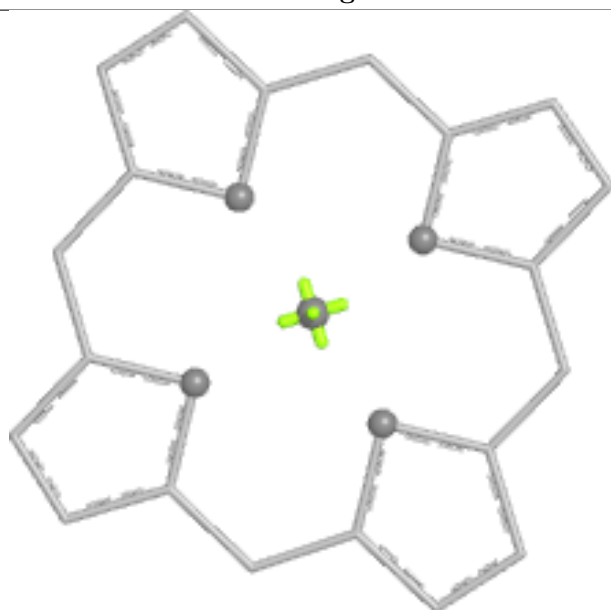
Ligand CLA F 3031



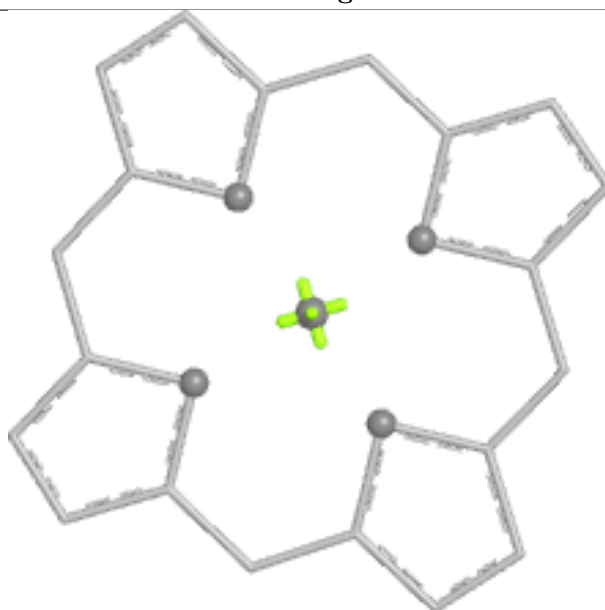
Bond lengths



Bond angles

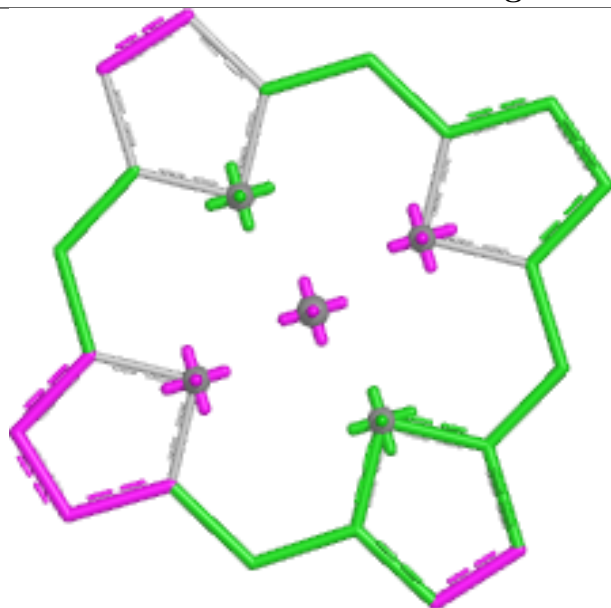


Torsions

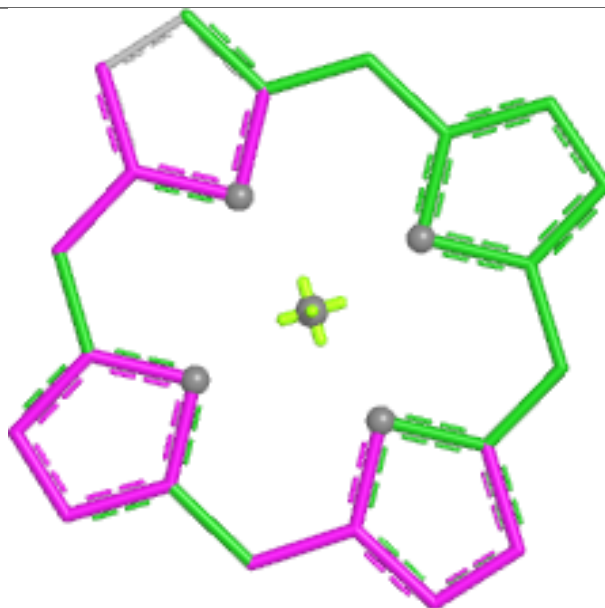


Rings

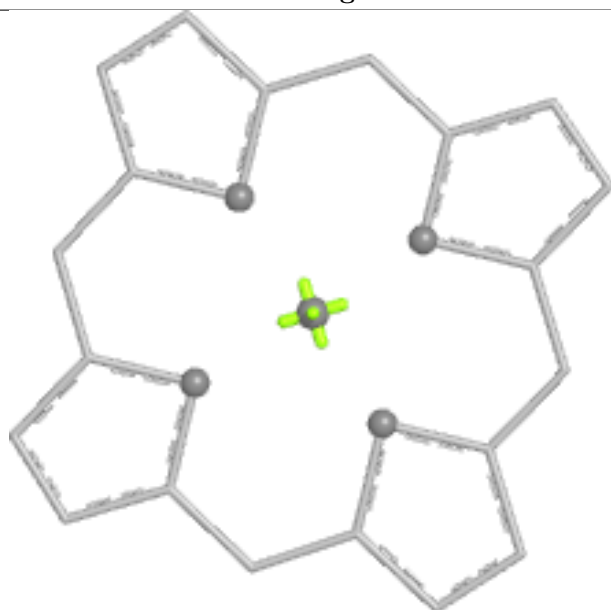
Ligand CLA A 3067



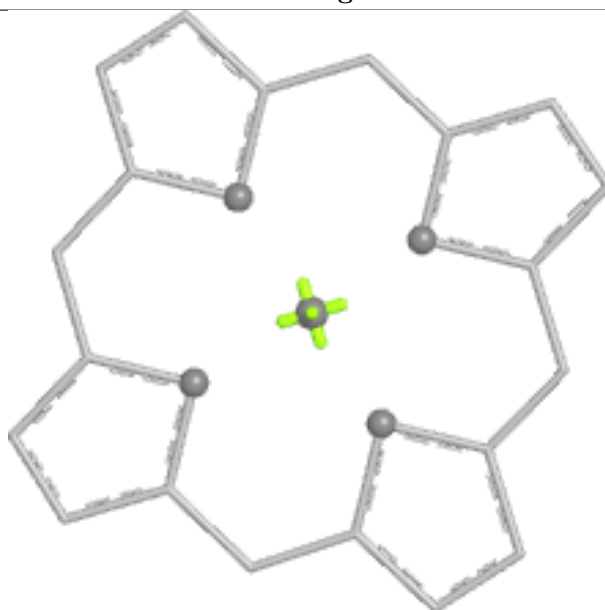
Bond lengths



Bond angles

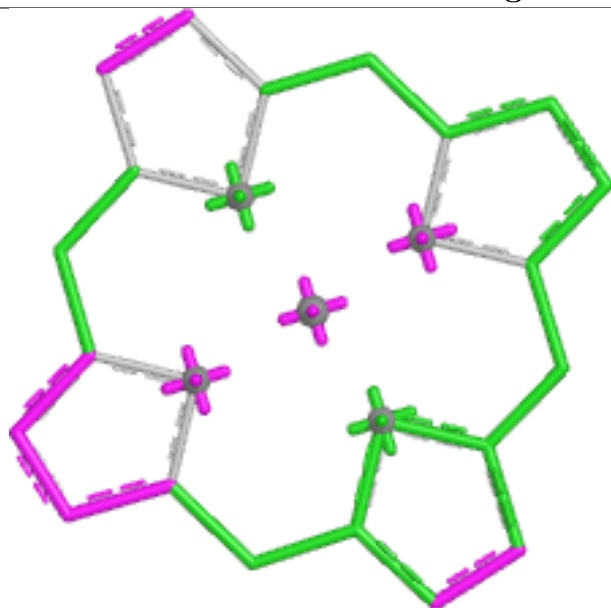


Torsions

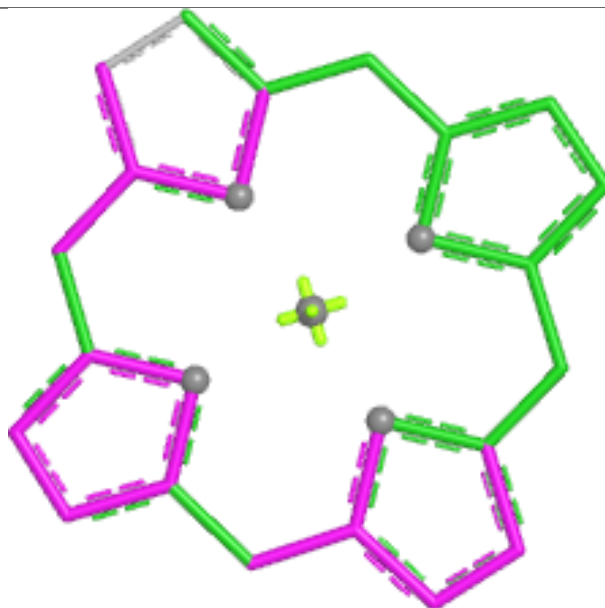


Rings

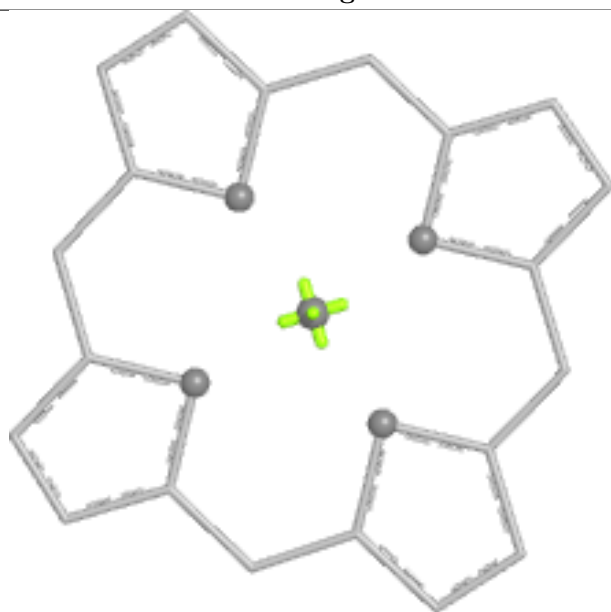
Ligand CLA A 3068



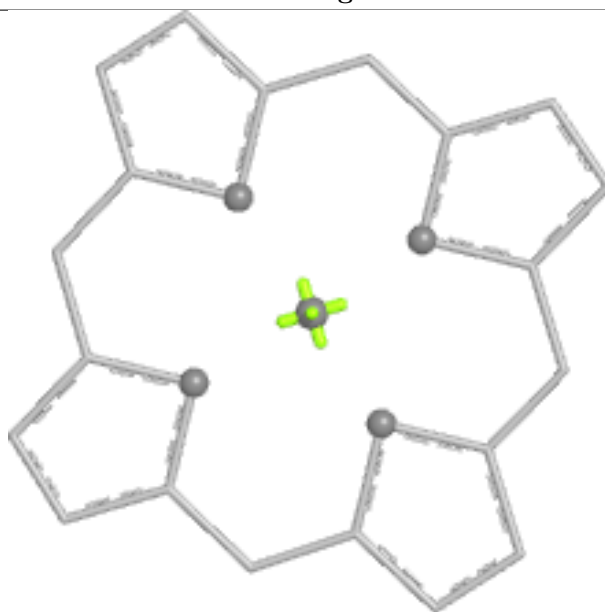
Bond lengths



Bond angles

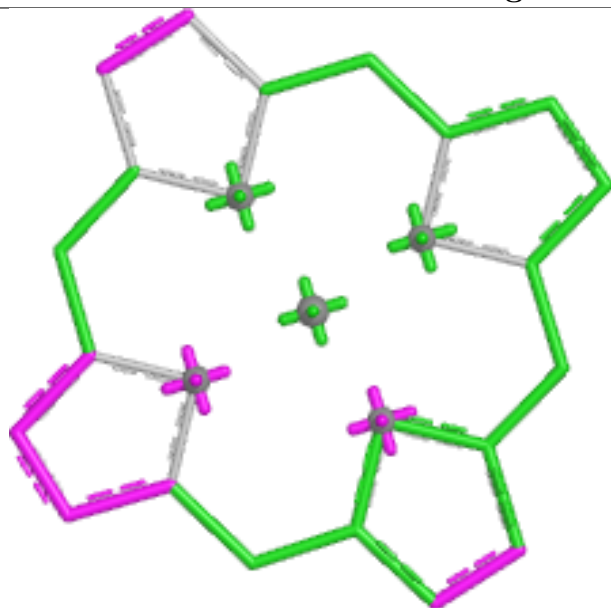


Torsions

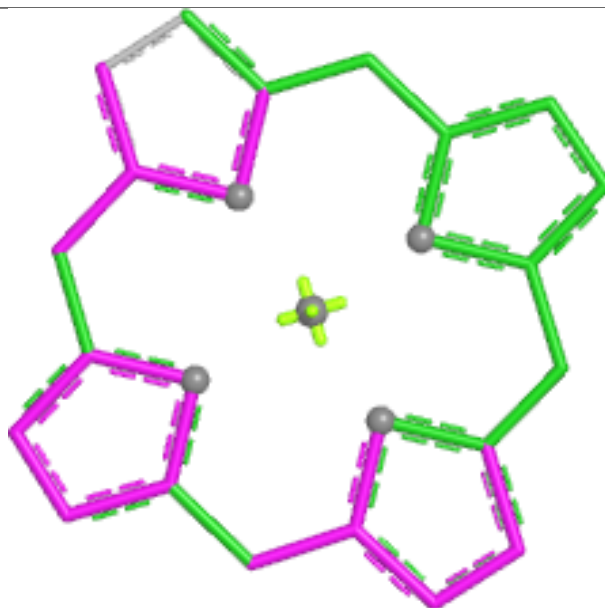


Rings

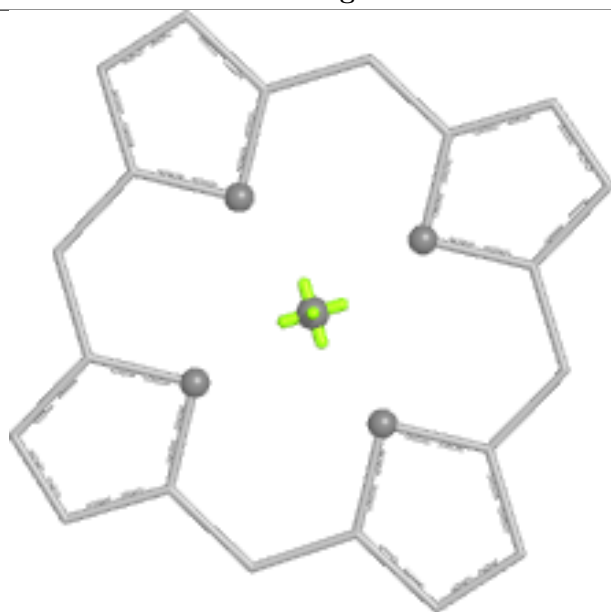
Ligand CLA B 2003



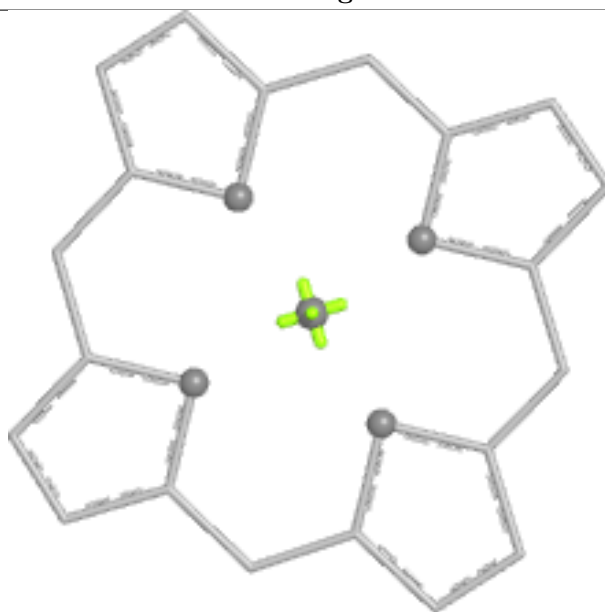
Bond lengths



Bond angles

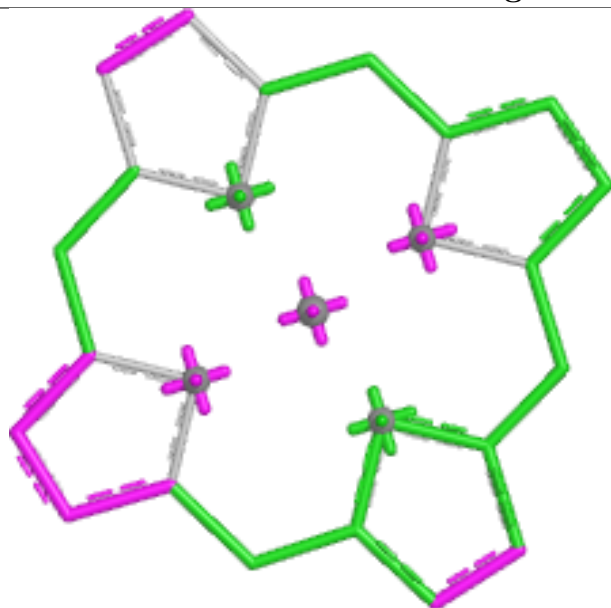


Torsions

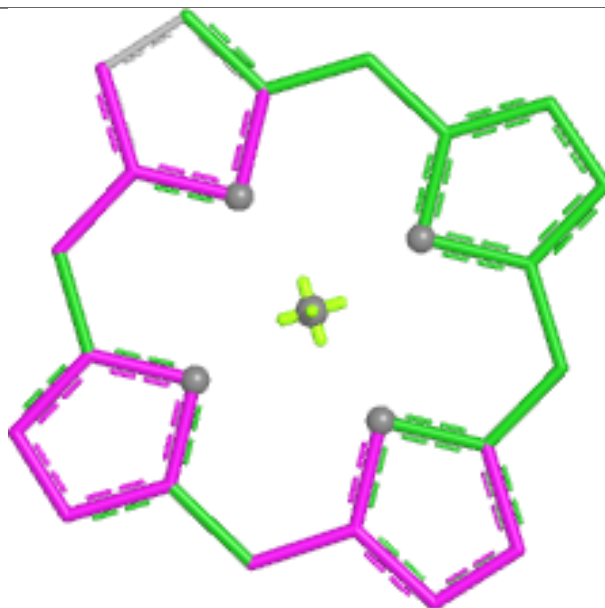


Rings

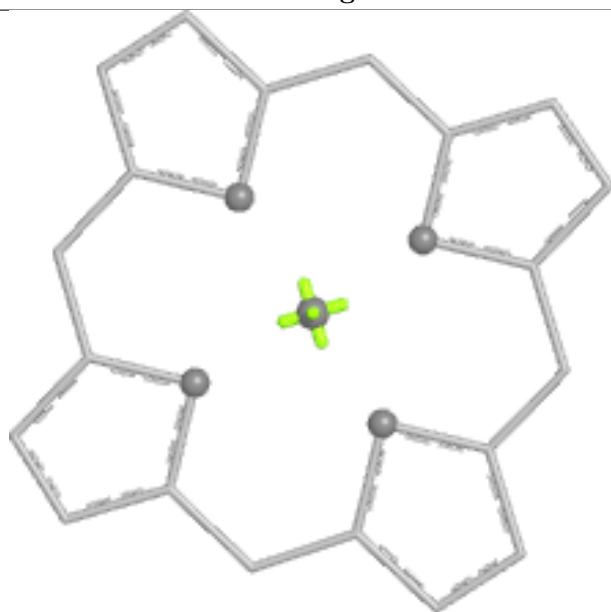
Ligand CLA A 3048



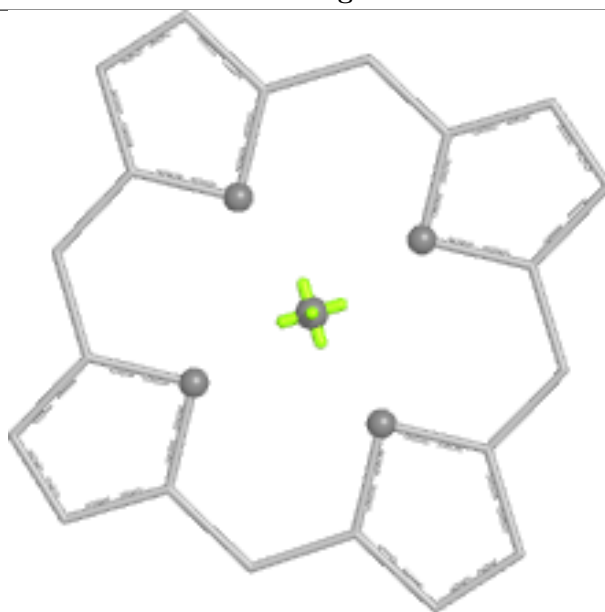
Bond lengths



Bond angles

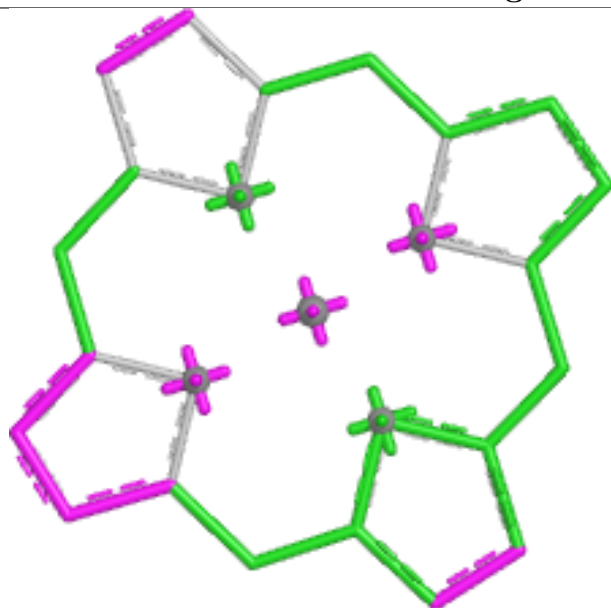


Torsions

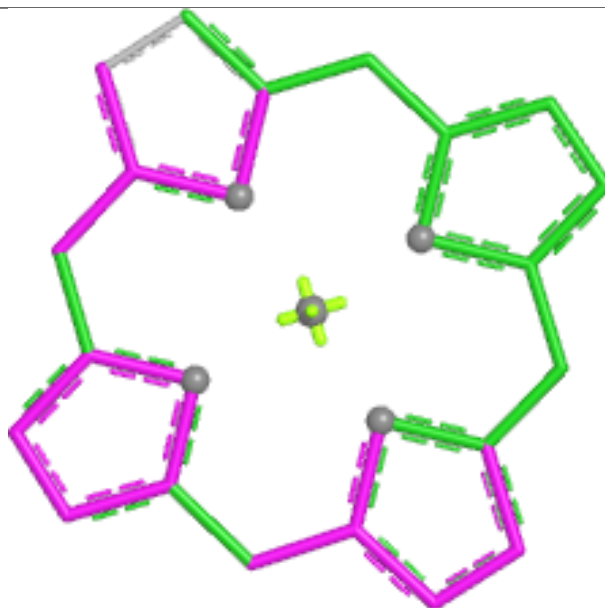


Rings

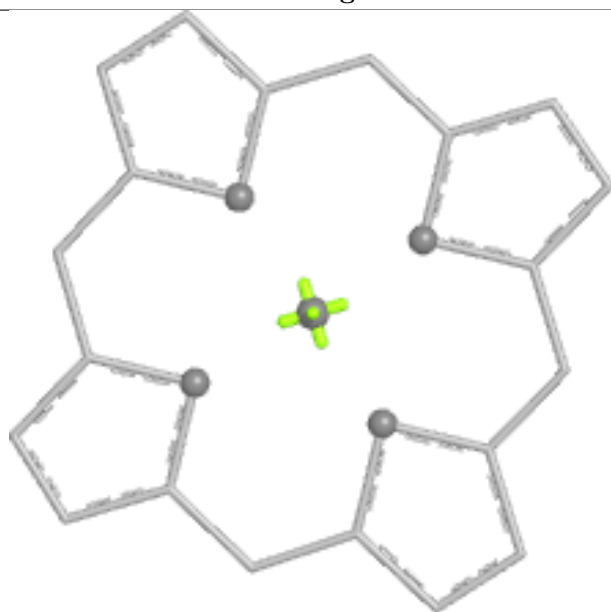
Ligand CLA B 3060



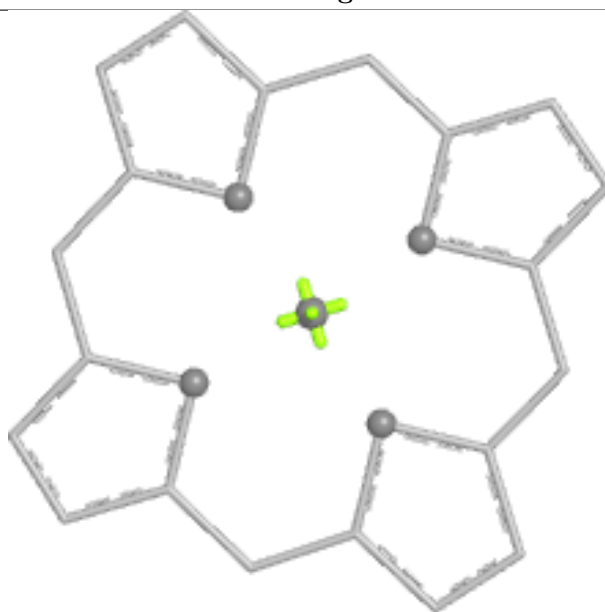
Bond lengths



Bond angles

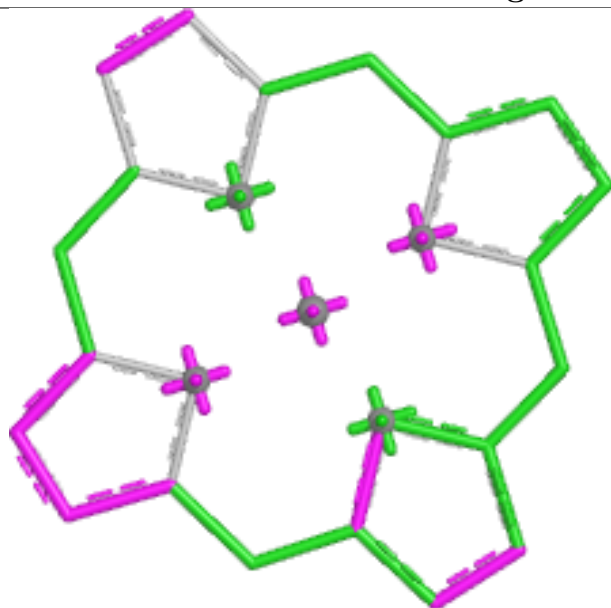


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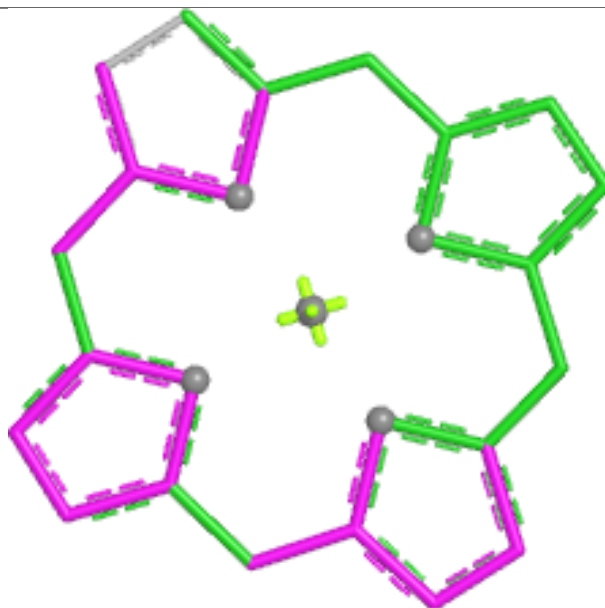


Rings

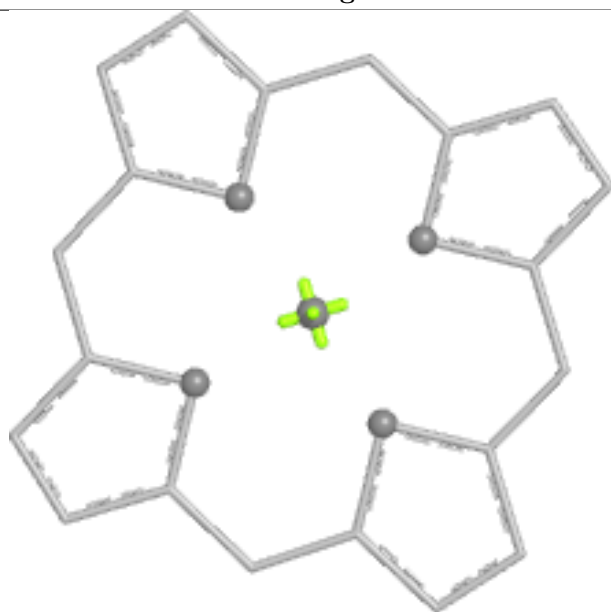
Ligand CLA F 3002



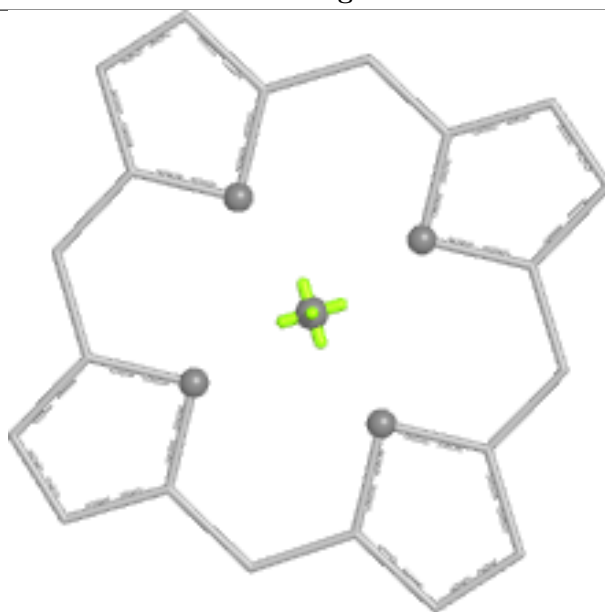
Bond lengths



Bond angles

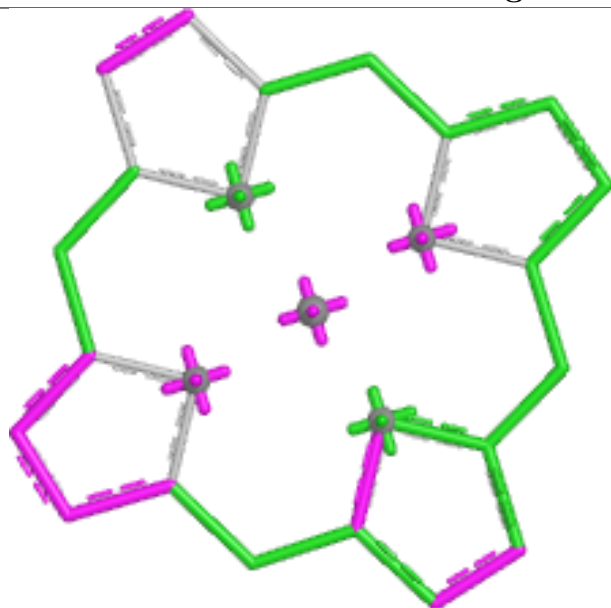


Torsions

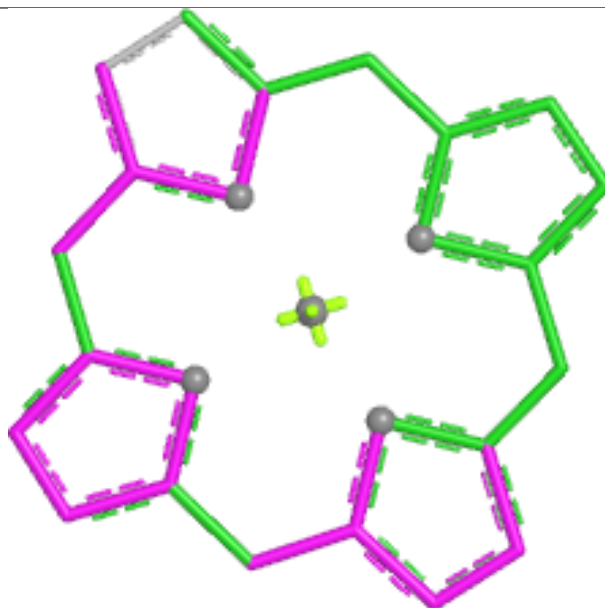


Rings

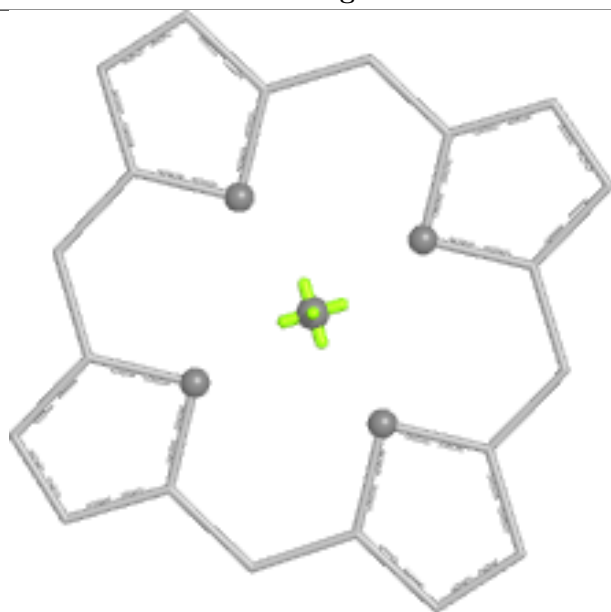
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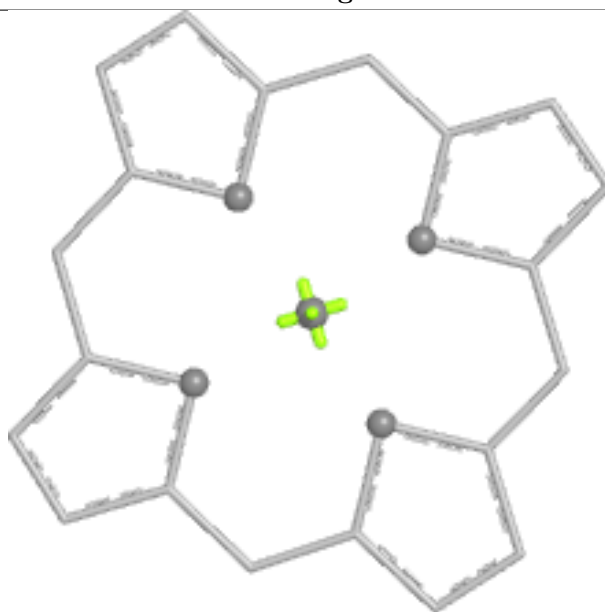
Bond lengths



Bond angles

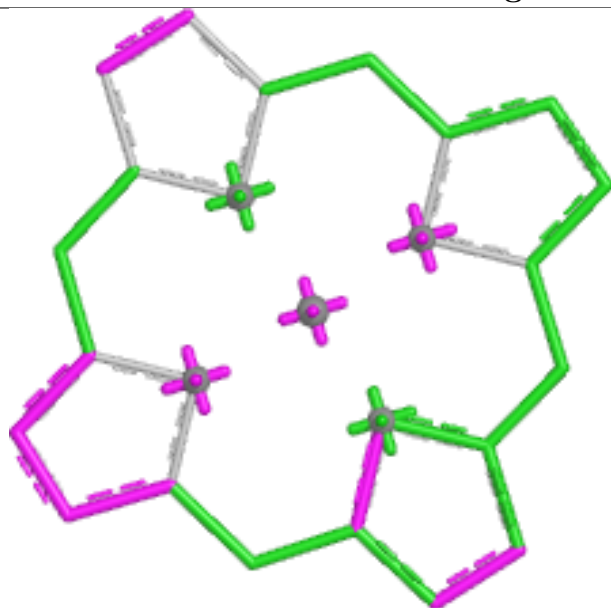


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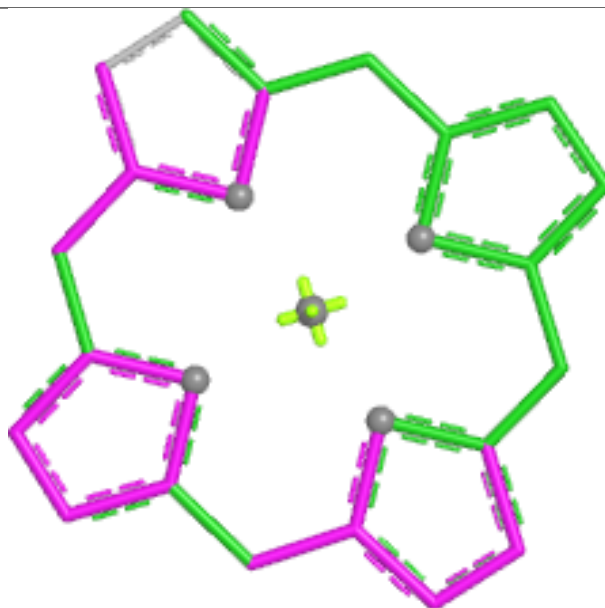


Rings

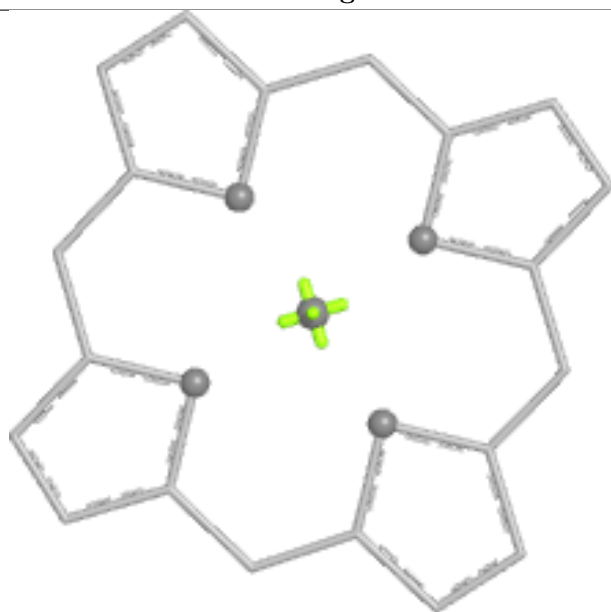
Ligand CLA A 3058



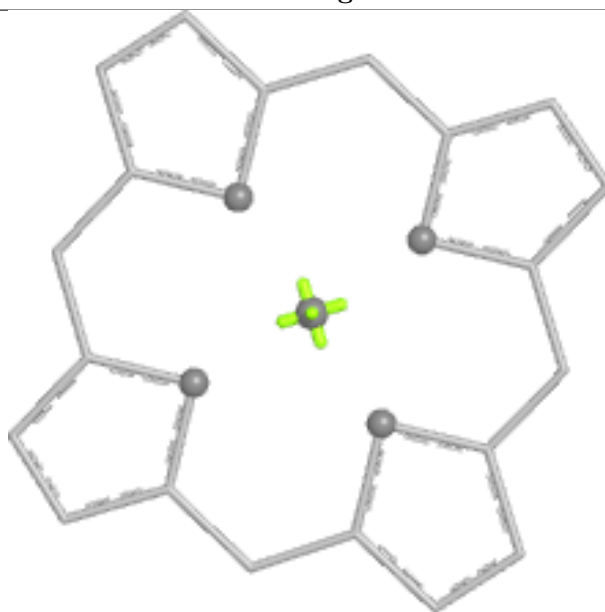
Bond lengths



Bond angles

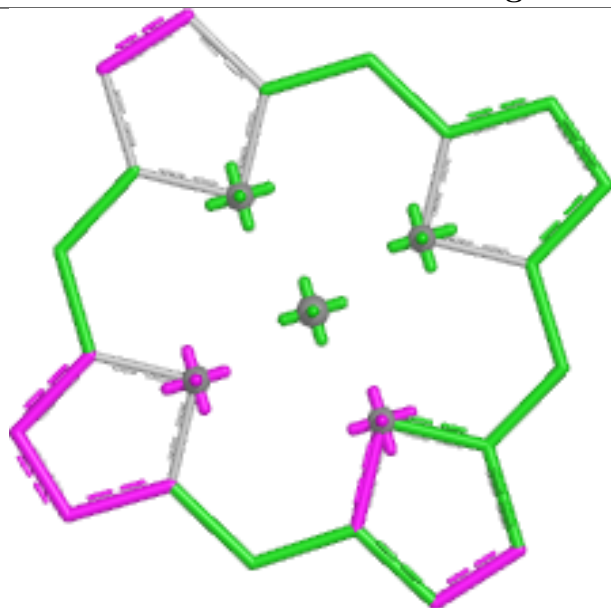


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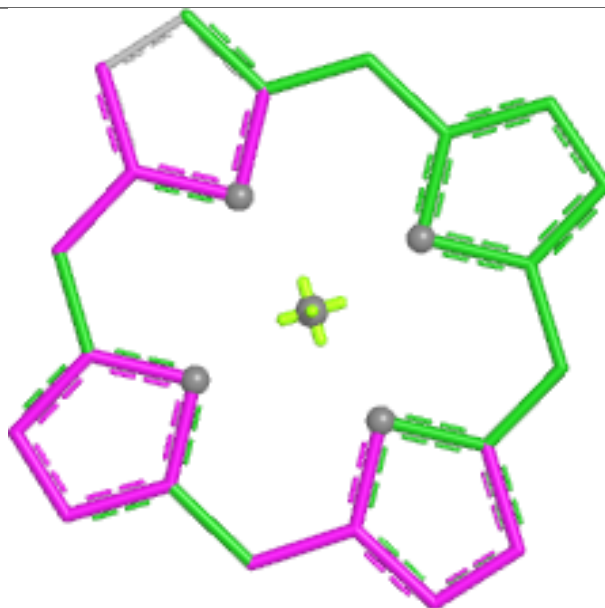


Rings

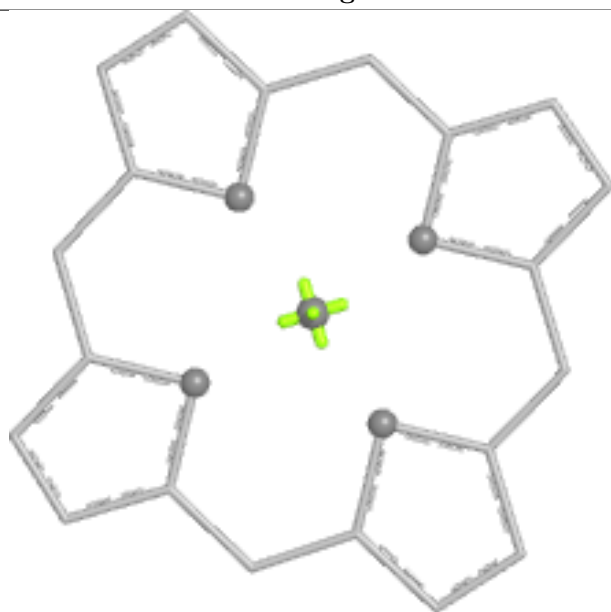
Ligand CLA B 2004



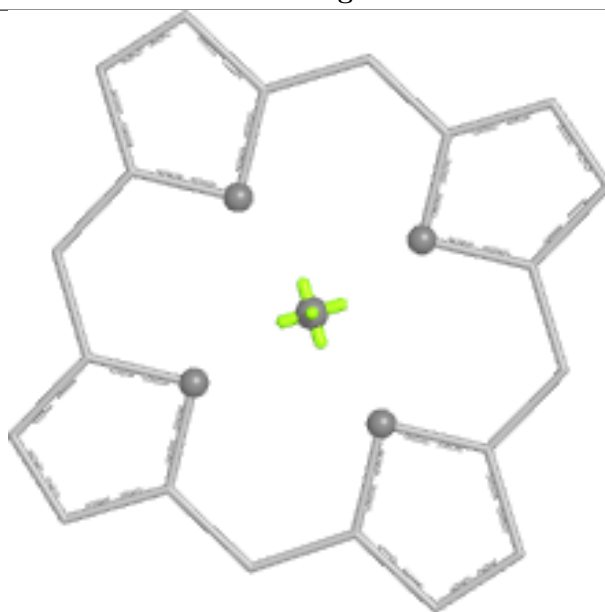
Bond lengths



Bond angles

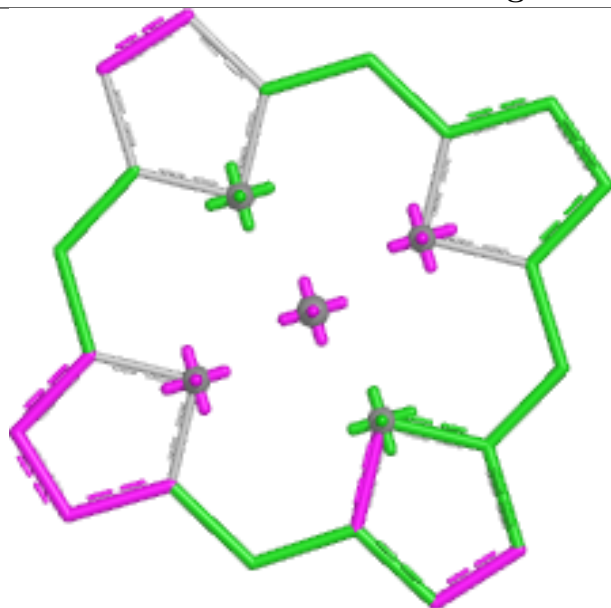


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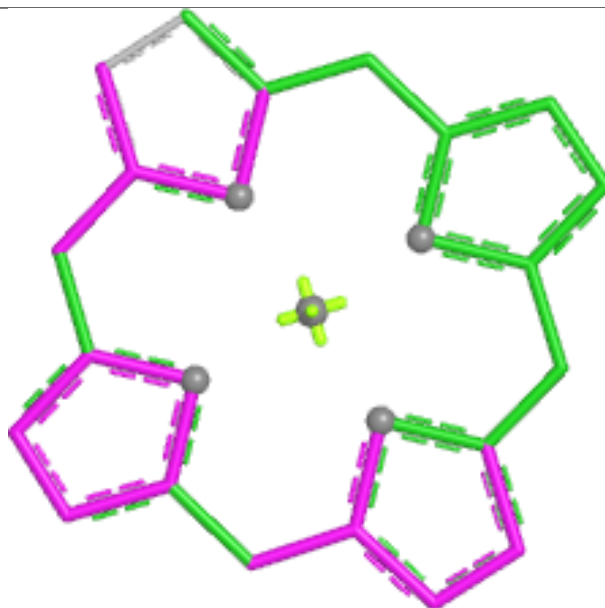


Rings

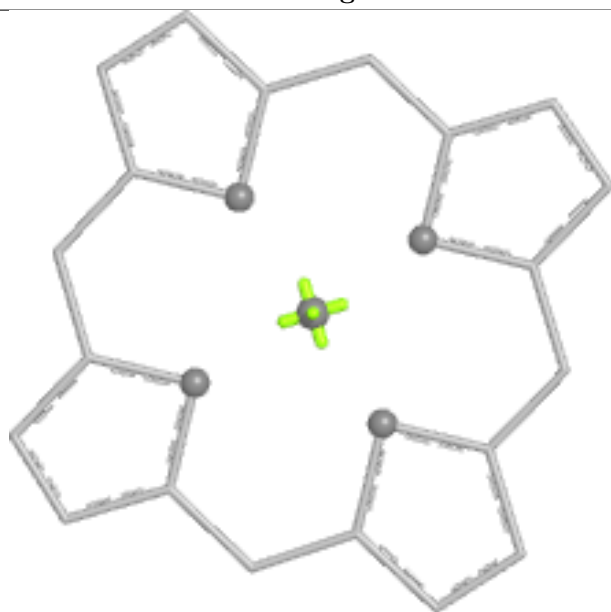
Ligand CLA F 3004



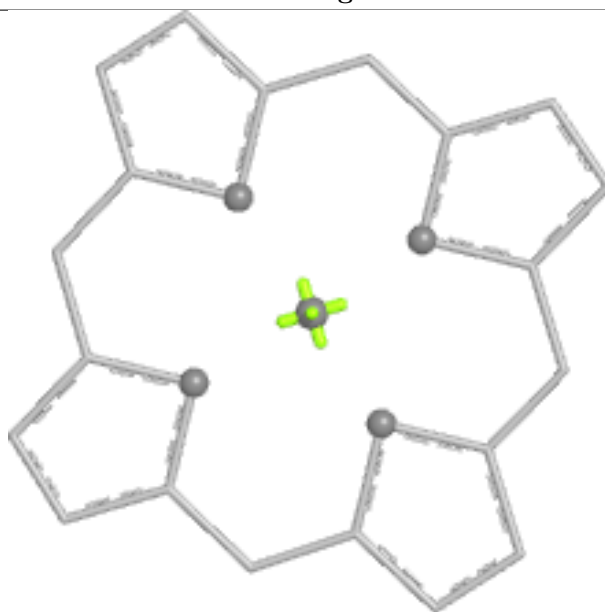
Bond lengths



Bond angles

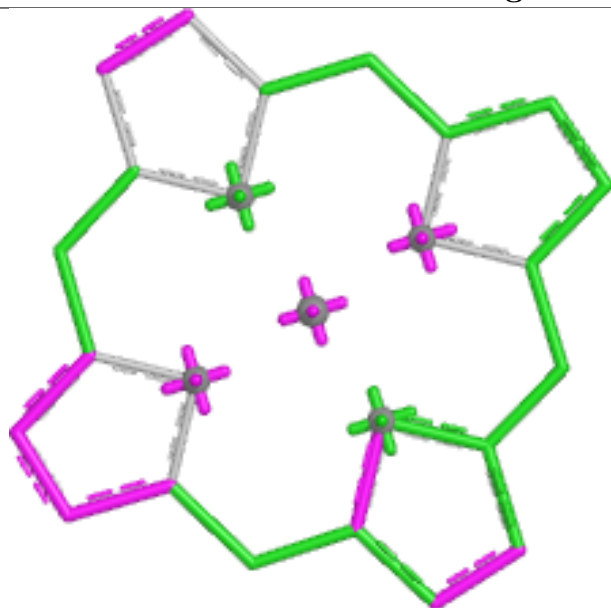


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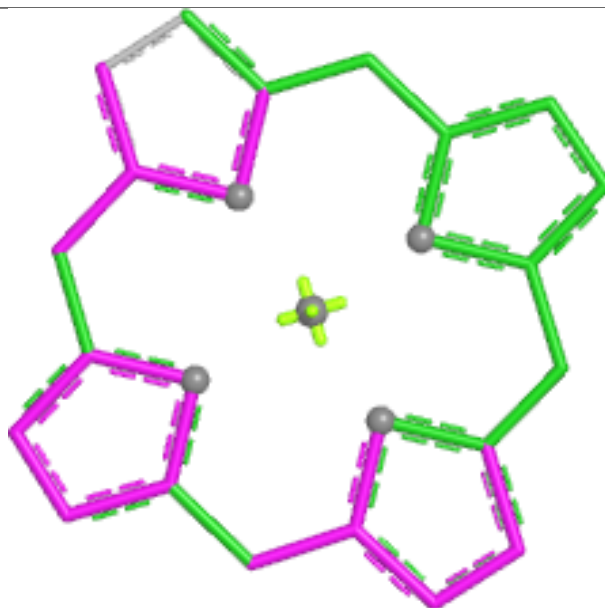


Rings

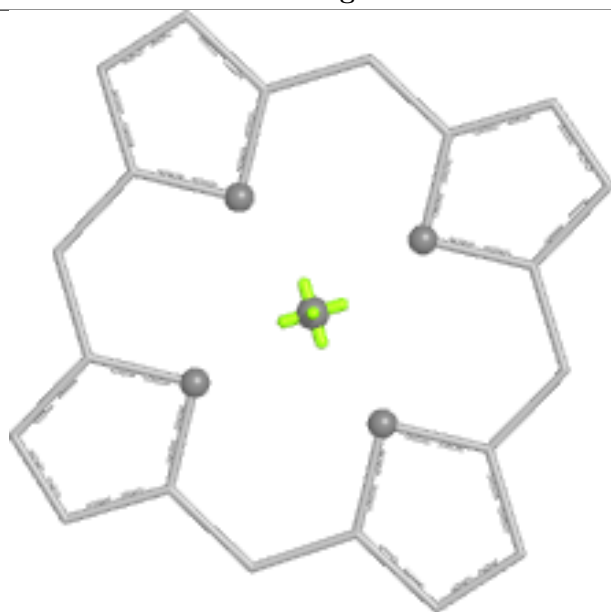
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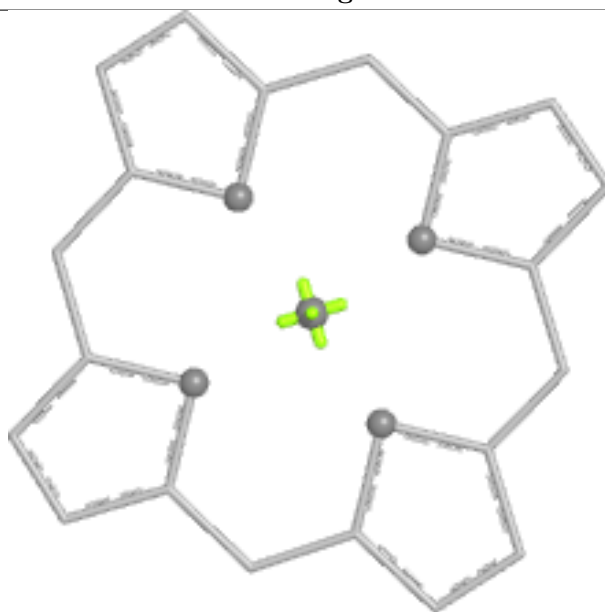
Bond lengths



Bond angles

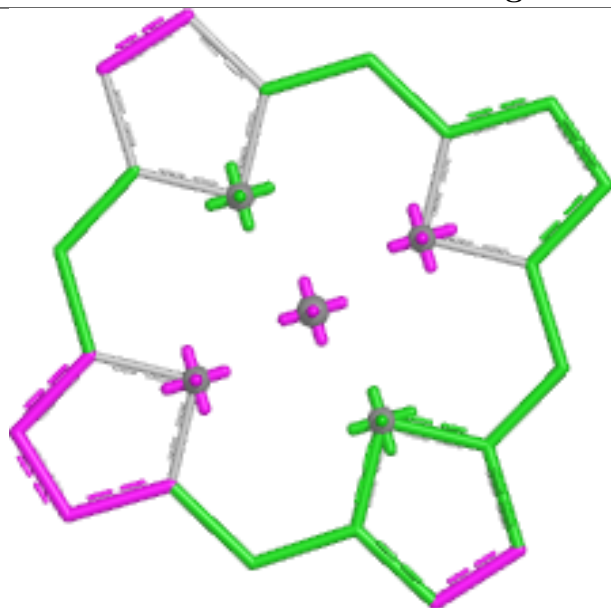


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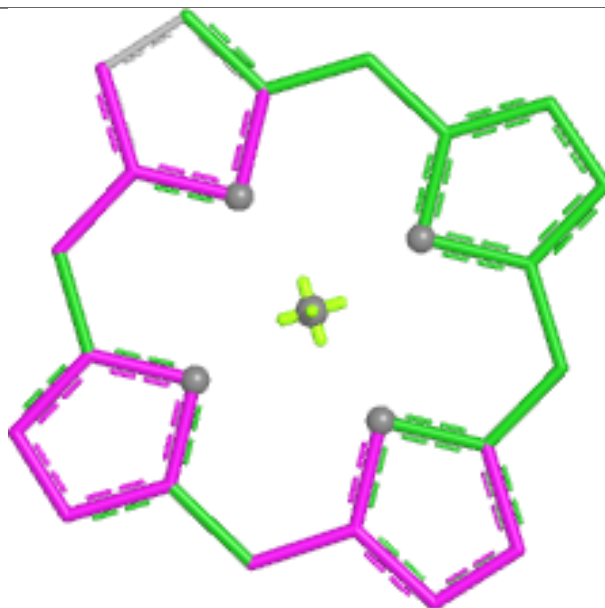


Rings

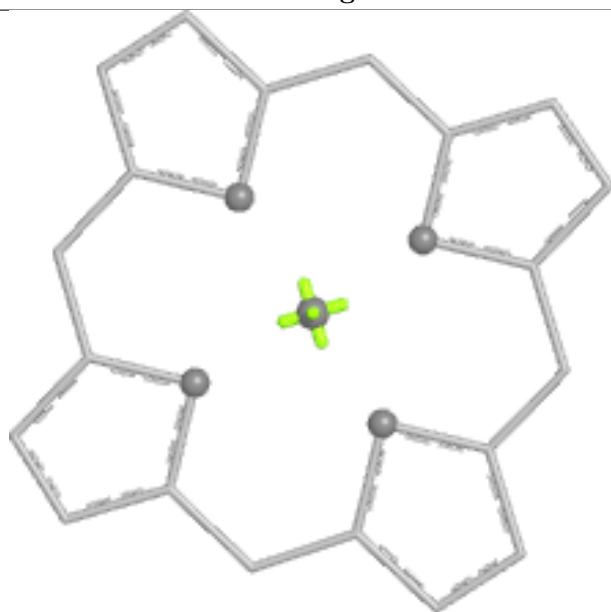
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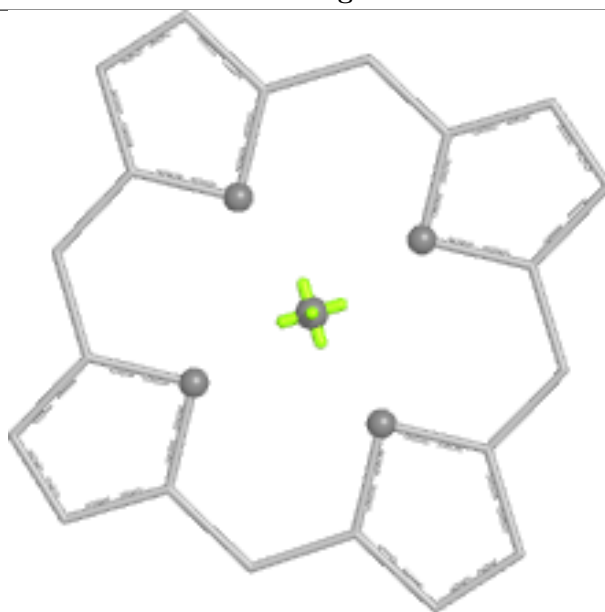
Bond lengths



Bond angles

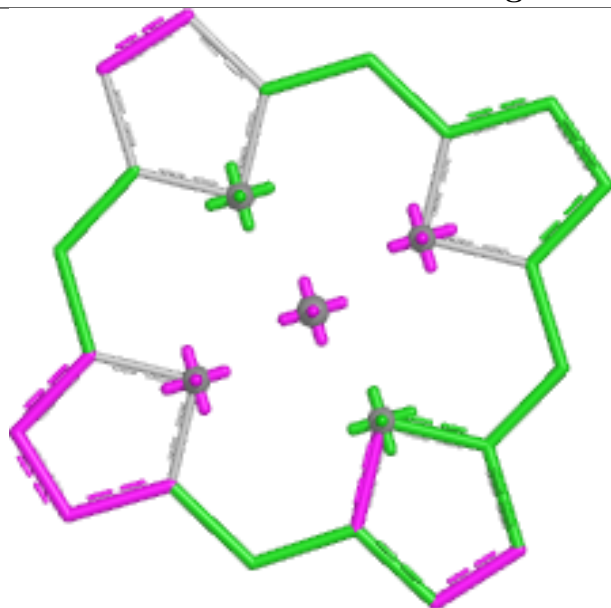


Torsions

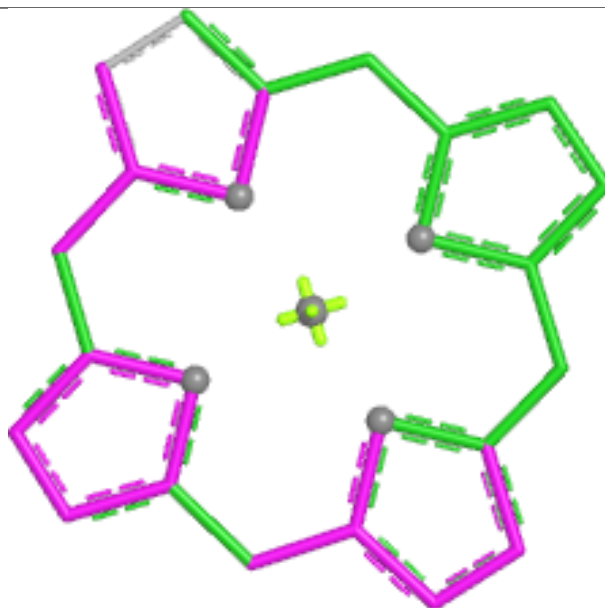


Rings

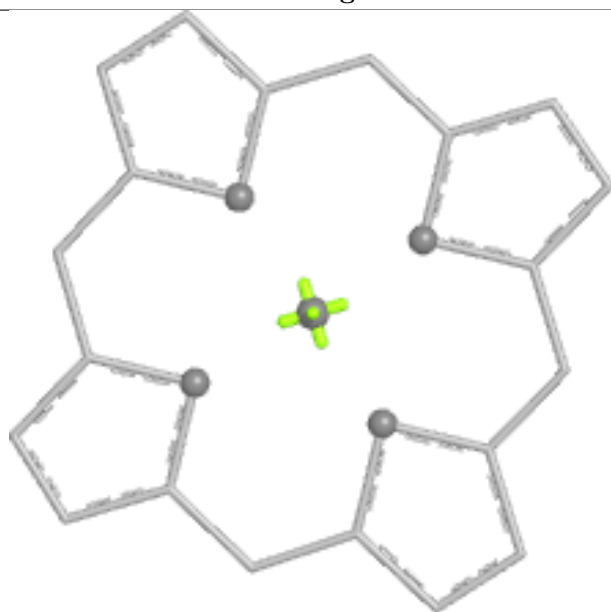
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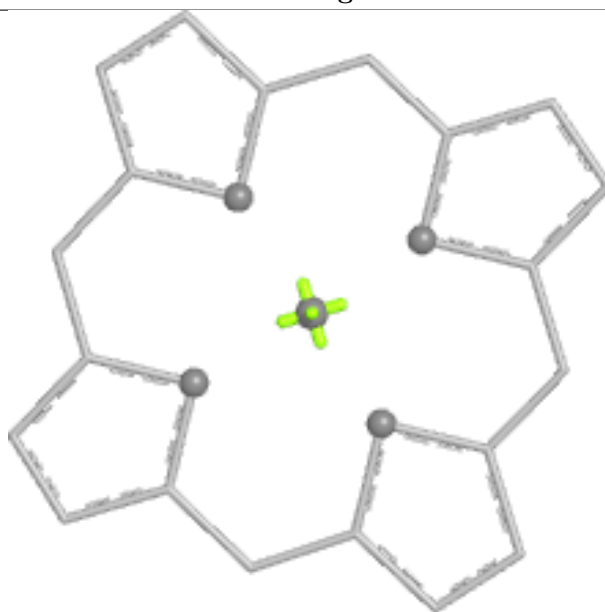
Bond lengths



Bond angles

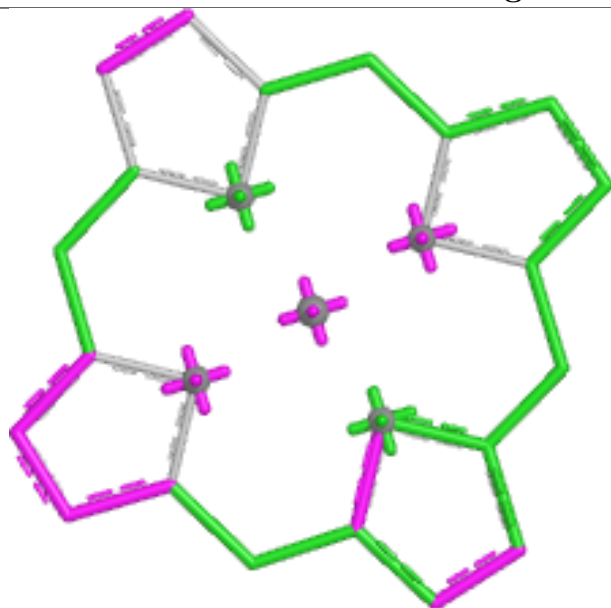


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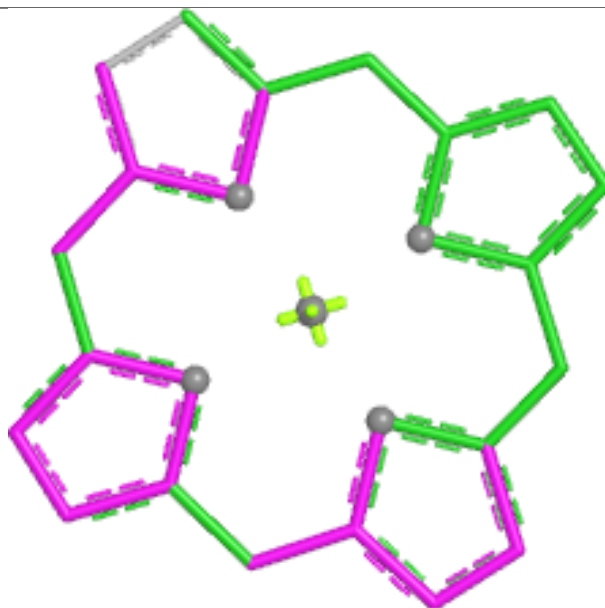


Rings

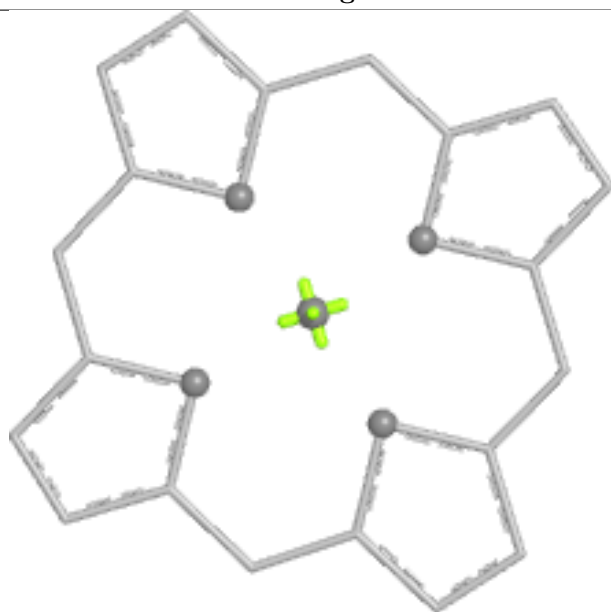
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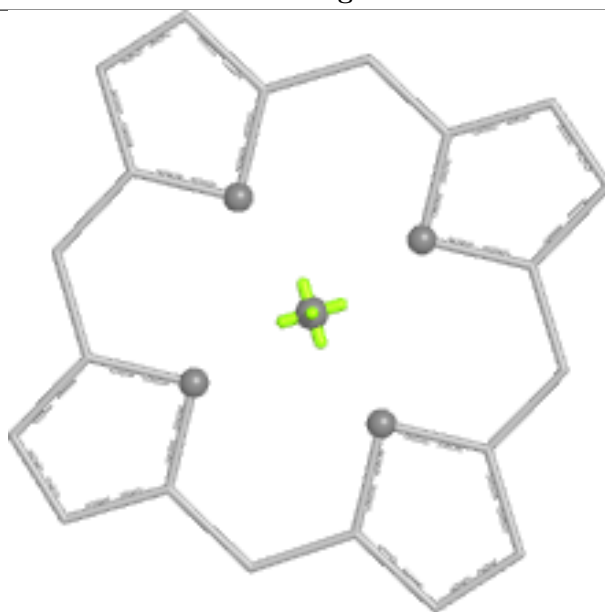
Bond lengths



Bond angles

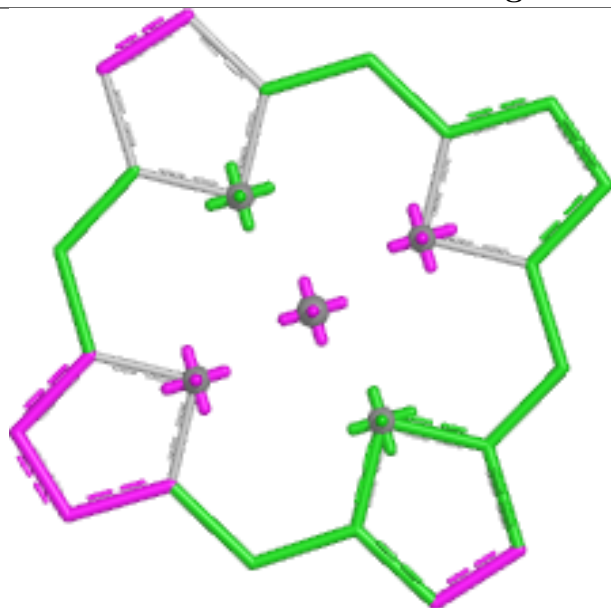


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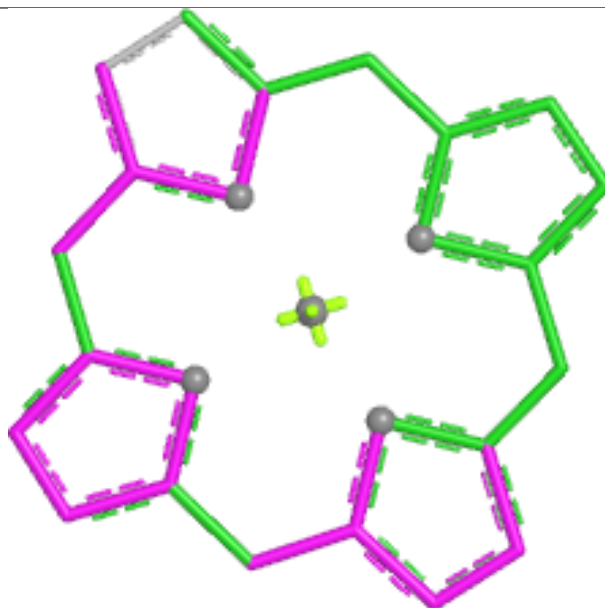


Rings

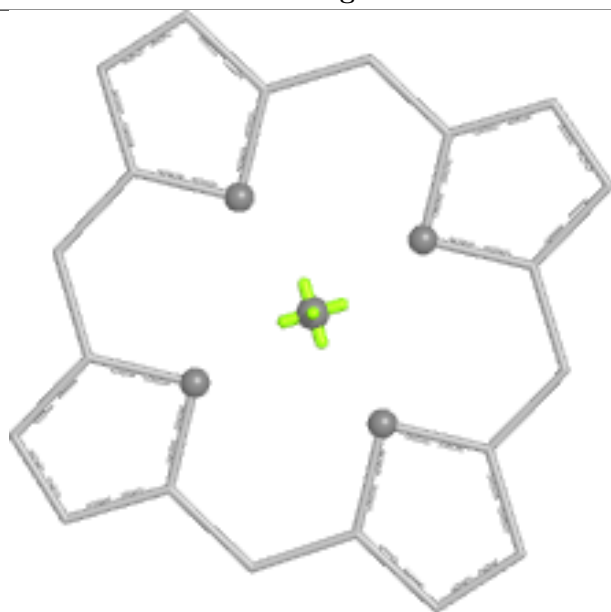
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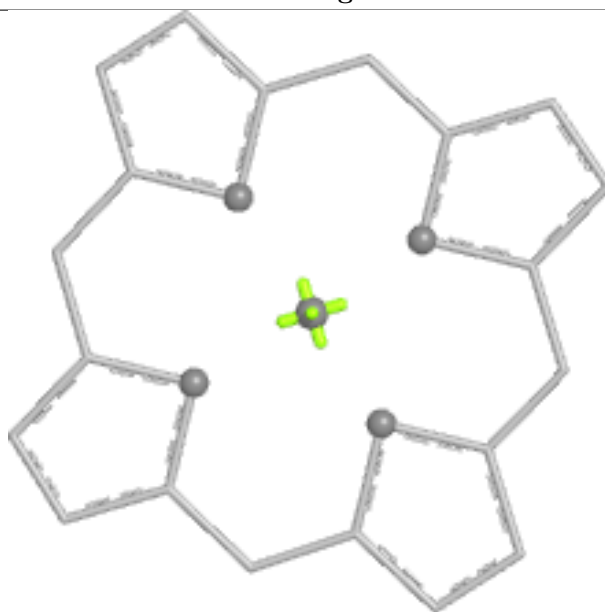
Bond lengths



Bond angles

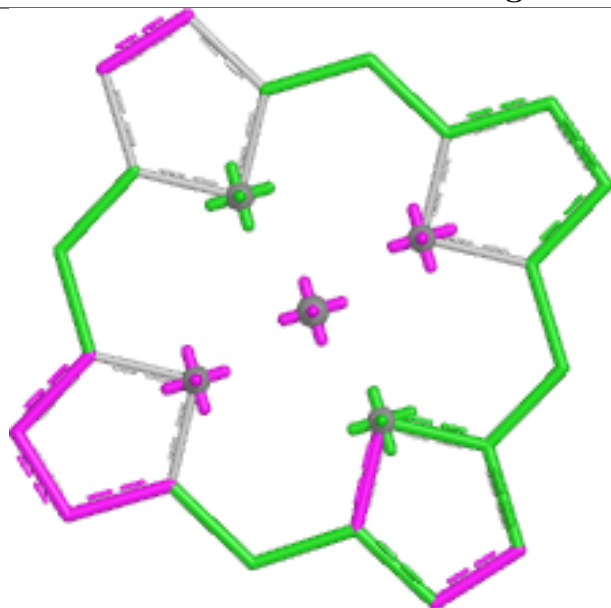


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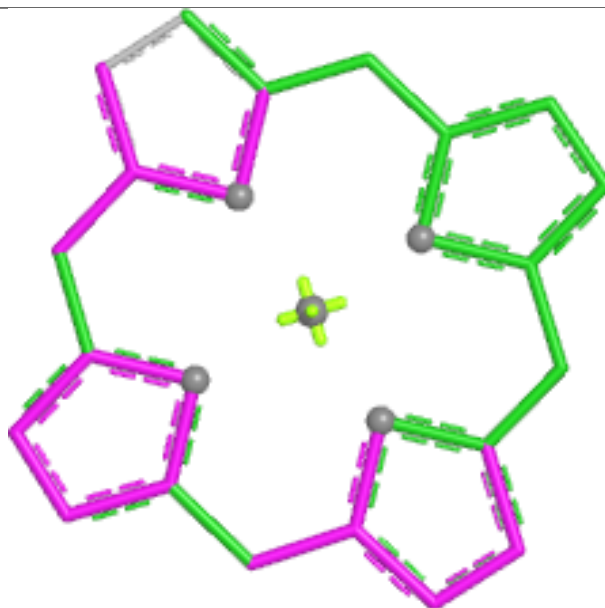


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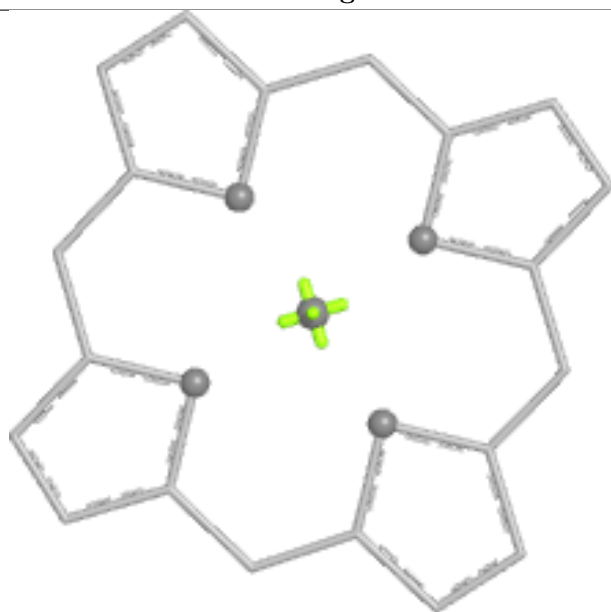
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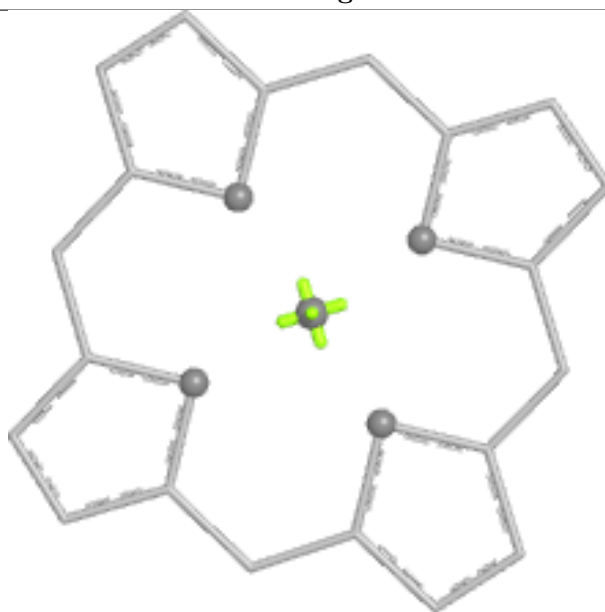
Bond lengths



Bond angles

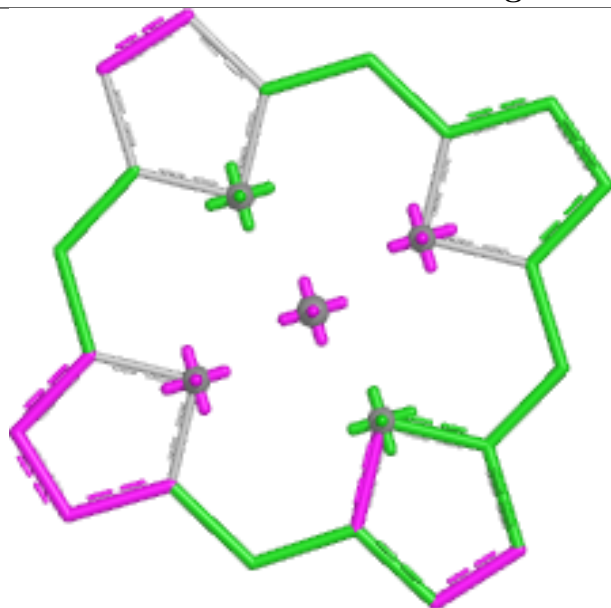


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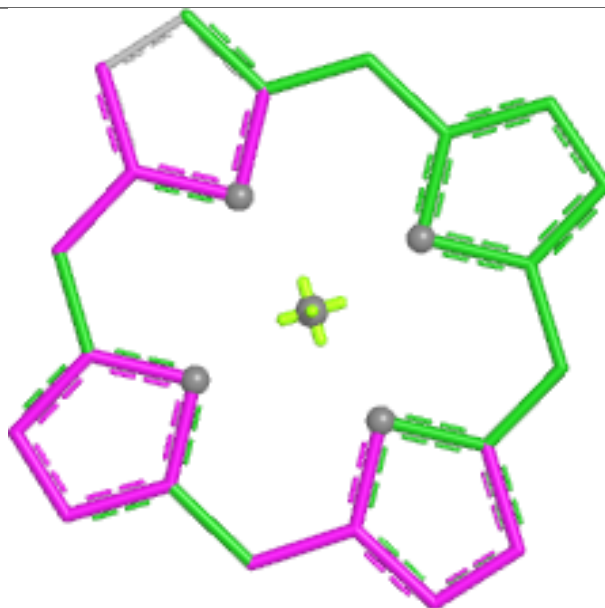


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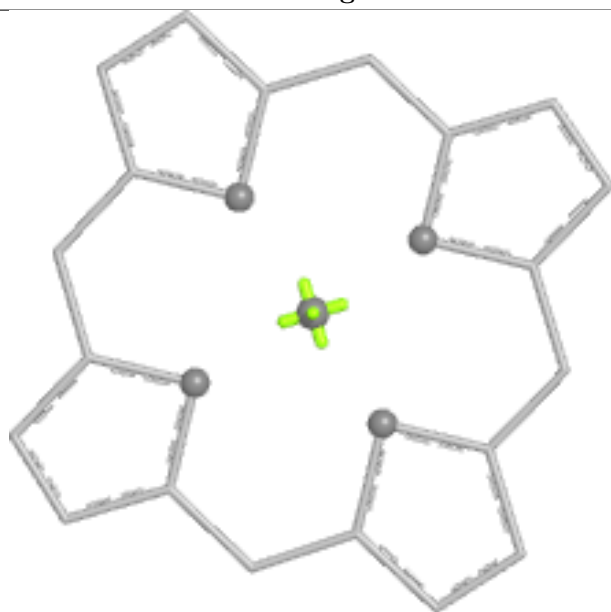
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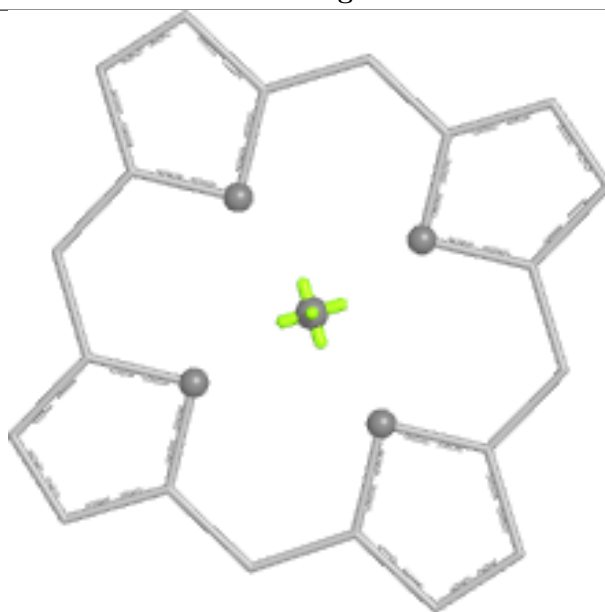
Bond lengths



Bond angles

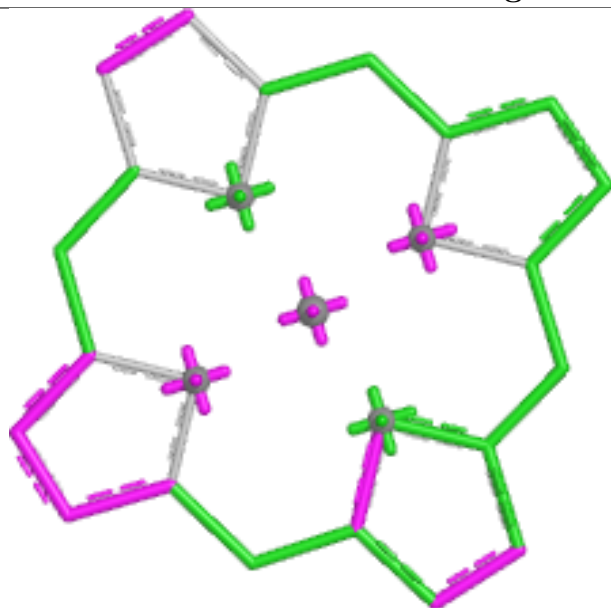


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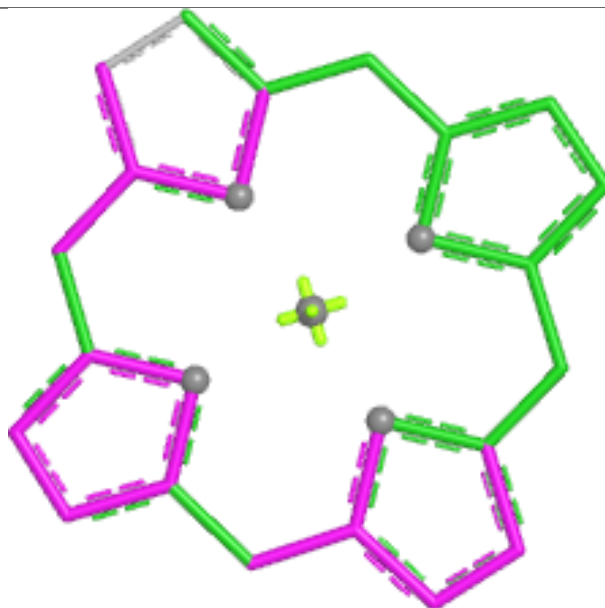


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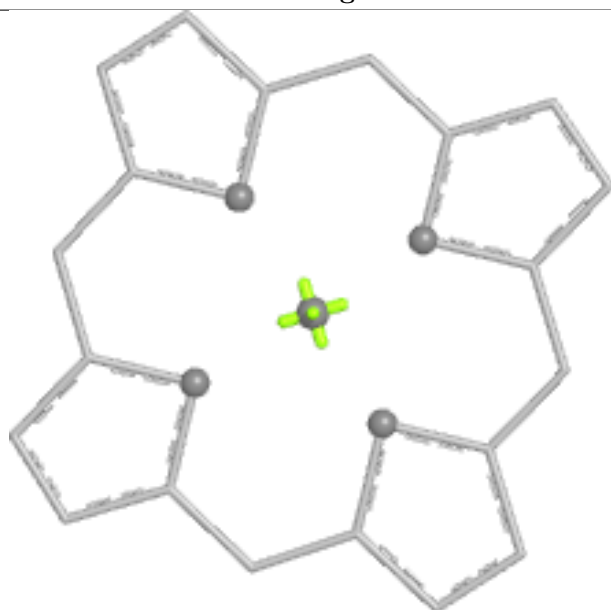
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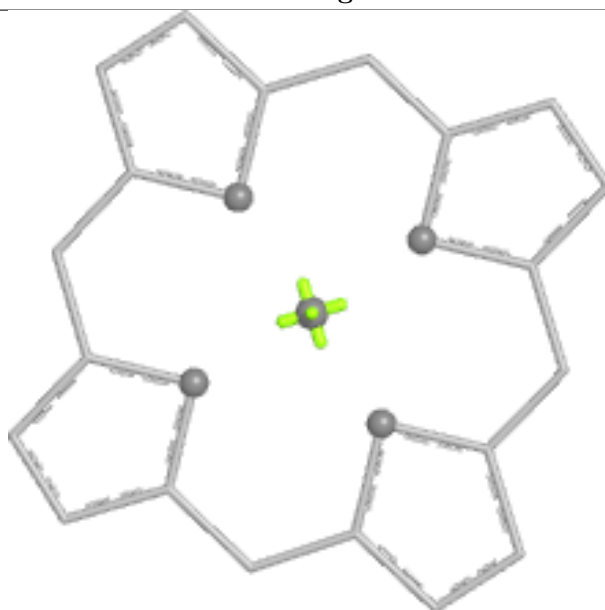
Bond lengths



Bond angles

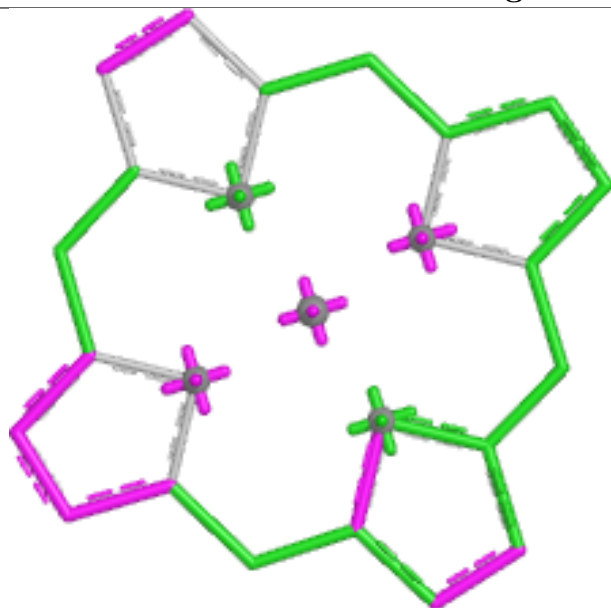


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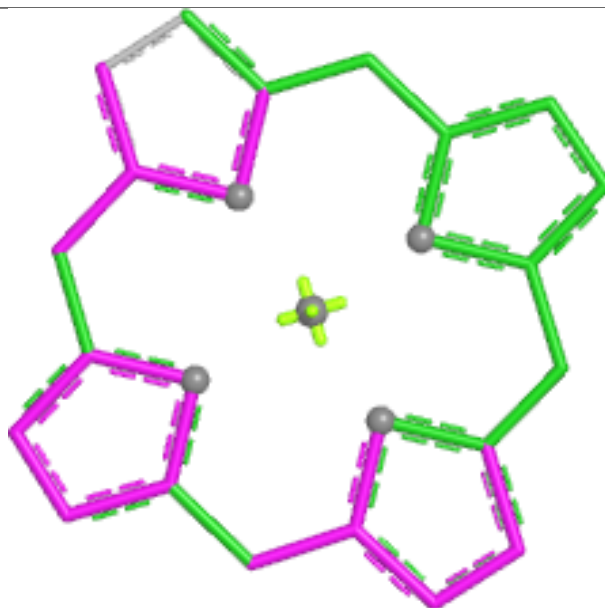


Rings

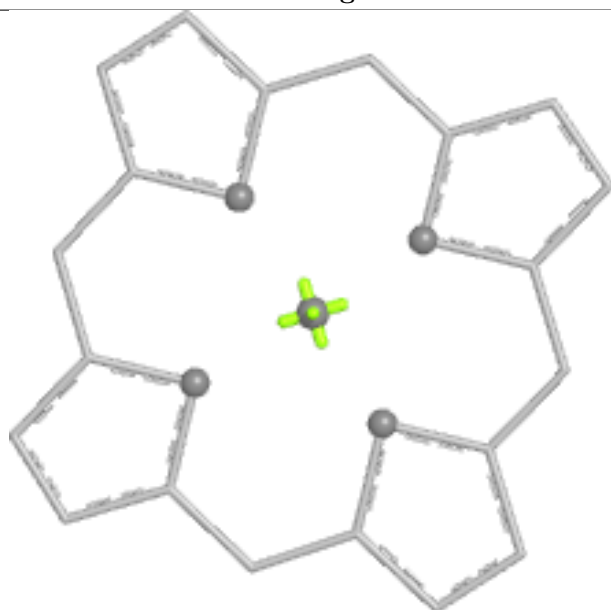
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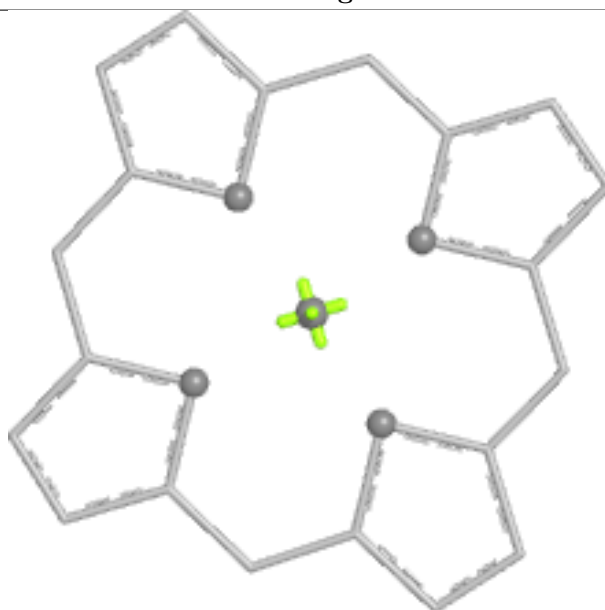
Bond lengths



Bond angles

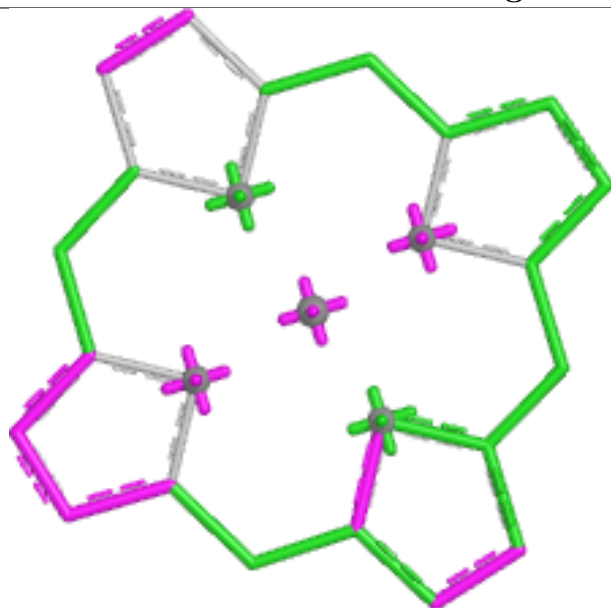


Torsions

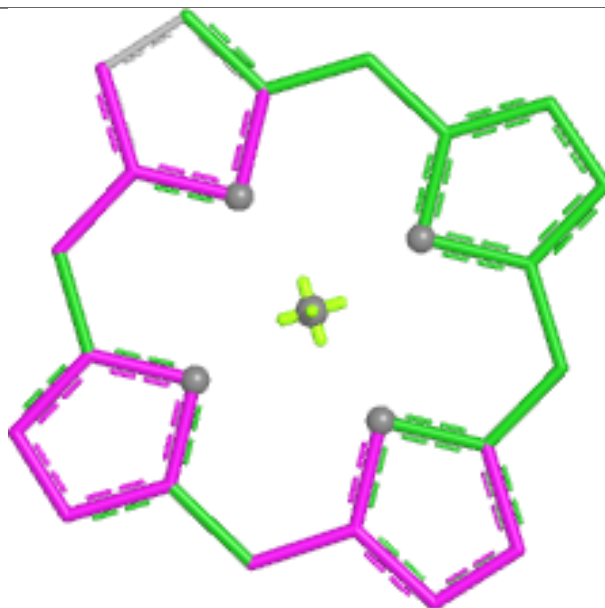


Rings

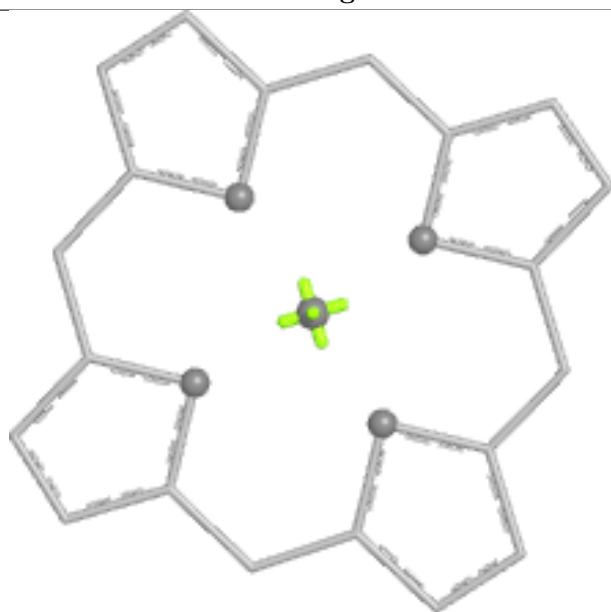
Ligand CLA B 3025



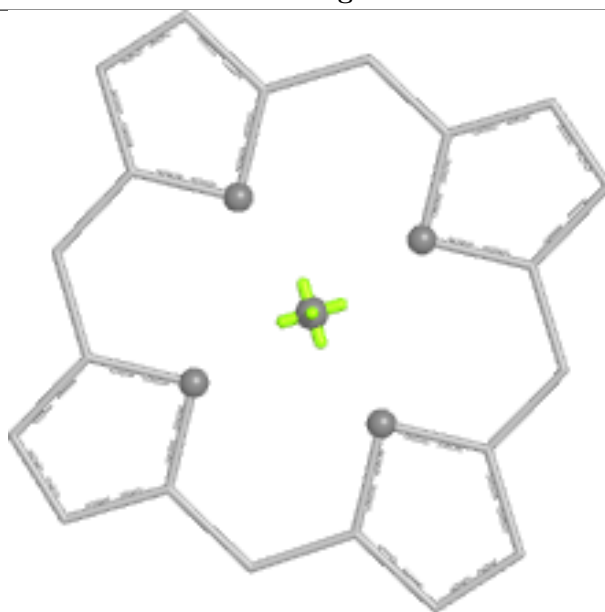
Bond lengths



Bond angles

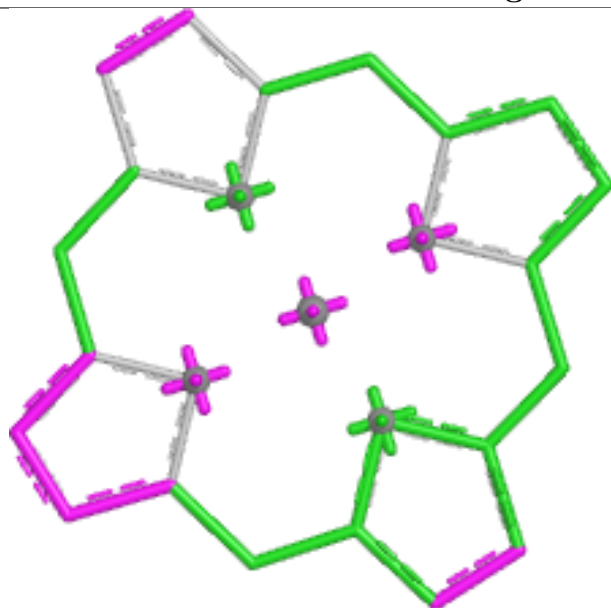


Torsions

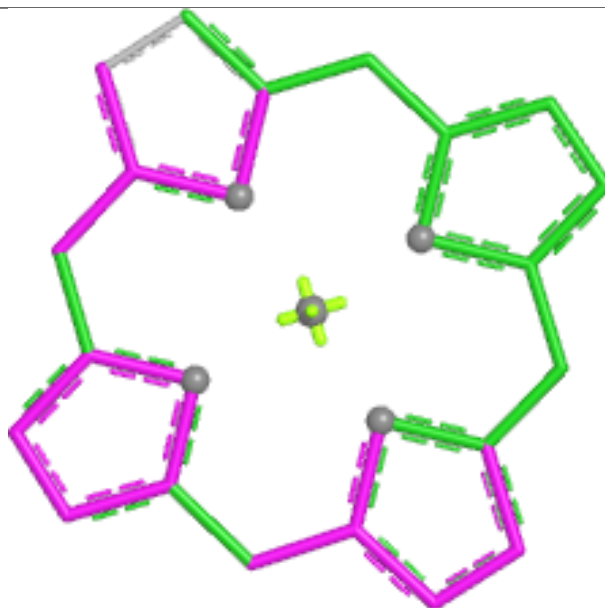


Rings

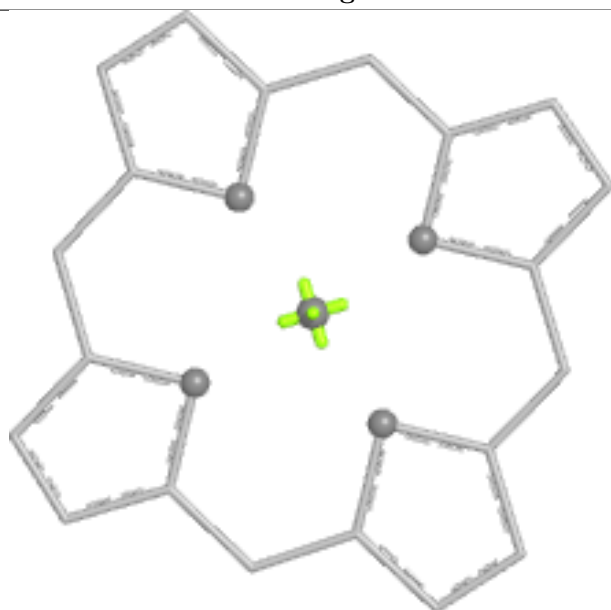
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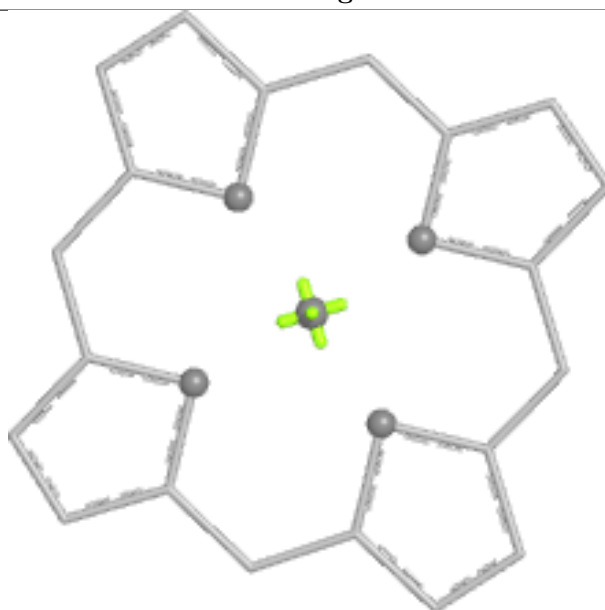
Bond lengths



Bond angles

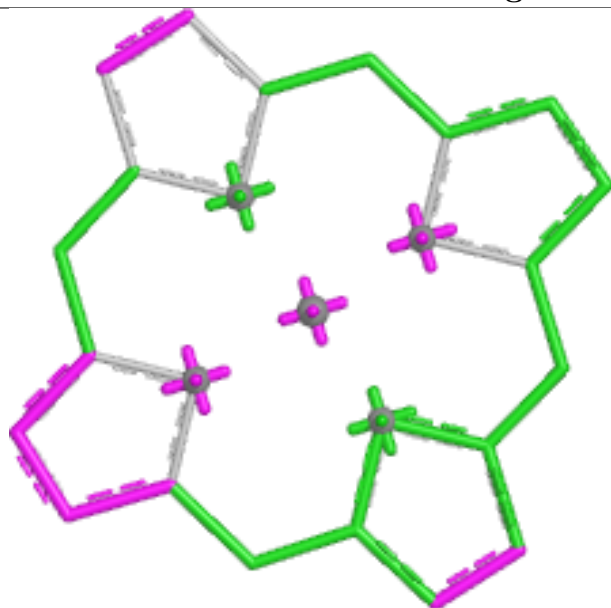


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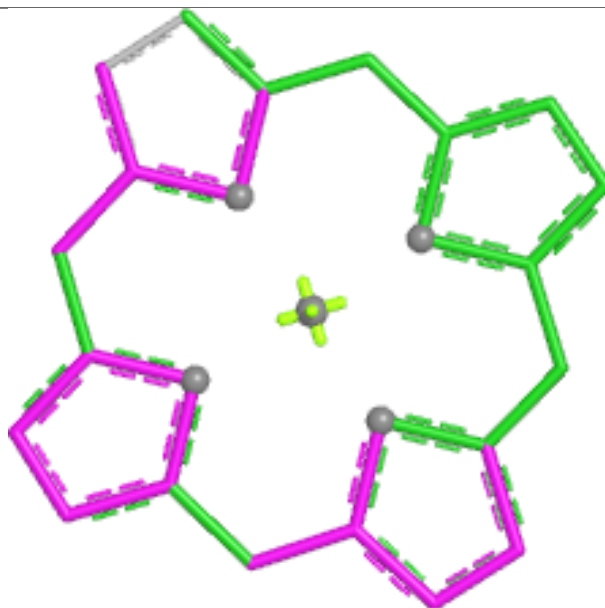


Rings

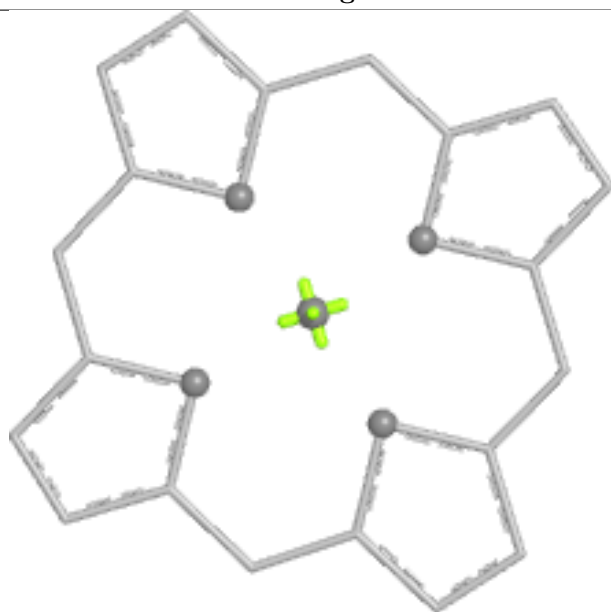
Ligand CLA B 3070



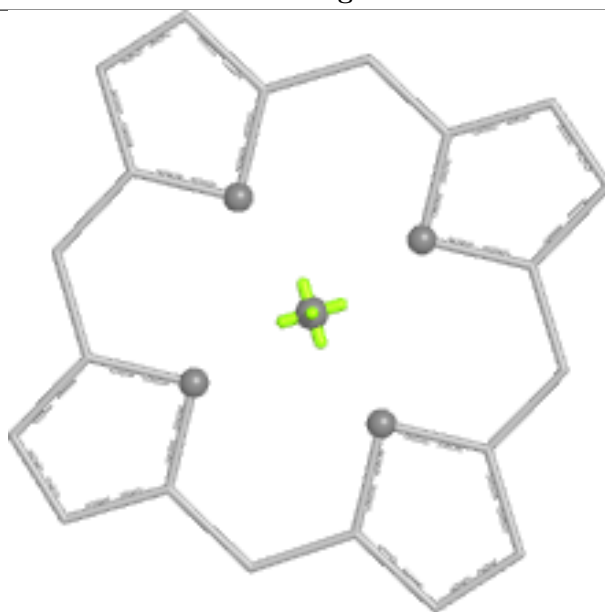
Bond lengths



Bond angles

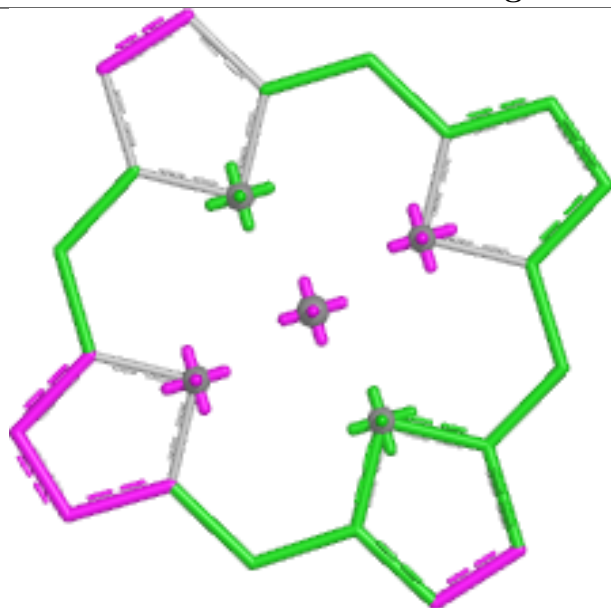


Torsions

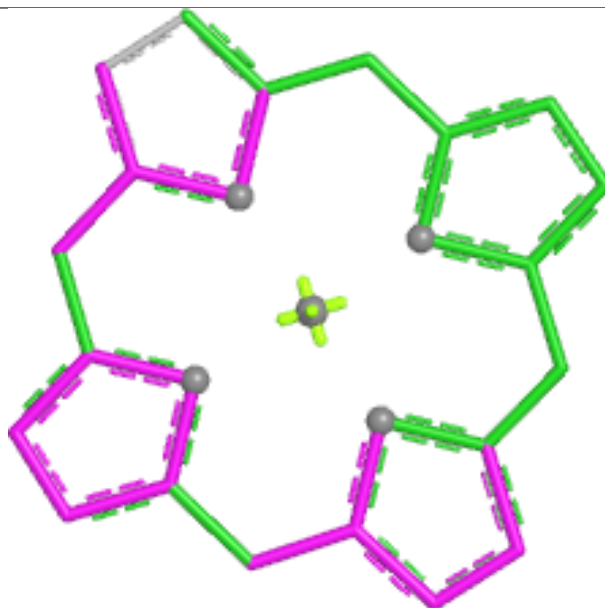


Rings

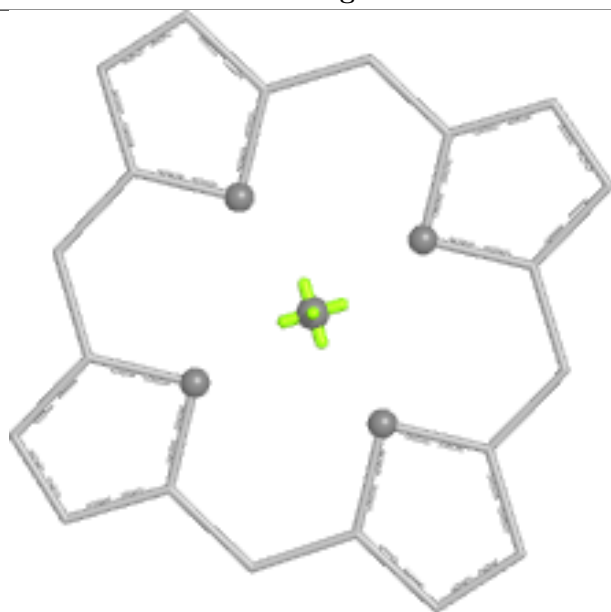
Ligand CLA A 3045



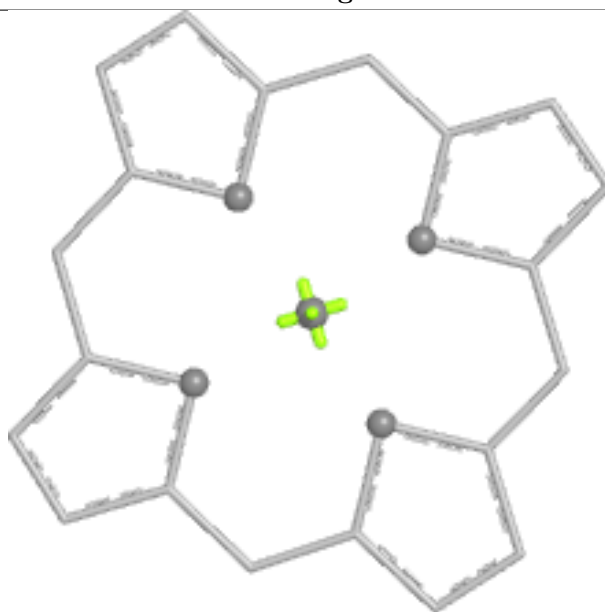
Bond lengths



Bond angles

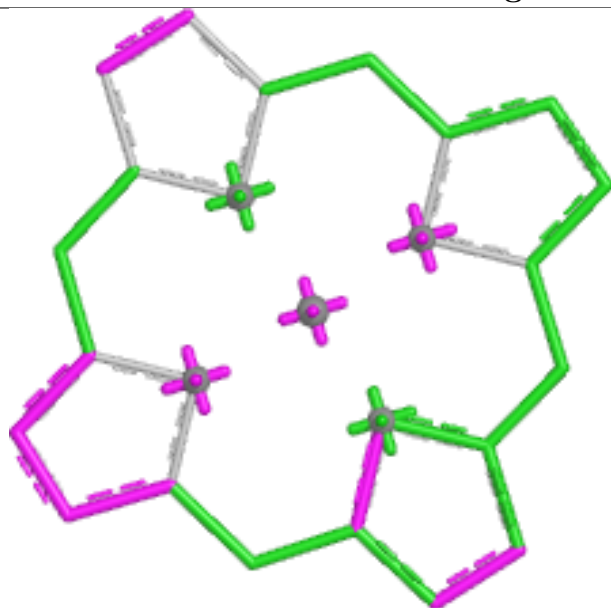


Torsions

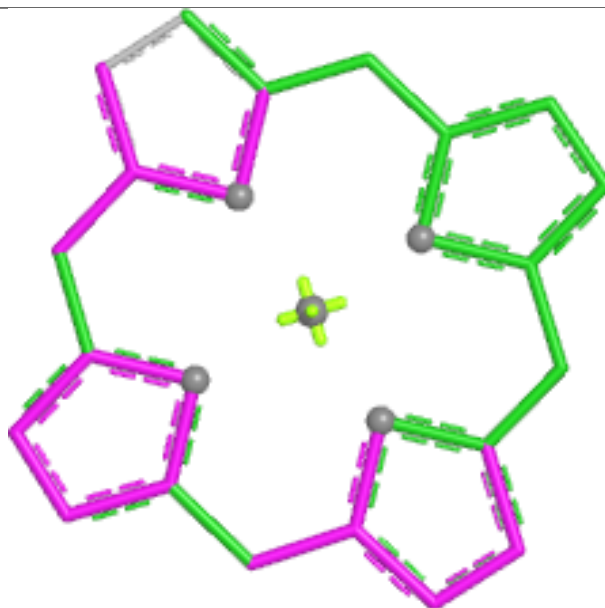


Rings

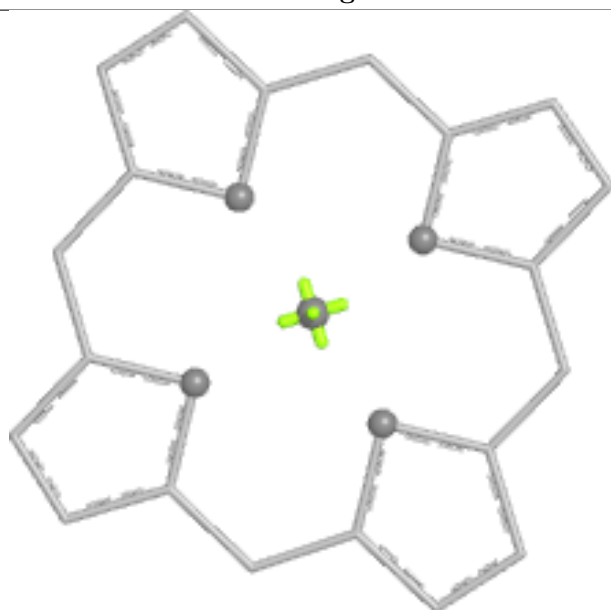
Ligand CLA A 3065



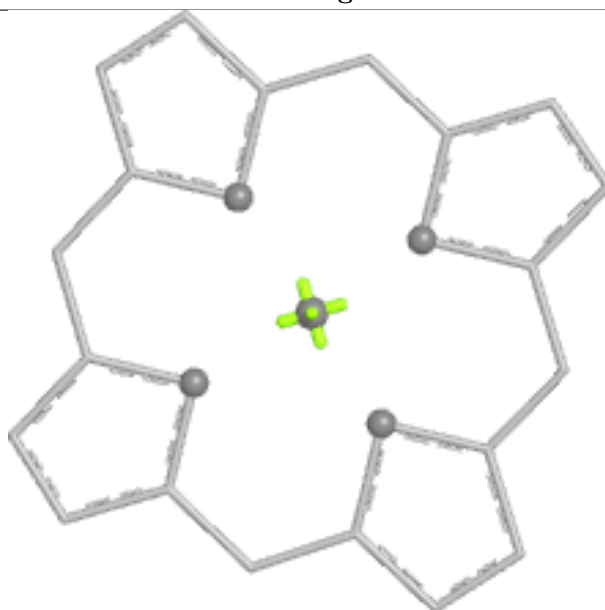
Bond lengths



Bond angles

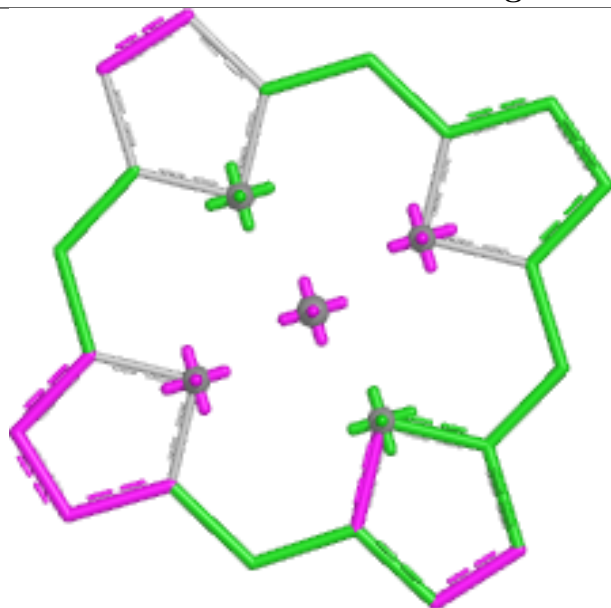


Torsions

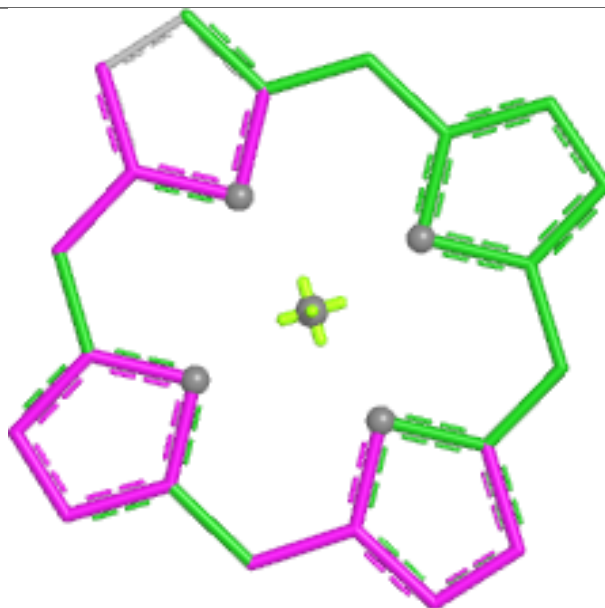


Rings

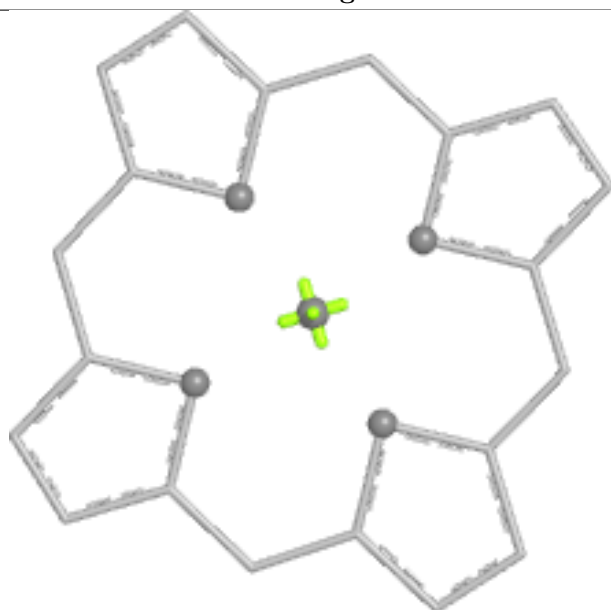
Ligand CLA A 3032



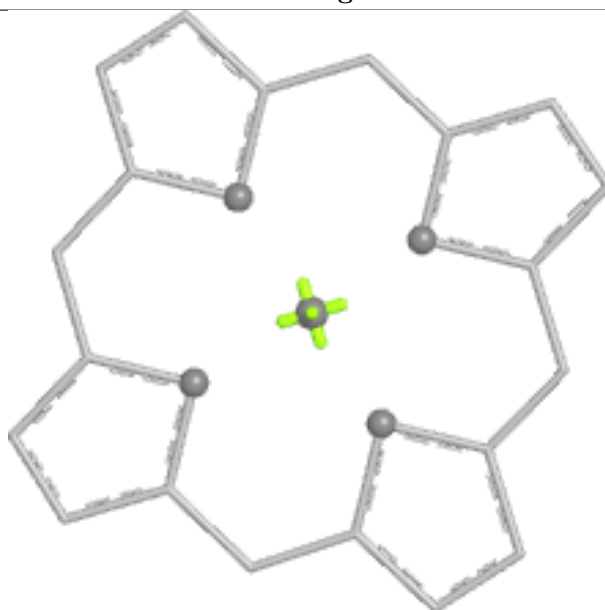
Bond lengths



Bond angles

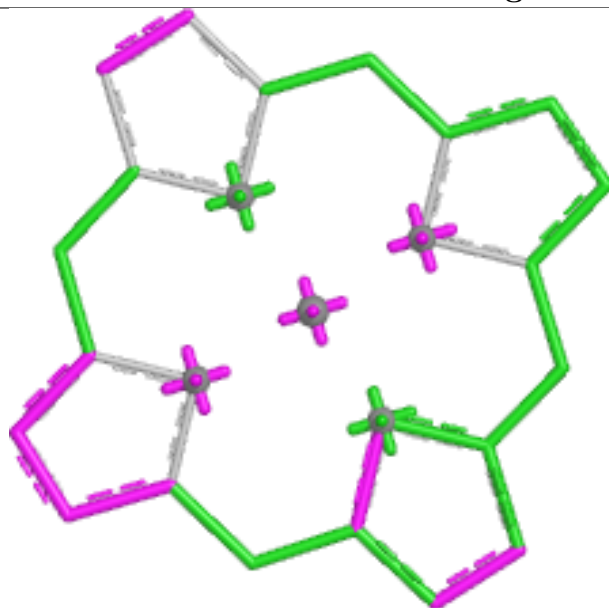


Torsions

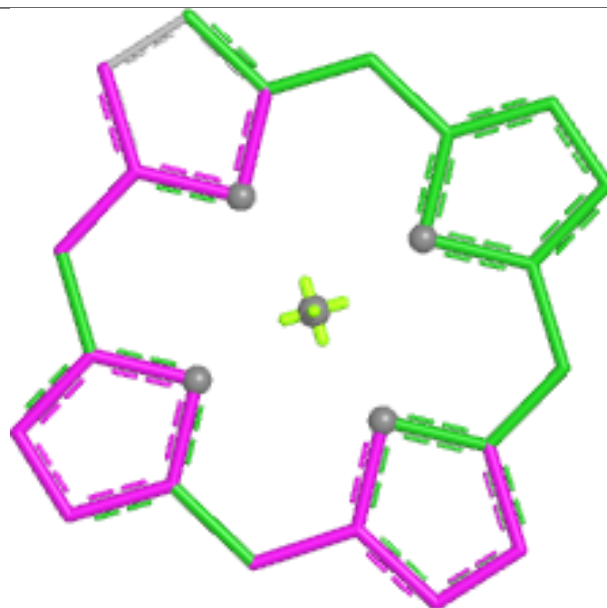


Rings

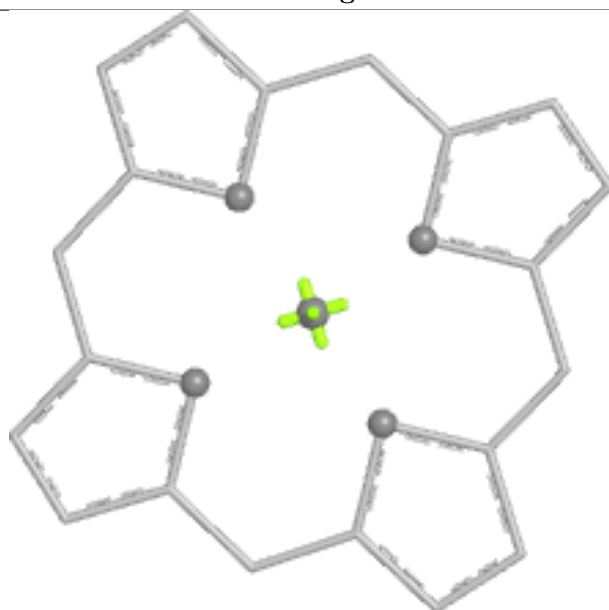
Ligand CLA B 3015



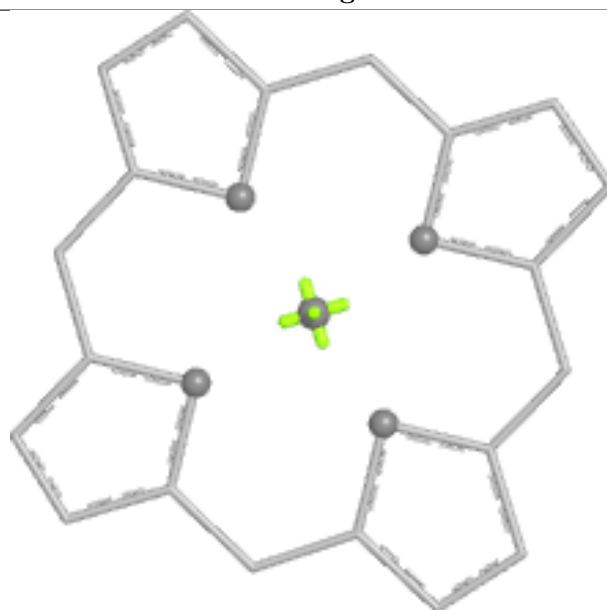
Bond lengths



Bond angles

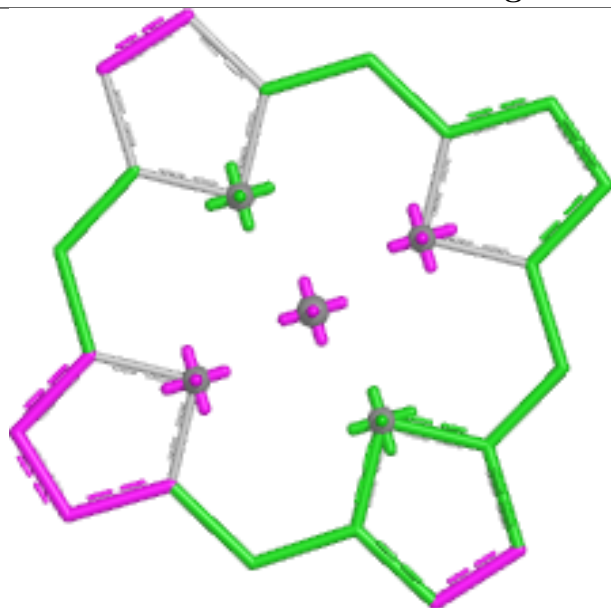


Torsions

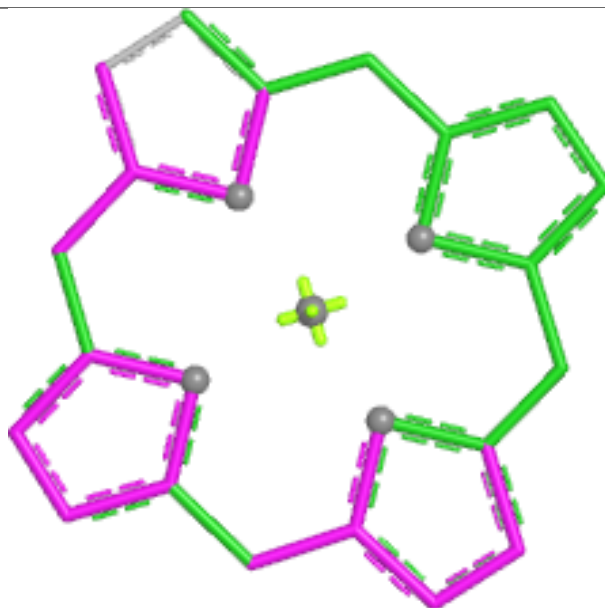


Rings

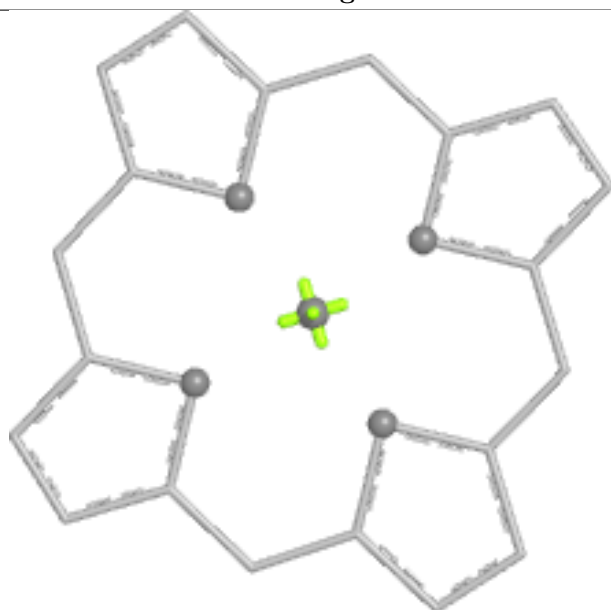
Ligand CLA A 3078



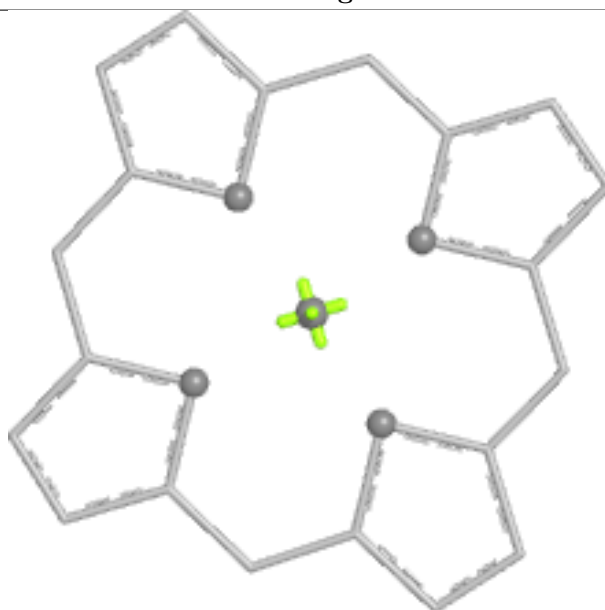
Bond lengths



Bond angles

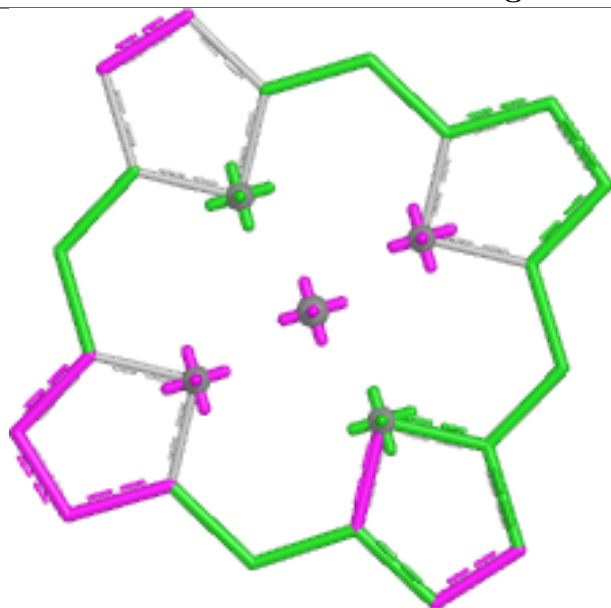


Torsions

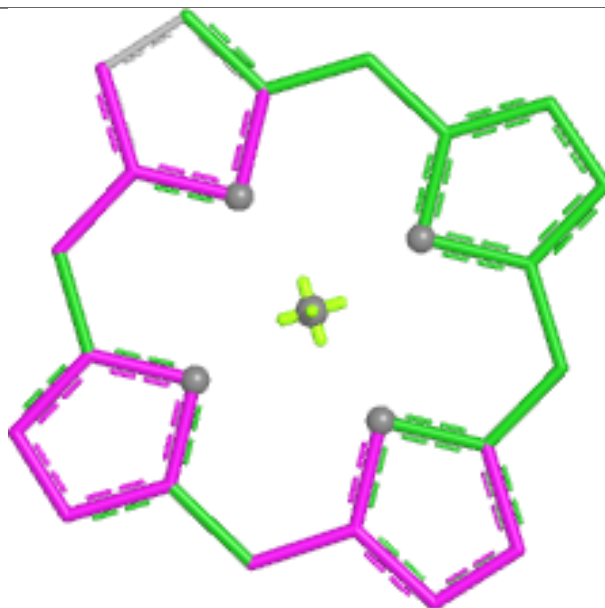


Rings

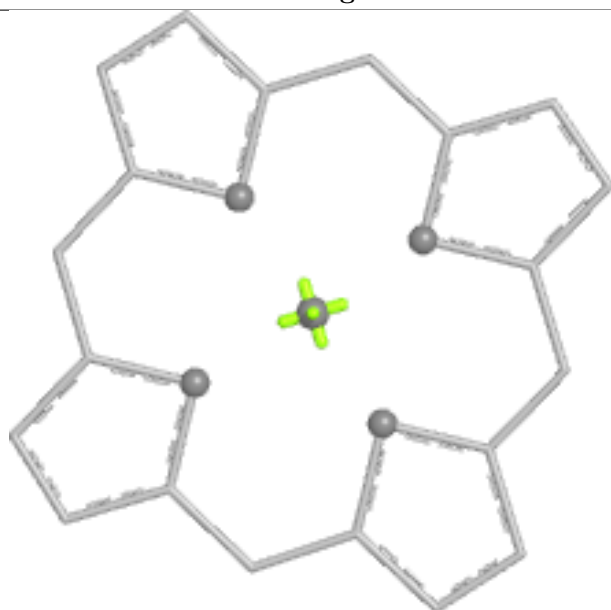
Ligand CLA A 3077



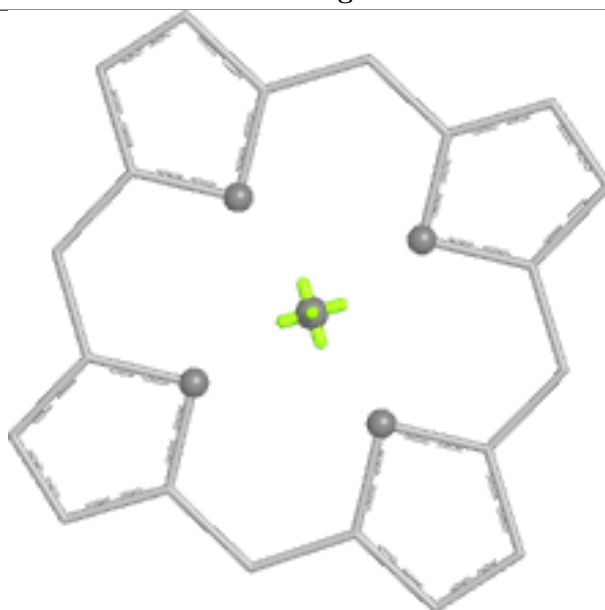
Bond lengths



Bond angles

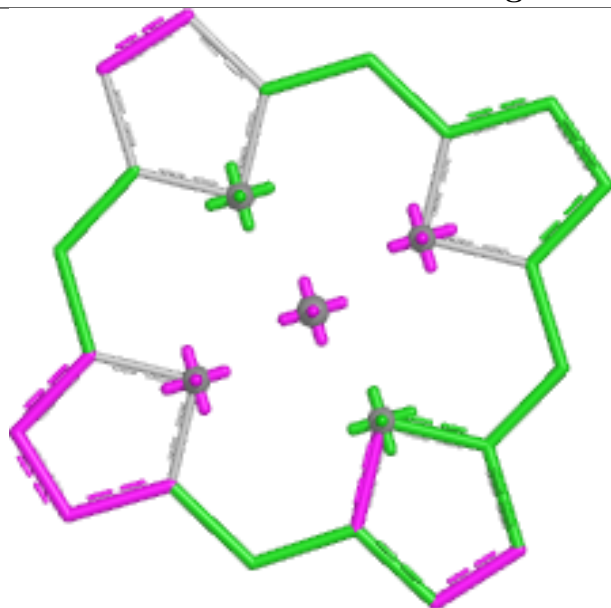


Torsions

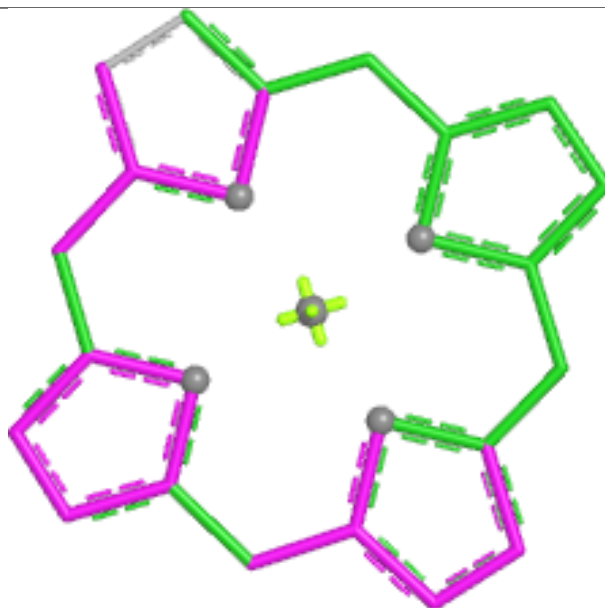


Rings

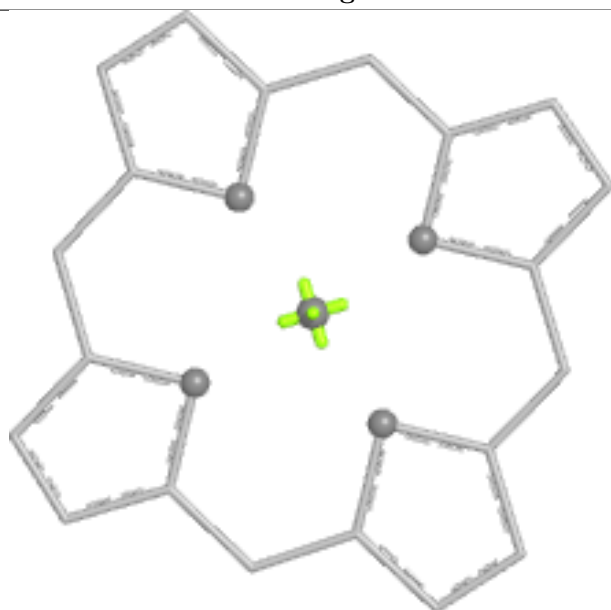
Ligand CLA B 2005



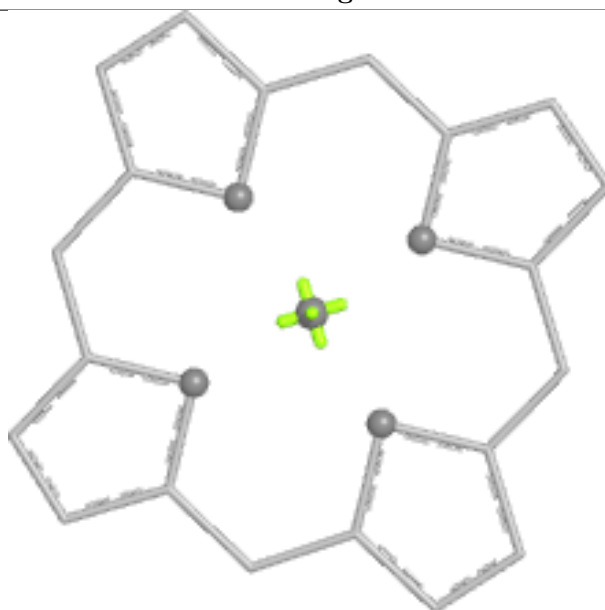
Bond lengths



Bond angles

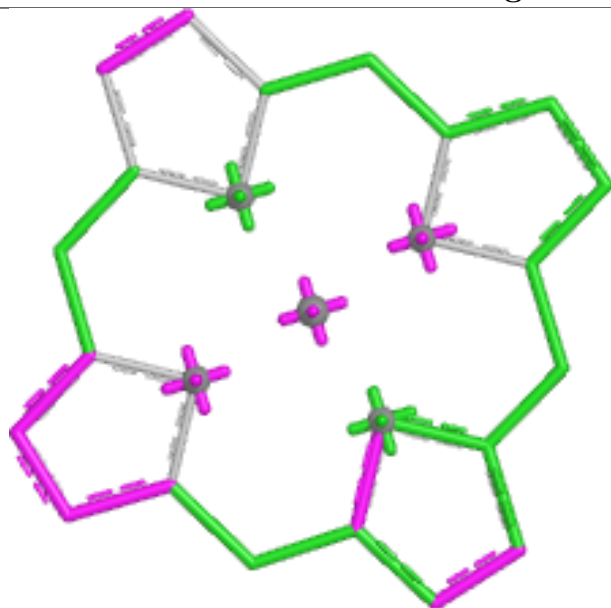


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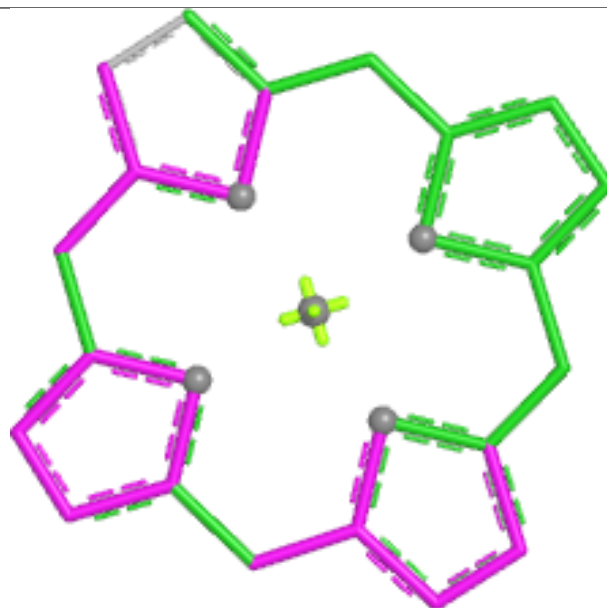


Rings

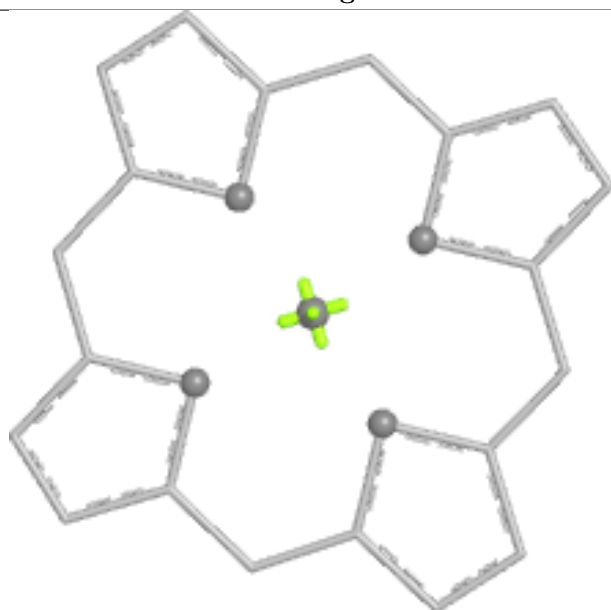
Ligand CLA A 3047



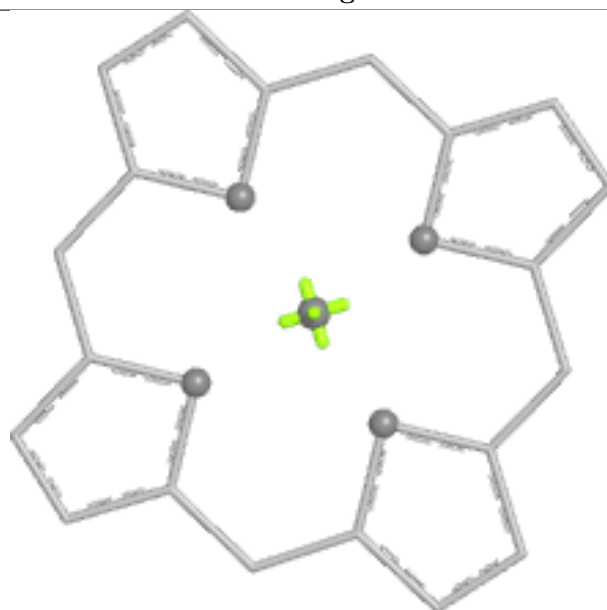
Bond lengths



Bond angles

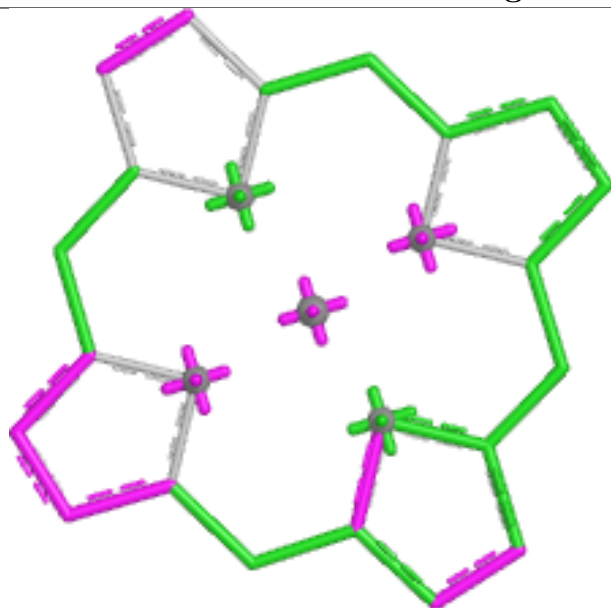


Torsions

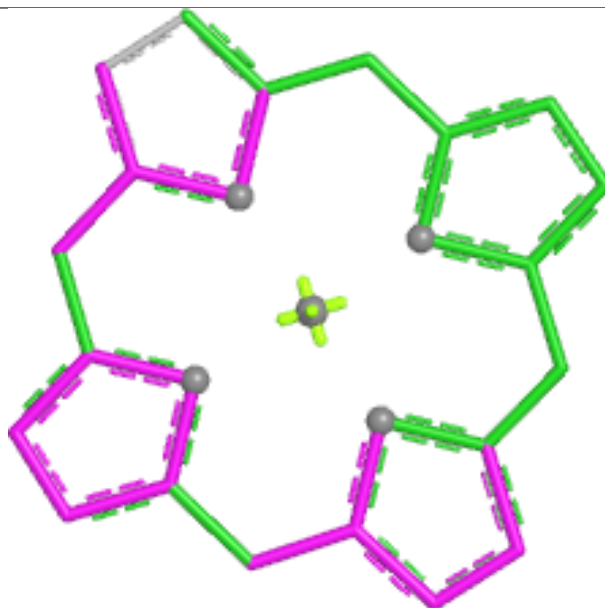


Rings

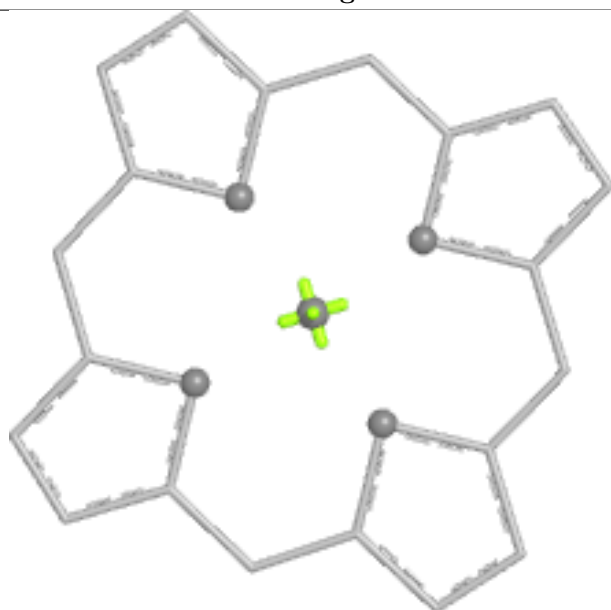
Ligand CLA A 2006



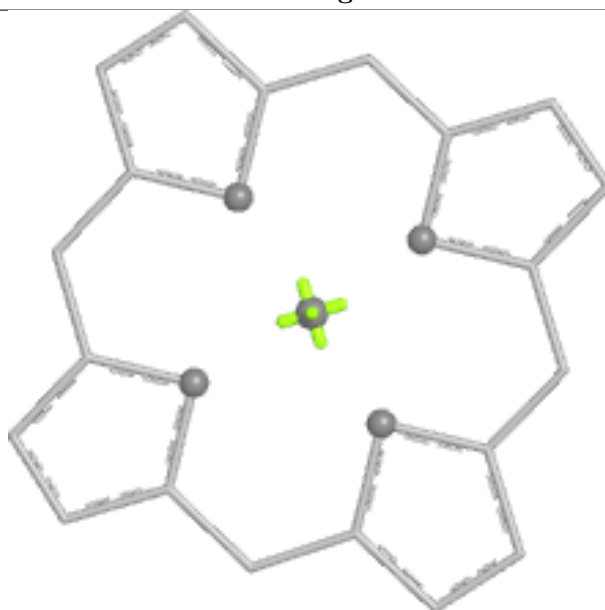
Bond lengths



Bond angles

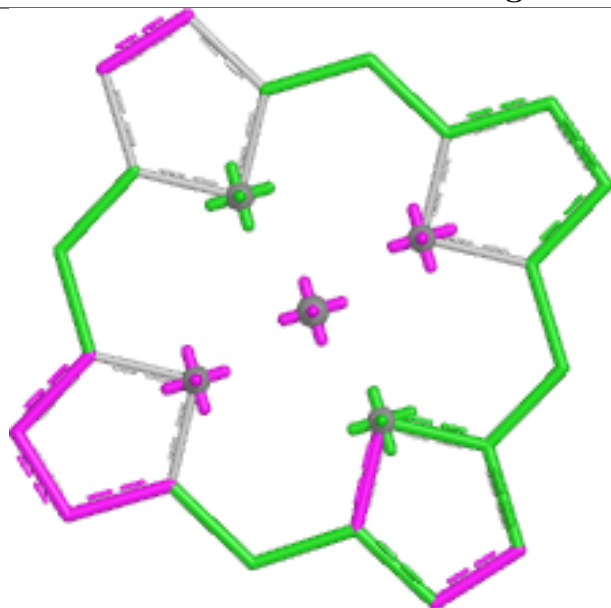


Torsions

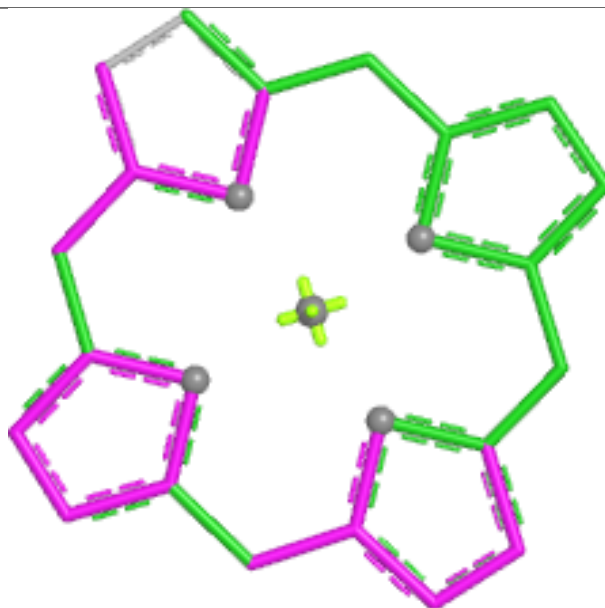


Rings

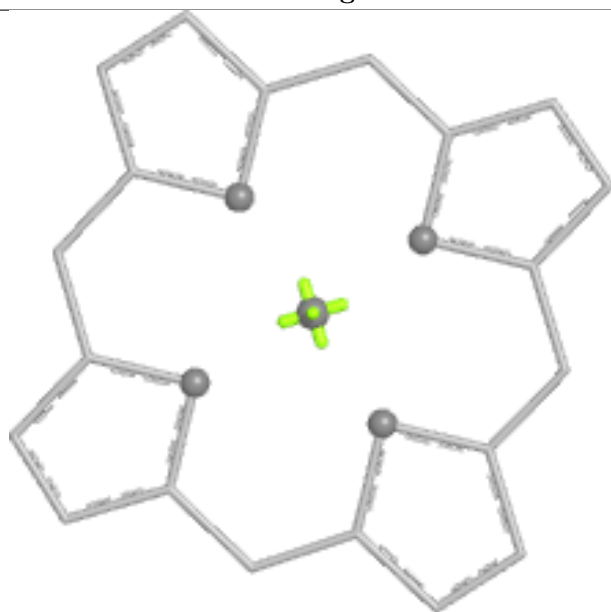
Ligand CLA B 3011



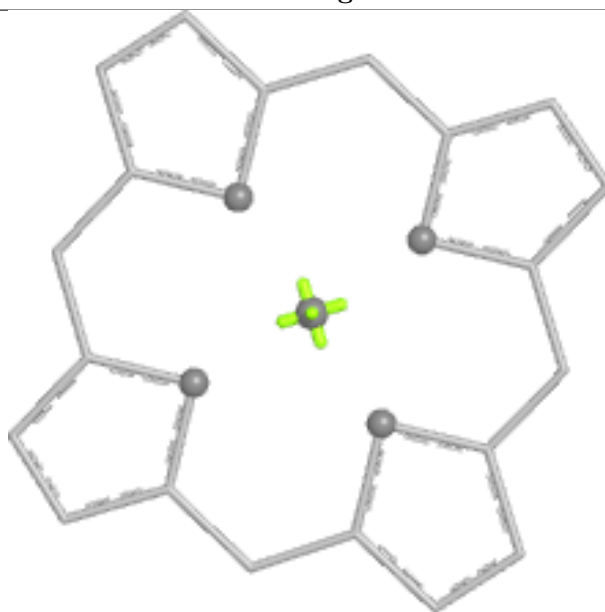
Bond lengths



Bond angles

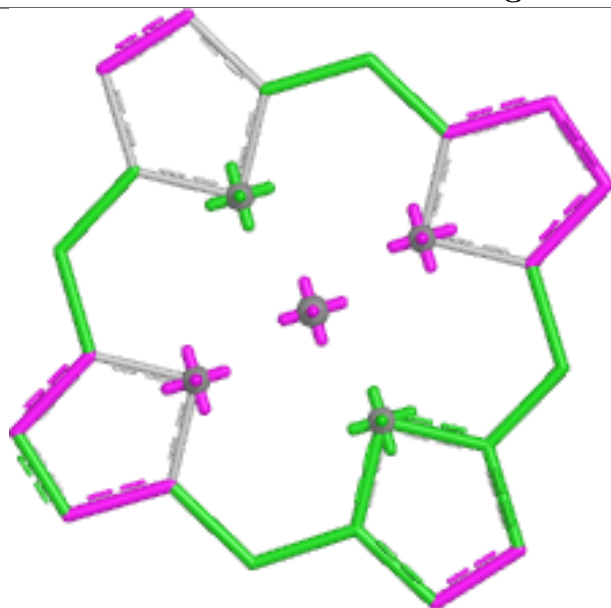


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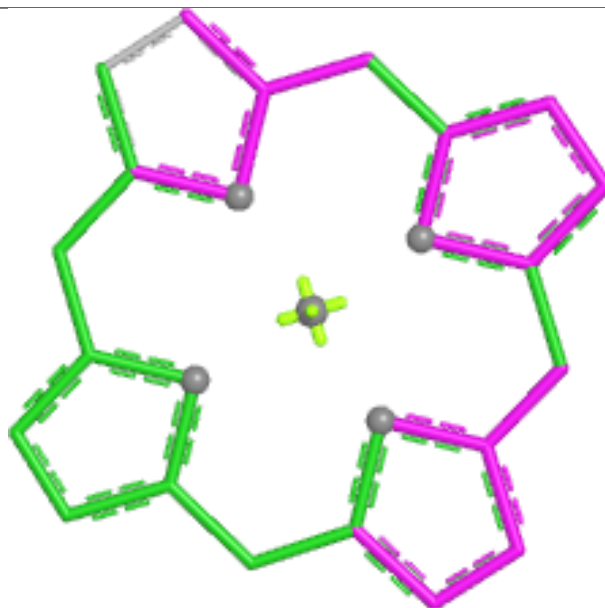


Rings

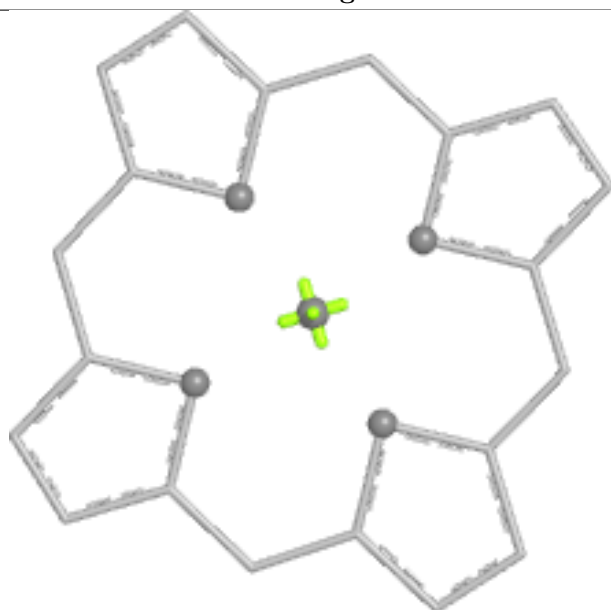
Ligand CLA A 3014



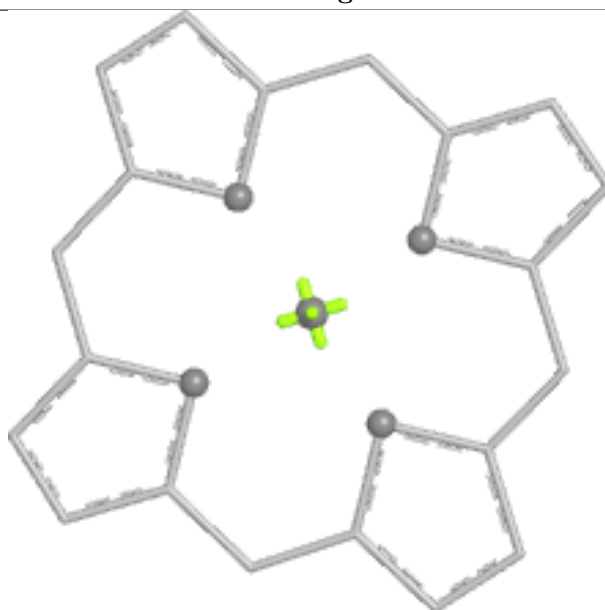
Bond lengths



Bond angles

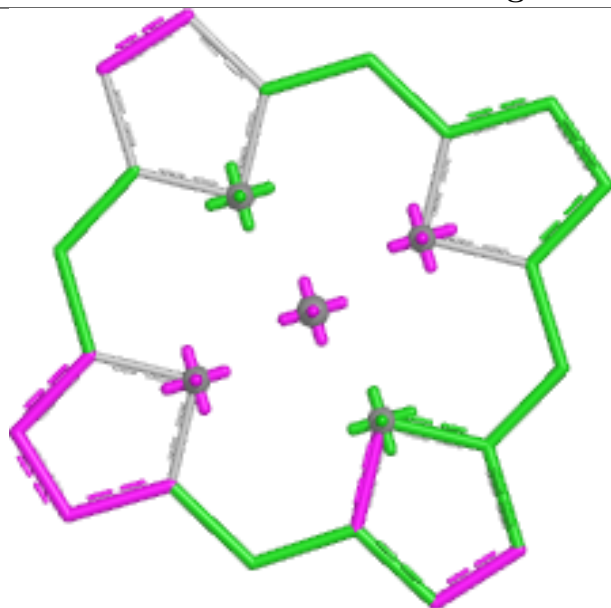


Torsions

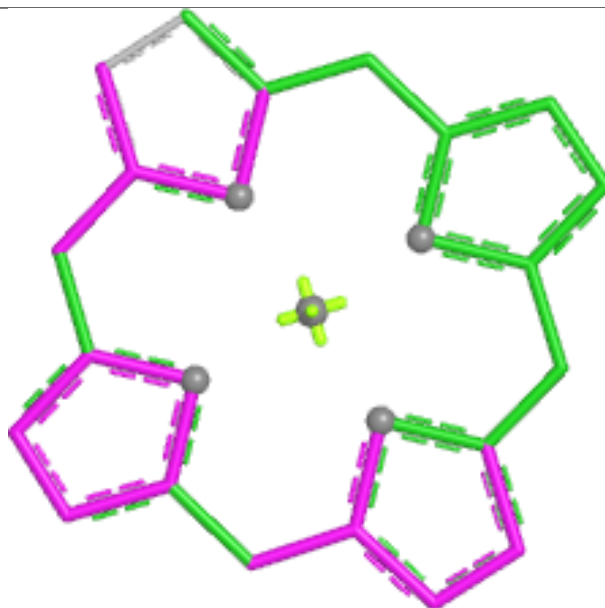


Rings

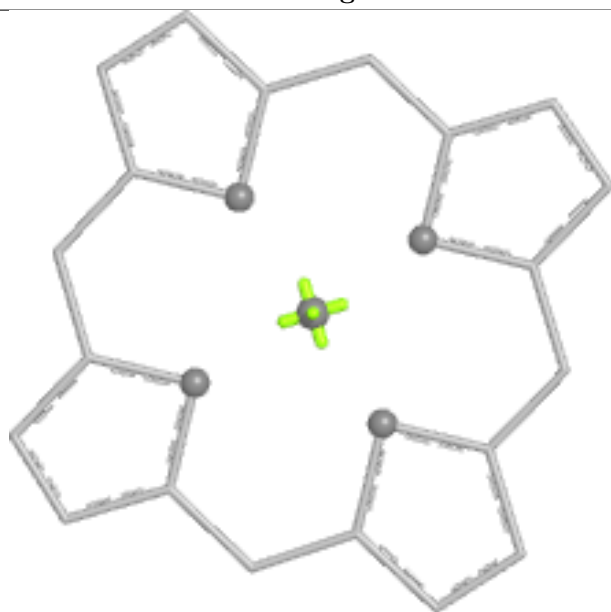
Ligand CLA F 3059



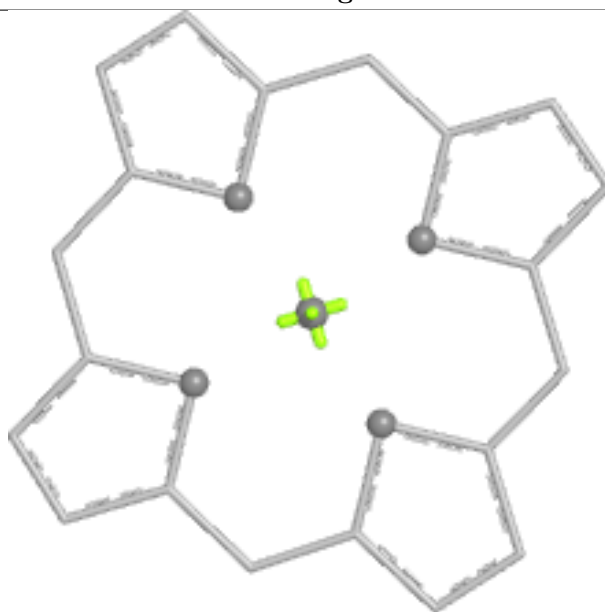
Bond lengths



Bond angles

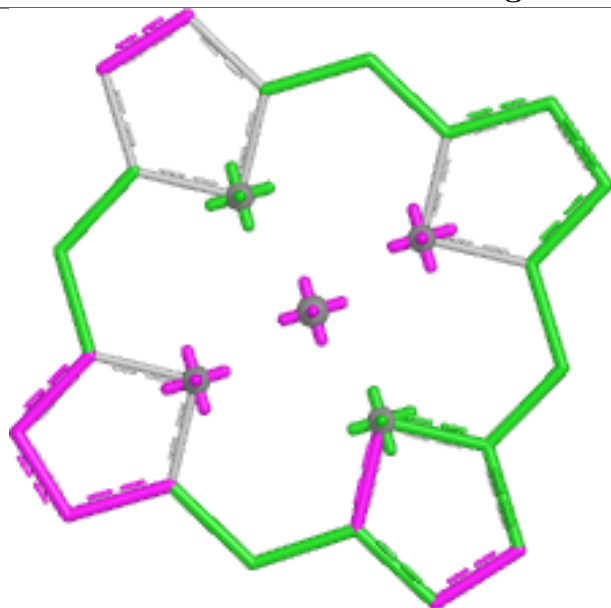


Torsions

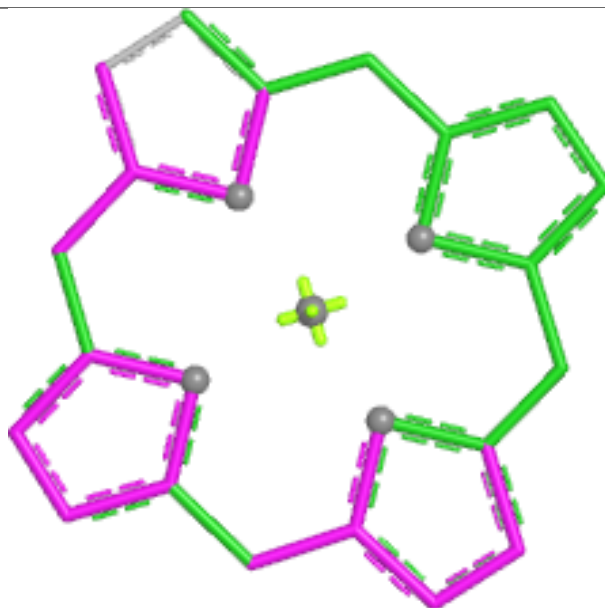


Rings

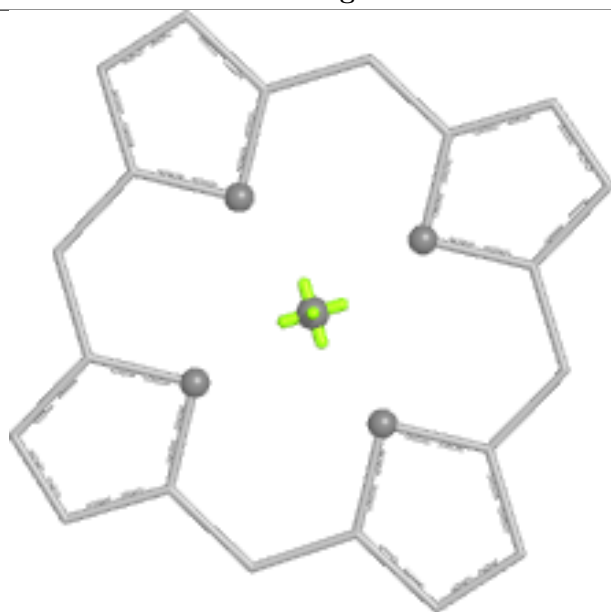
Ligand CLA A 3073



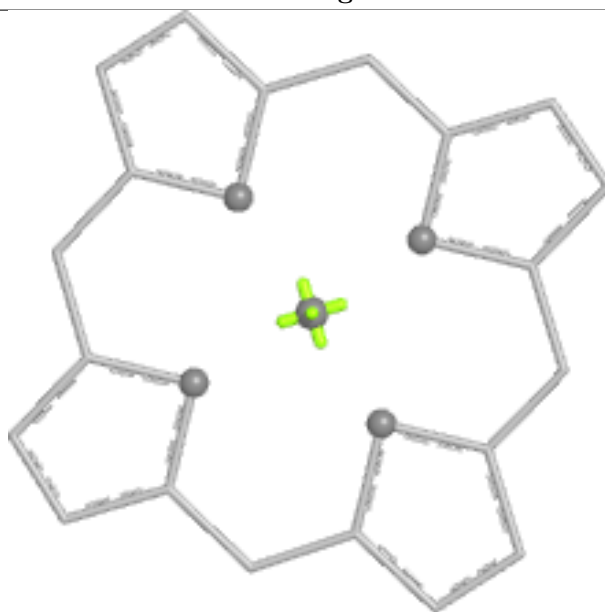
Bond lengths



Bond angles

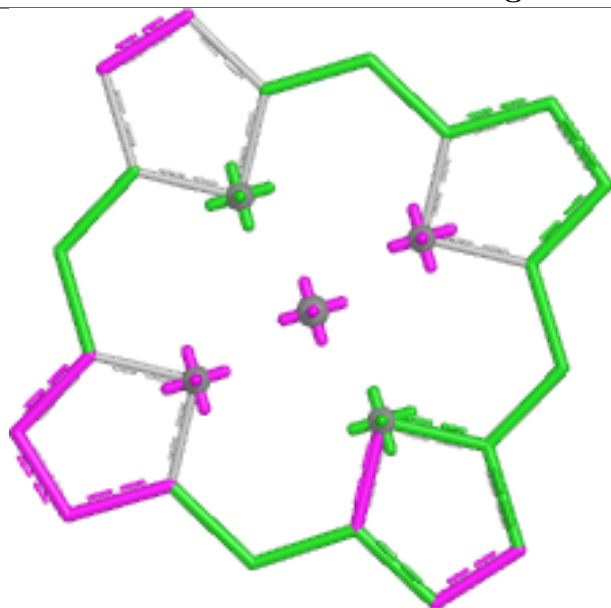


Torsions

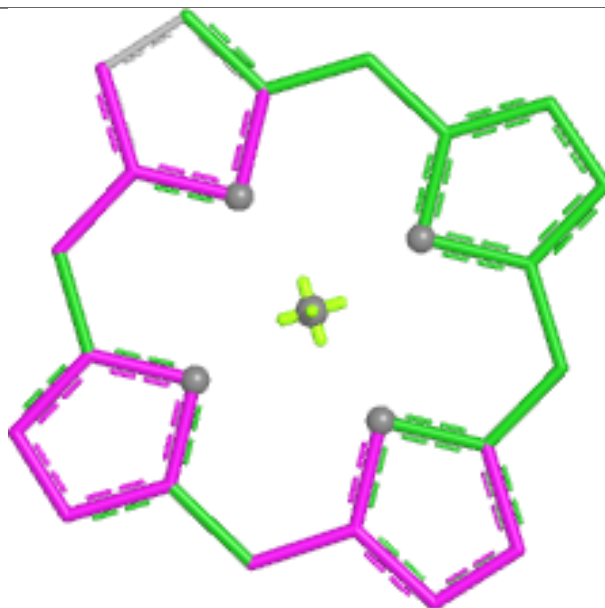


Rings

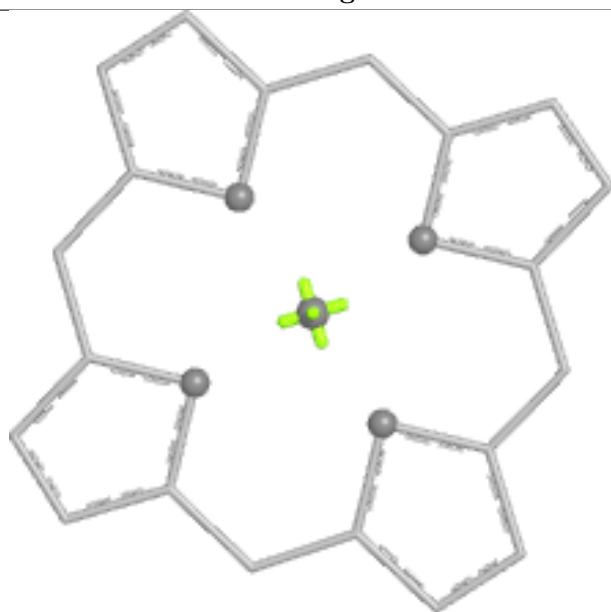
Ligand CLA A 3017



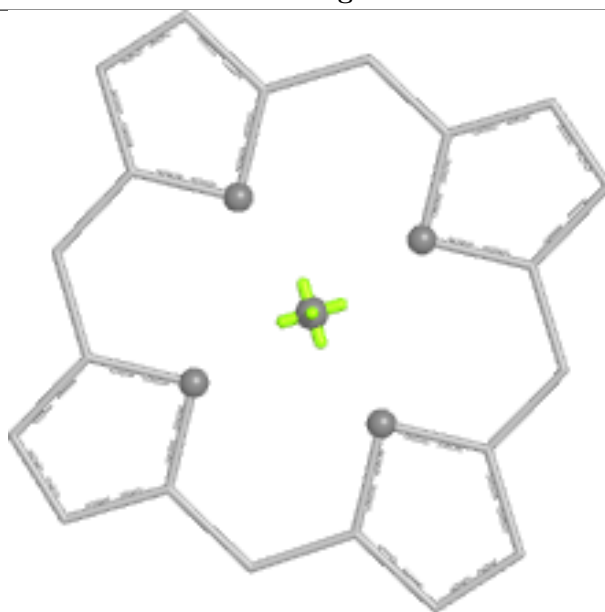
Bond lengths



Bond angles

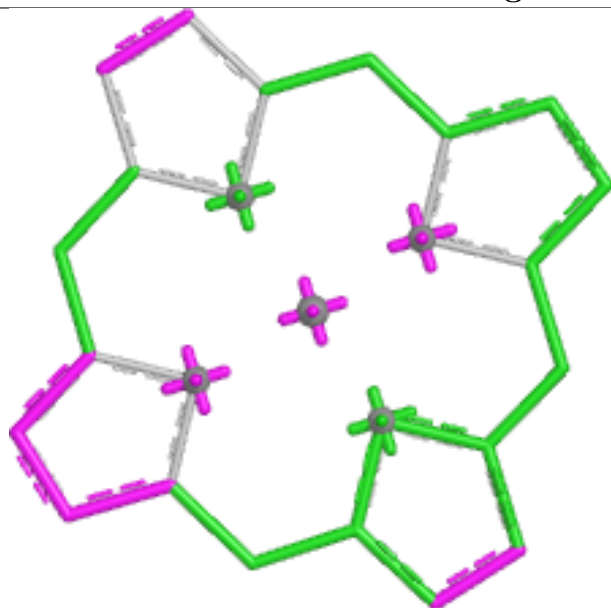


Torsions

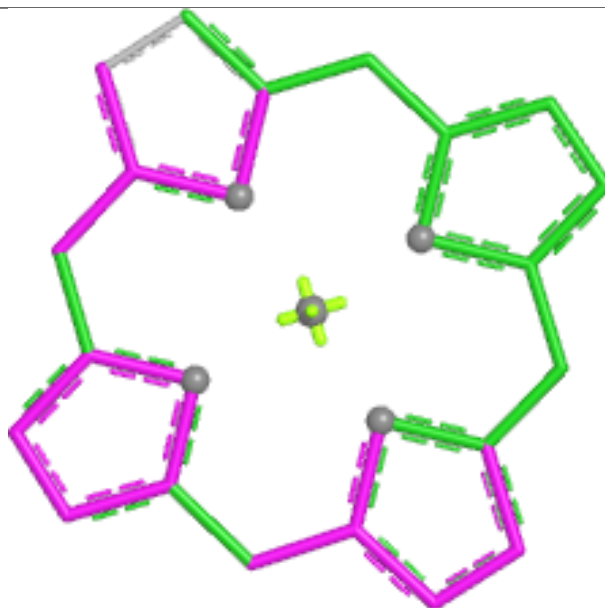


Rings

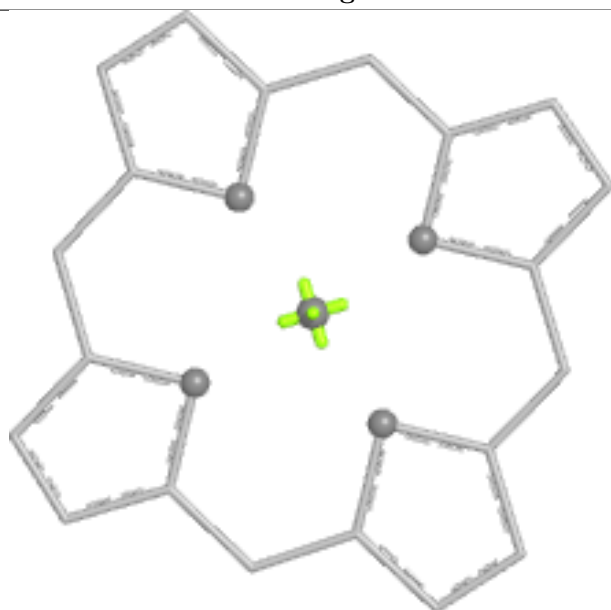
Ligand CLA A 3057



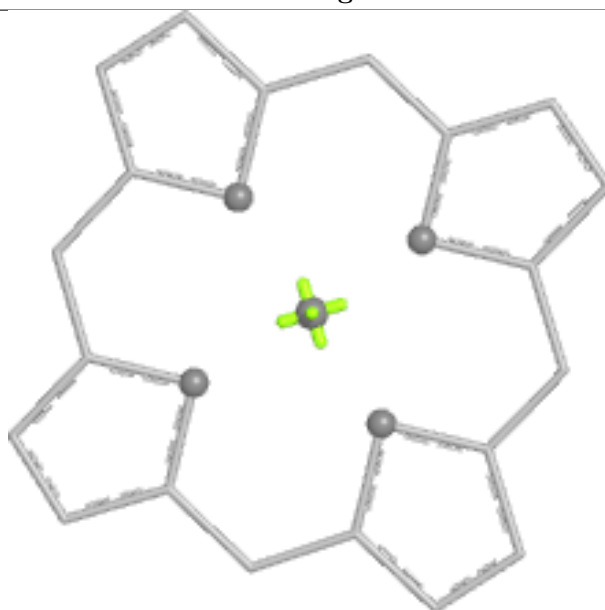
Bond lengths



Bond angles

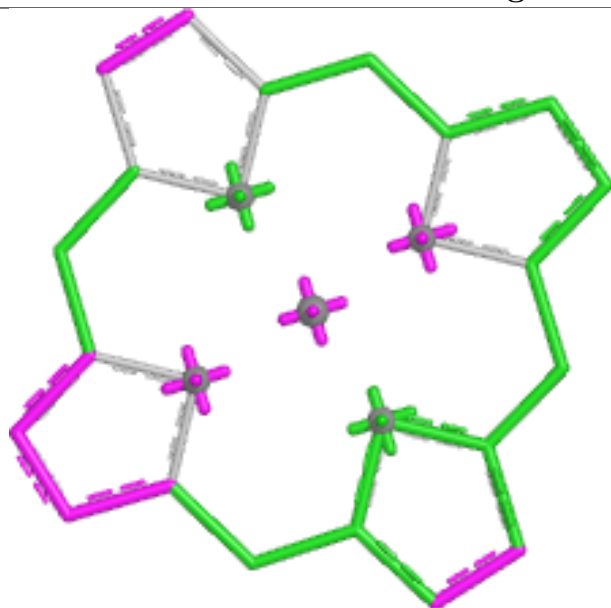


Torsions

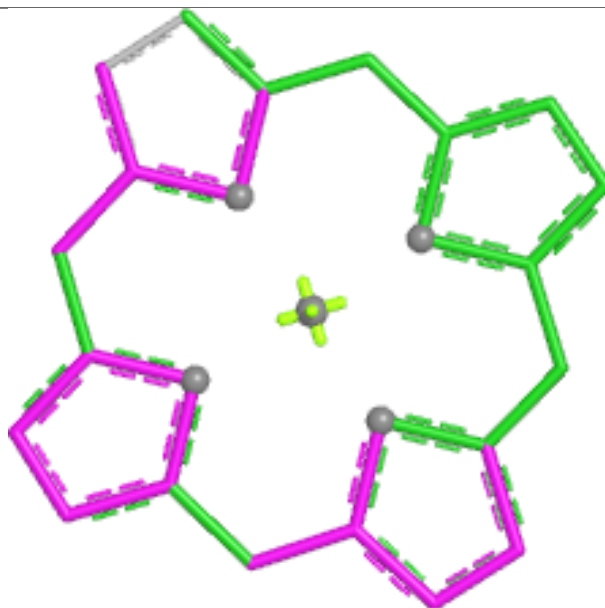


Rings

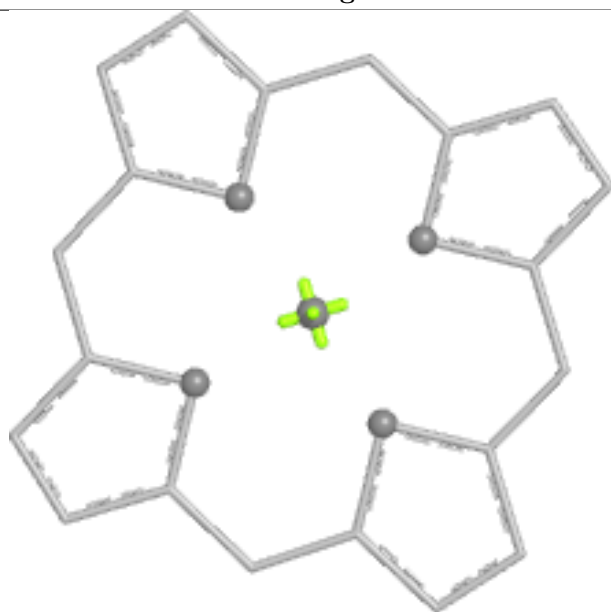
Ligand CLA L 3038



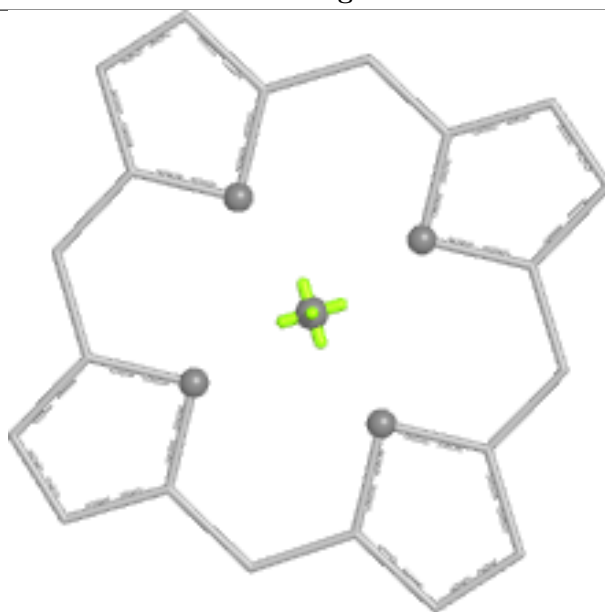
Bond lengths



Bond angles

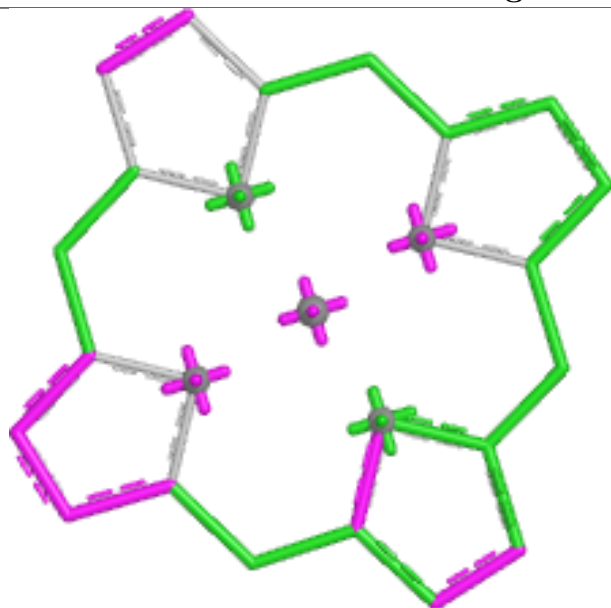


Torsions

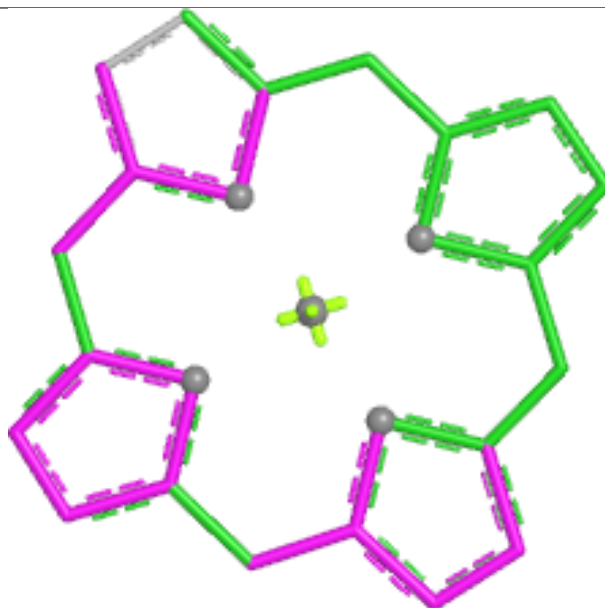


Rings

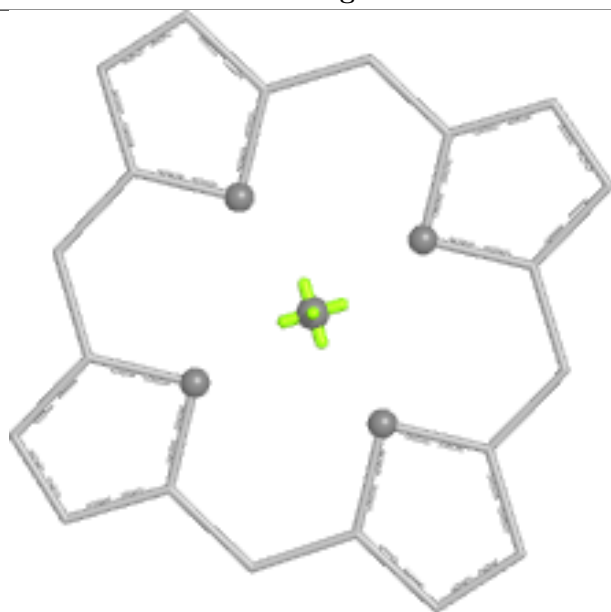
Ligand CLA B 2501



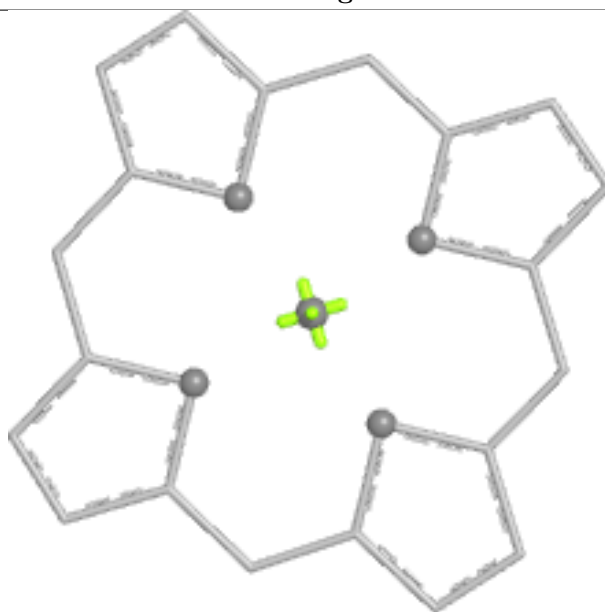
Bond lengths



Bond angles

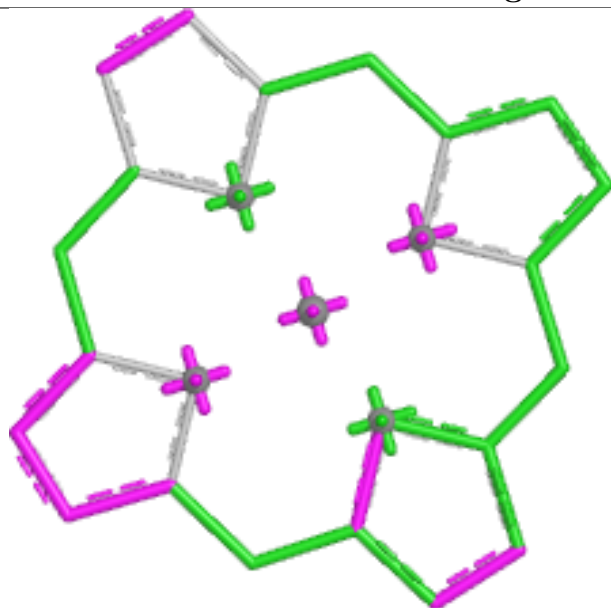


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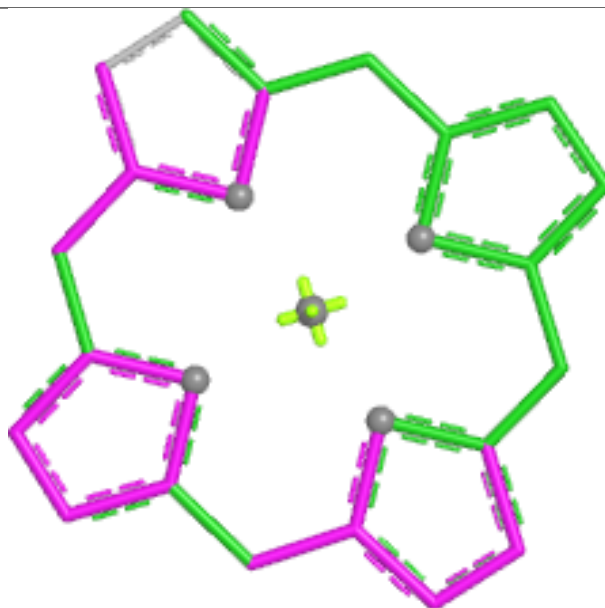


Rings

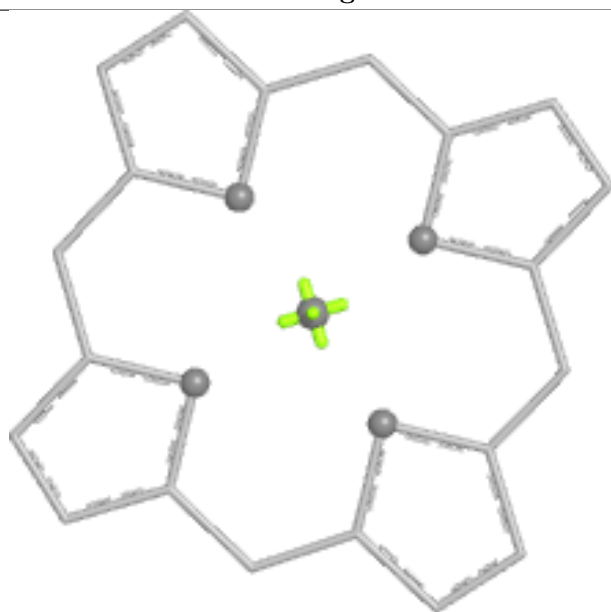
Ligand CLA A 3041



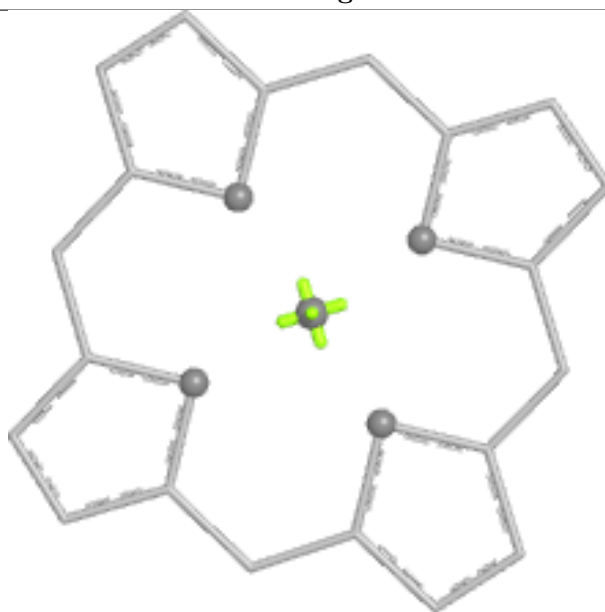
Bond lengths



Bond angles

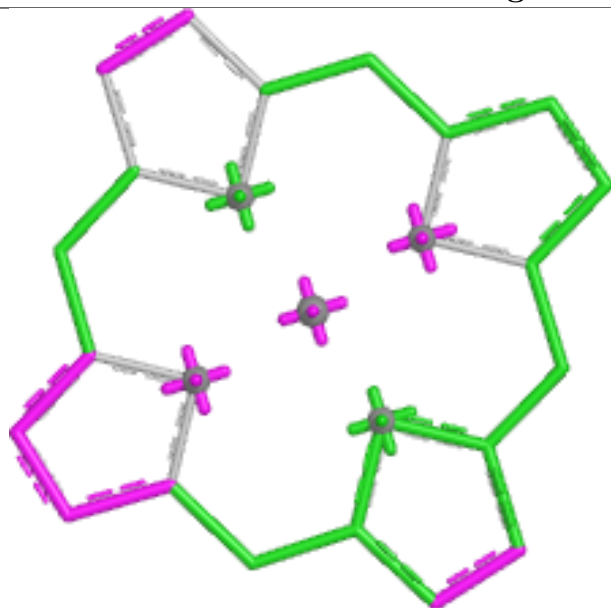


Torsions

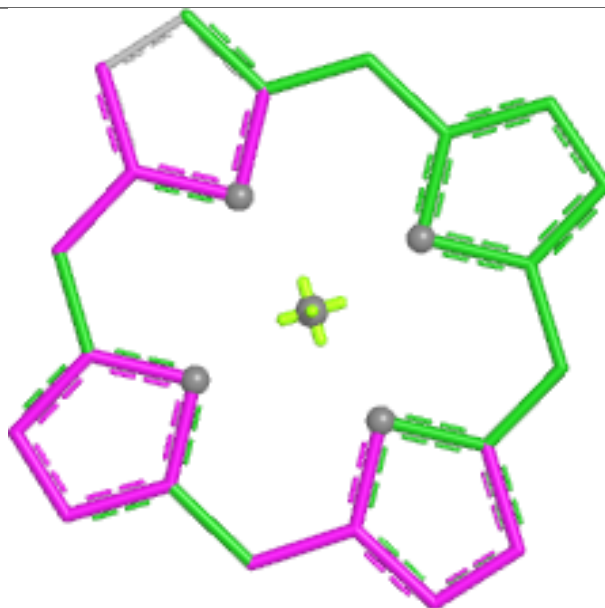


Rings

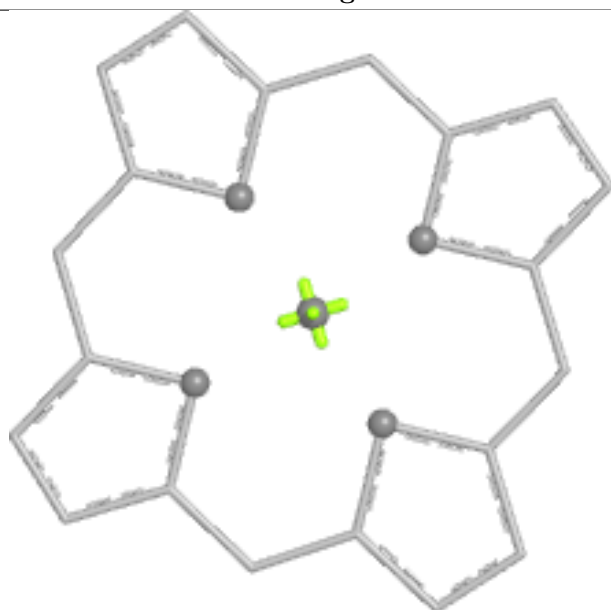
Ligand CLA F 3061



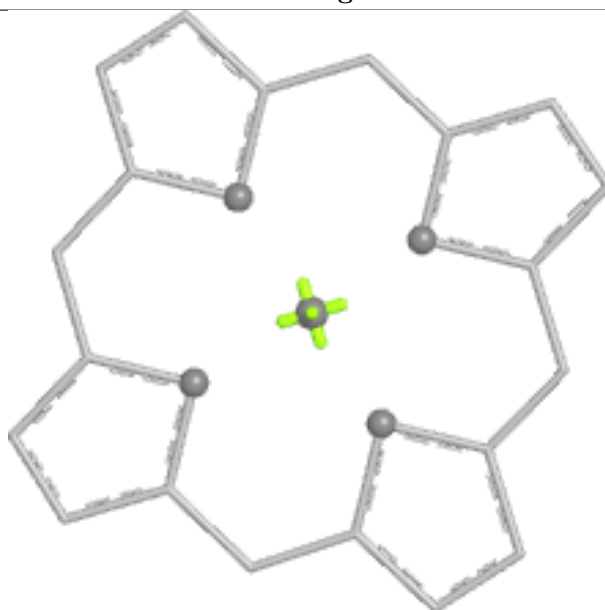
Bond lengths



Bond angles

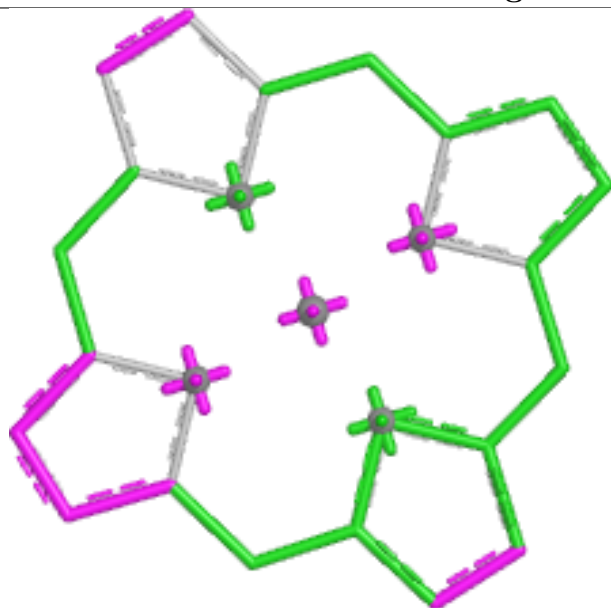


Torsions

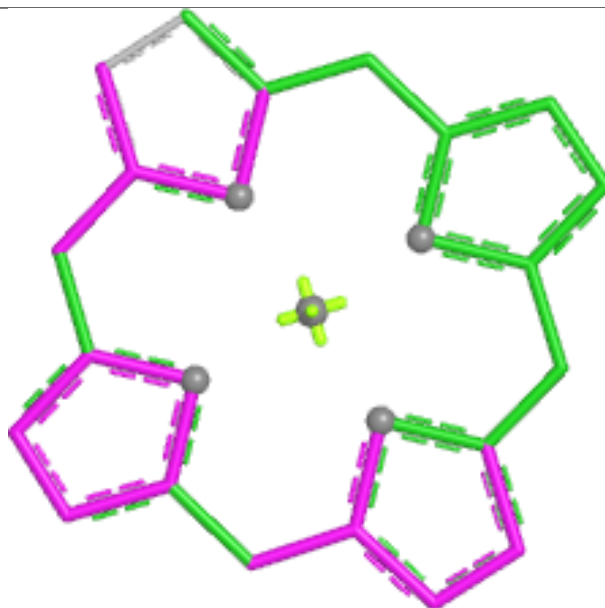


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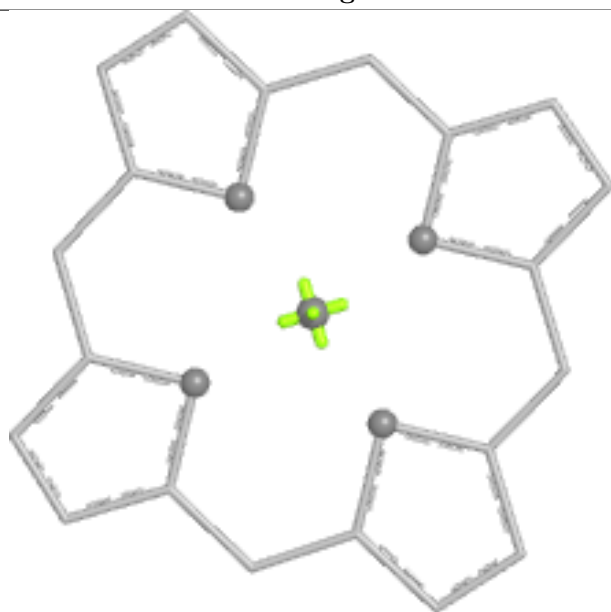
Ligand CLA B 3020



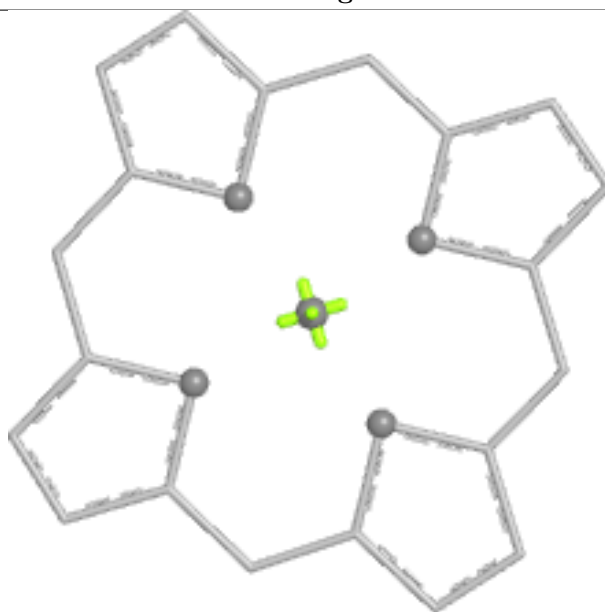
Bond lengths



Bond angles

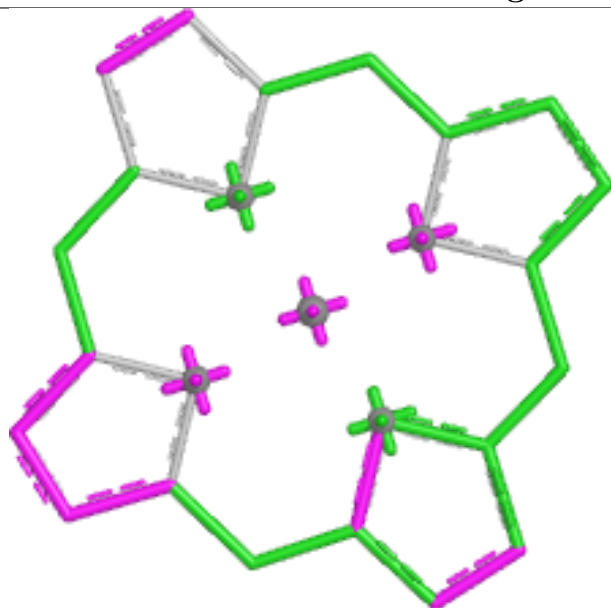


Torsions

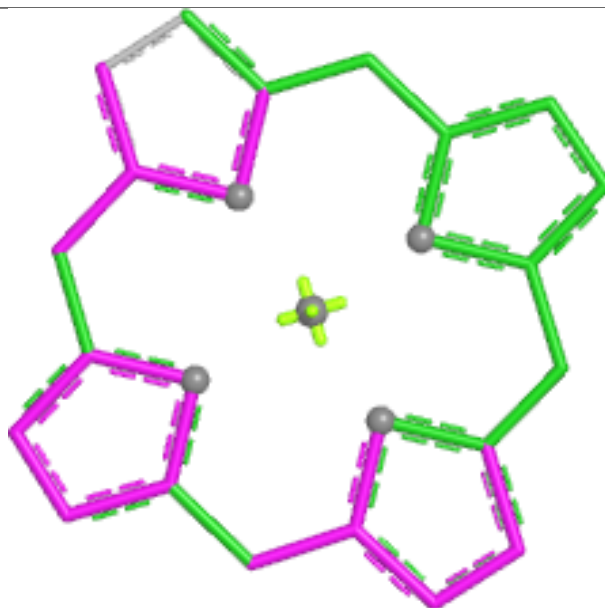


Rings

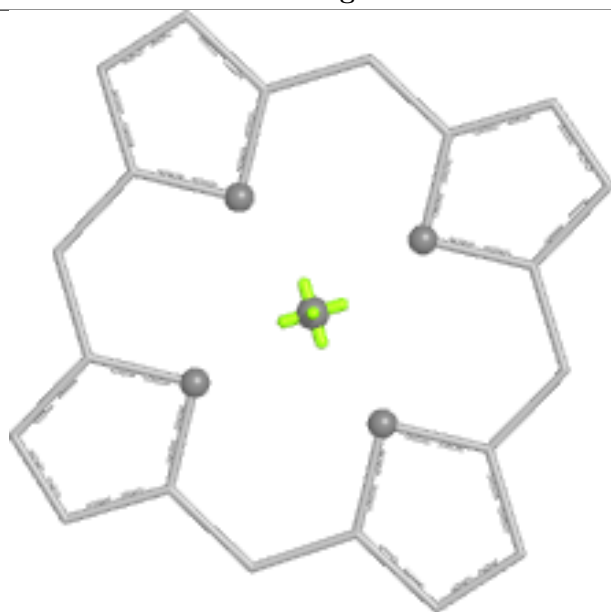
Ligand CLA F 3033



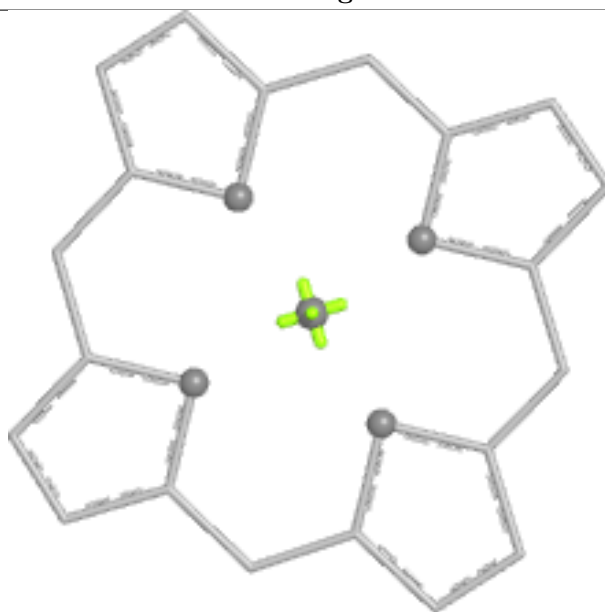
Bond lengths



Bond angles

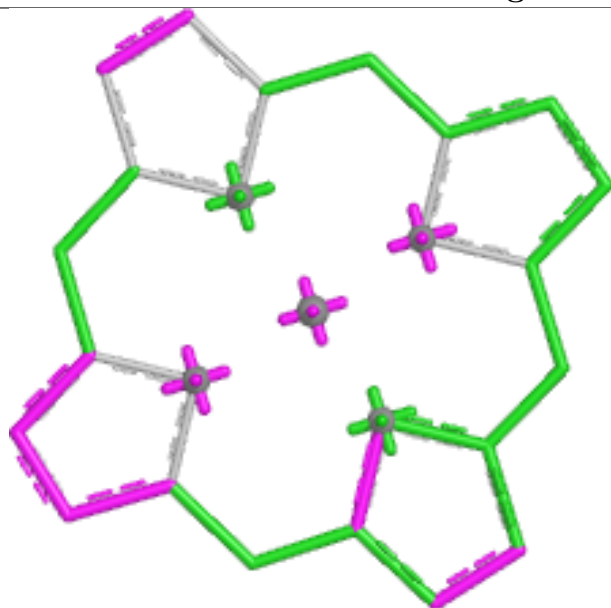


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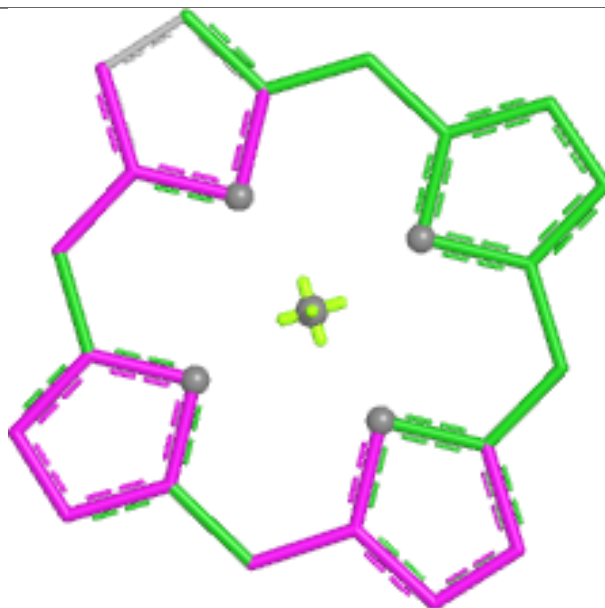


Rings

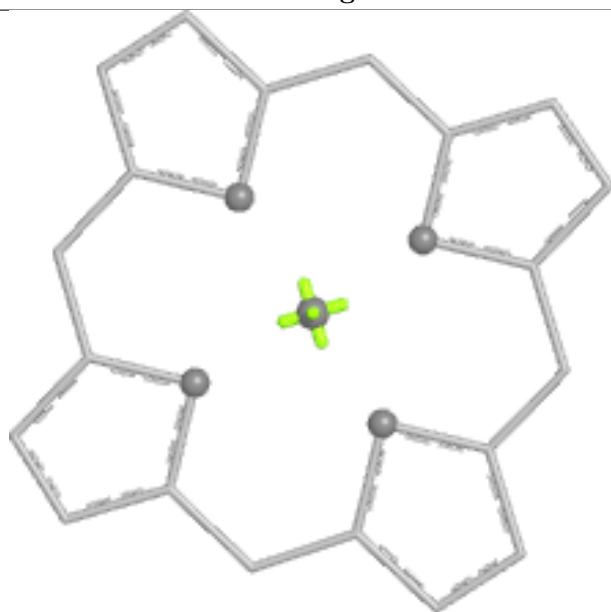
Ligand CLA F 3022



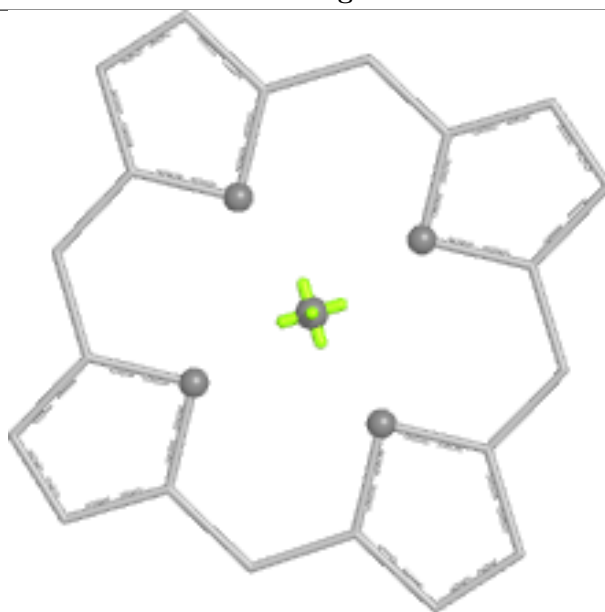
Bond lengths



Bond angles

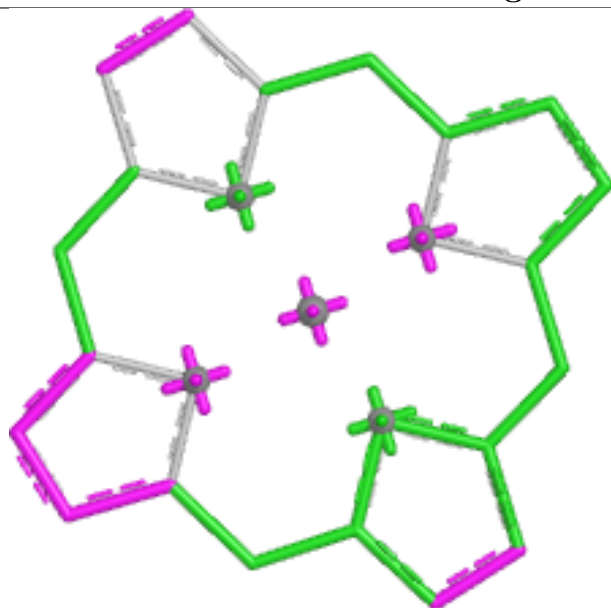


Torsions

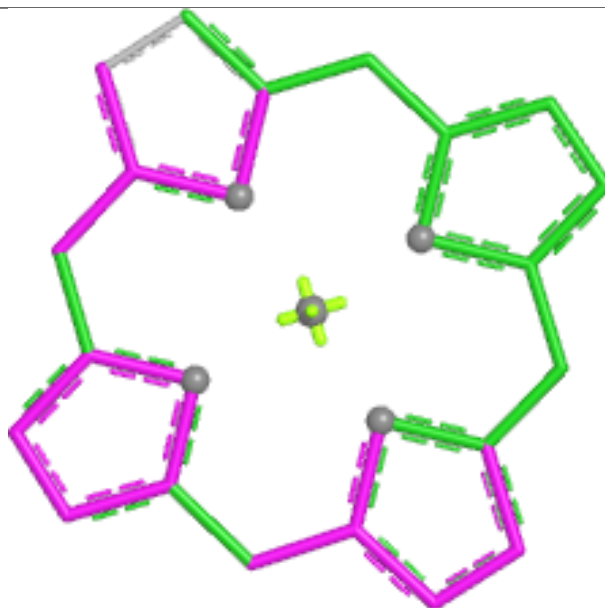


Rings

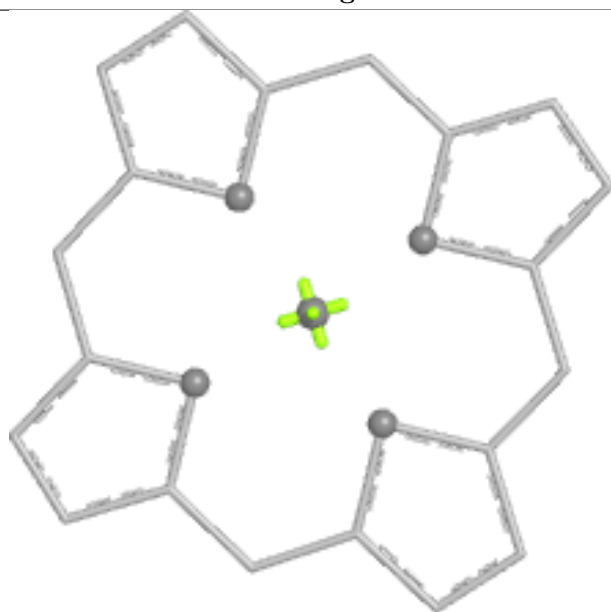
Ligand CLA A 2502



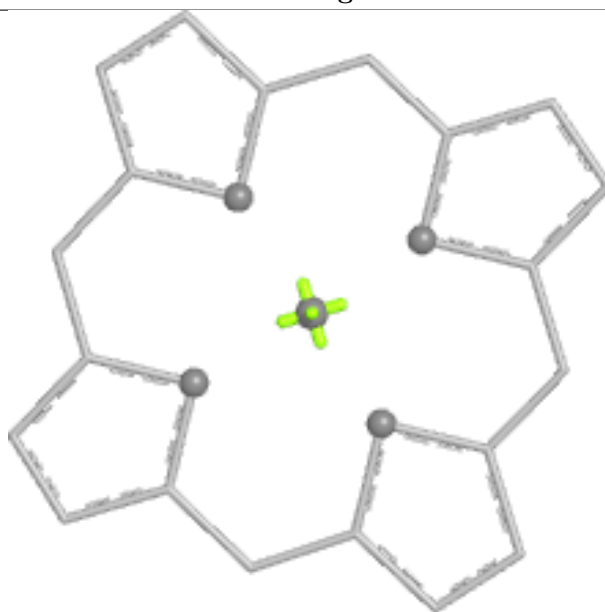
Bond lengths



Bond angles

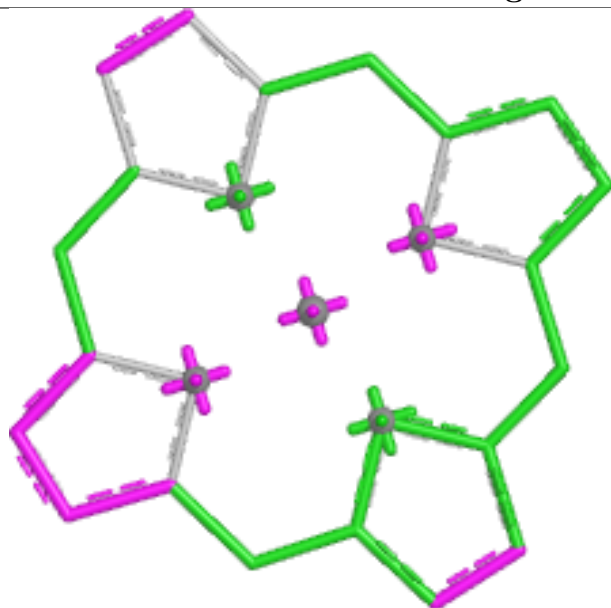


Torsions

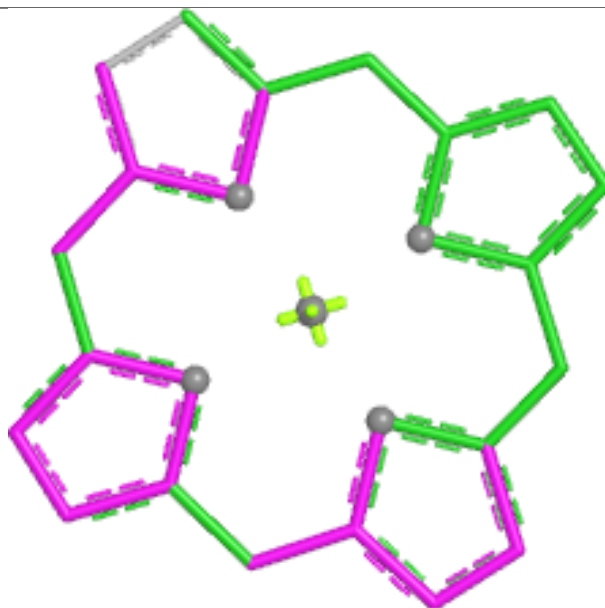


Rings

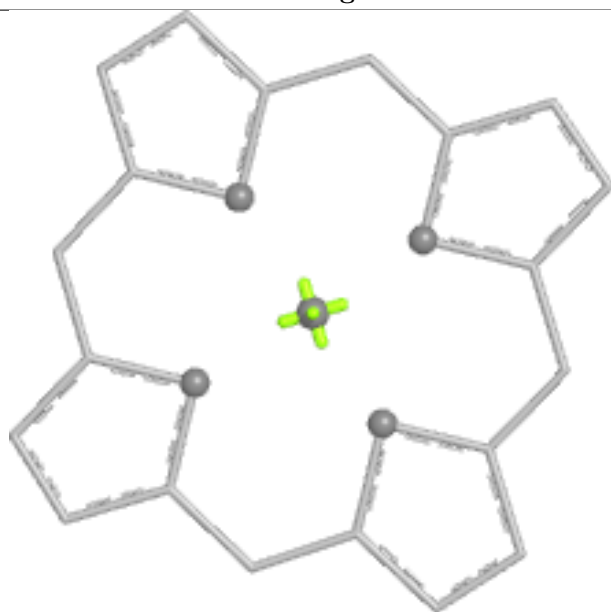
Ligand CLA B 3080



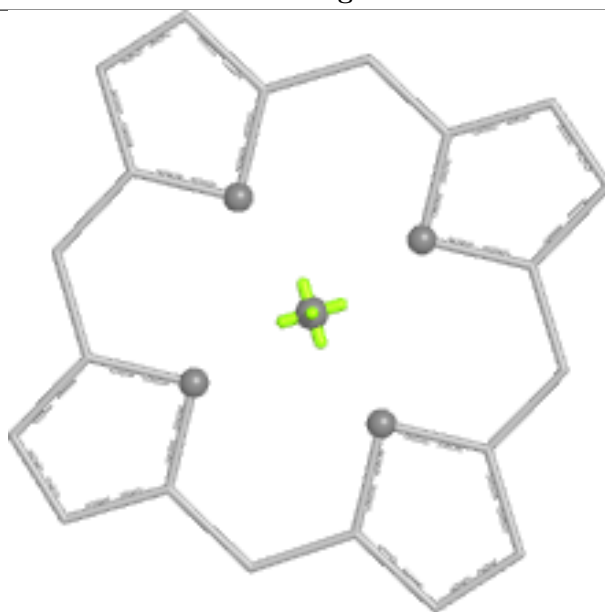
Bond lengths



Bond angles

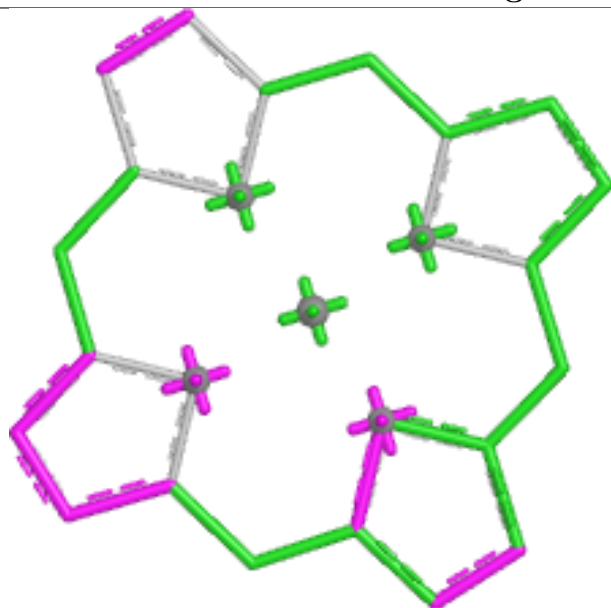


Torsions

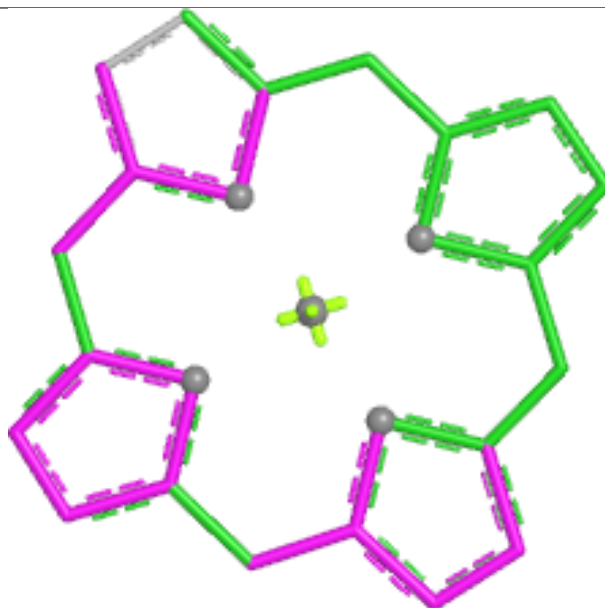


Rings

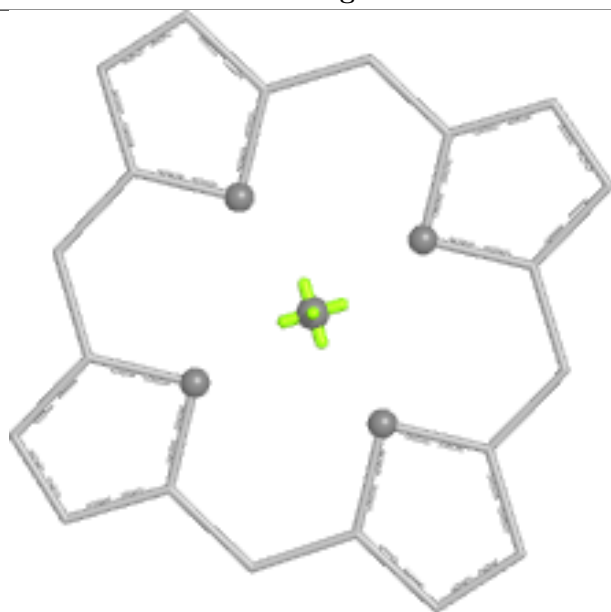
Ligand CLA B 2002



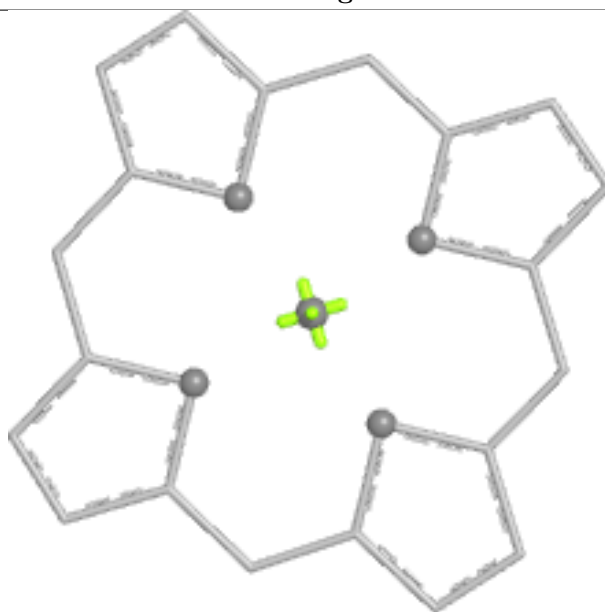
Bond lengths



Bond angles

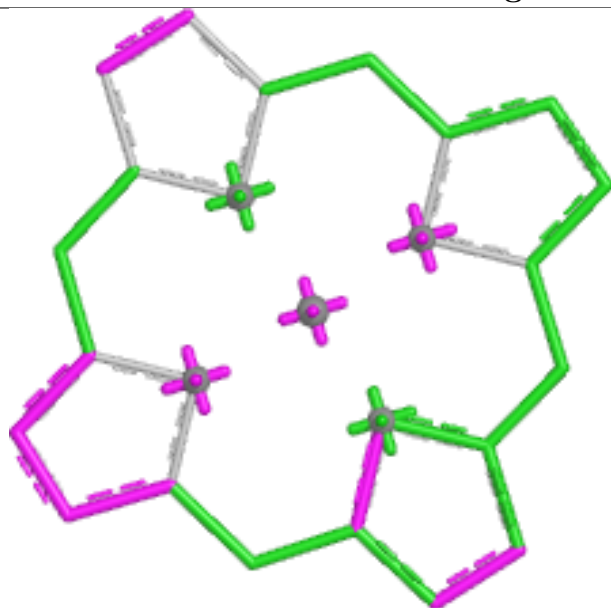


Torsions

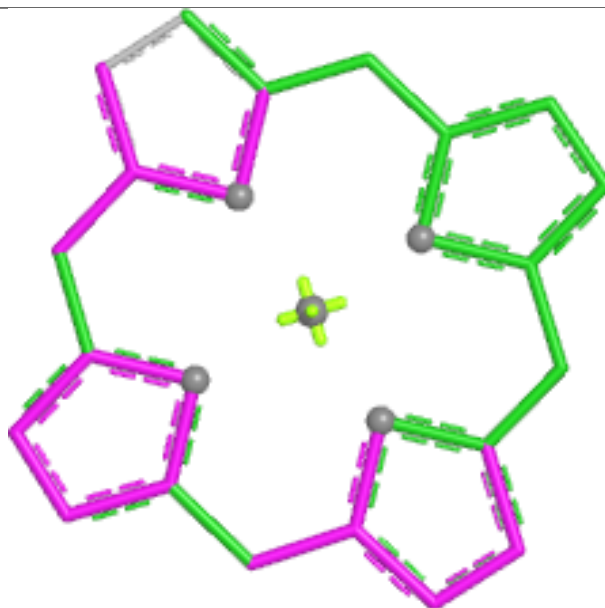


Rings

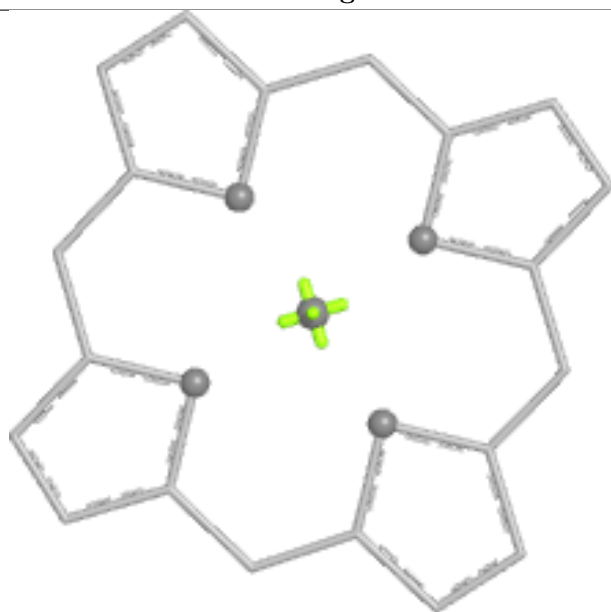
Ligand CLA A 3040



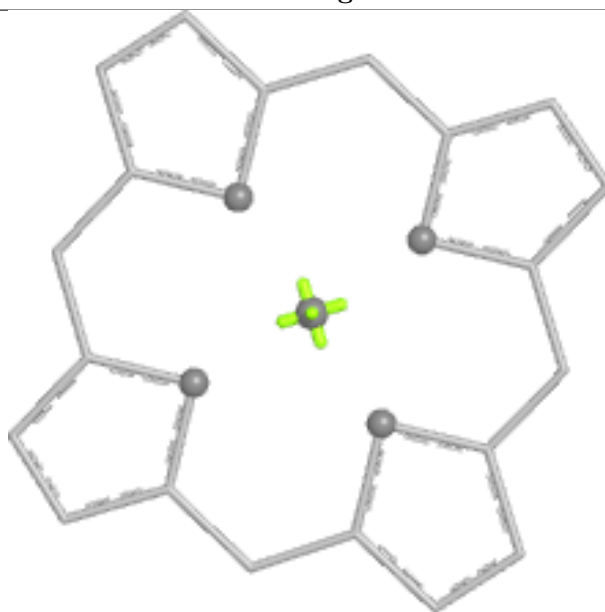
Bond lengths



Bond angles

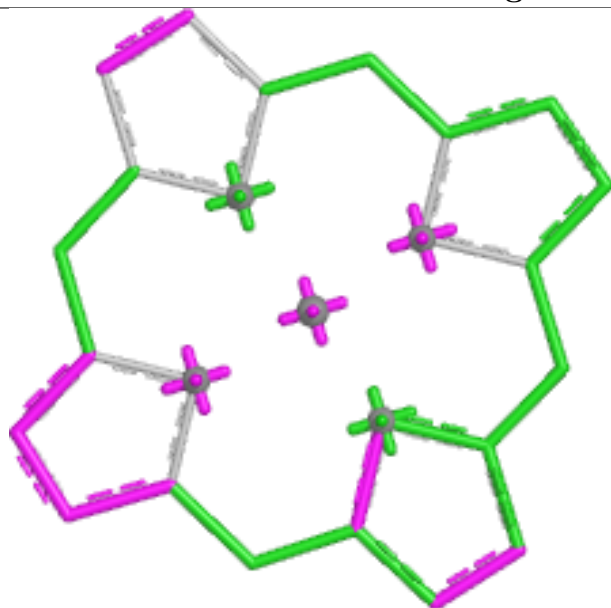


Torsions

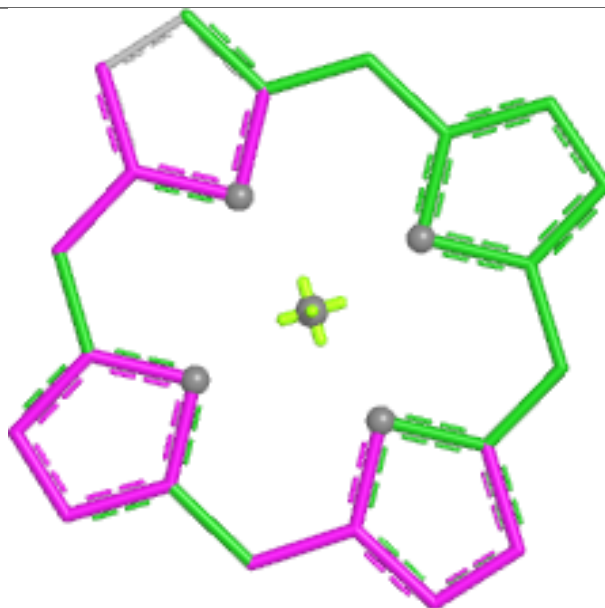


Rings

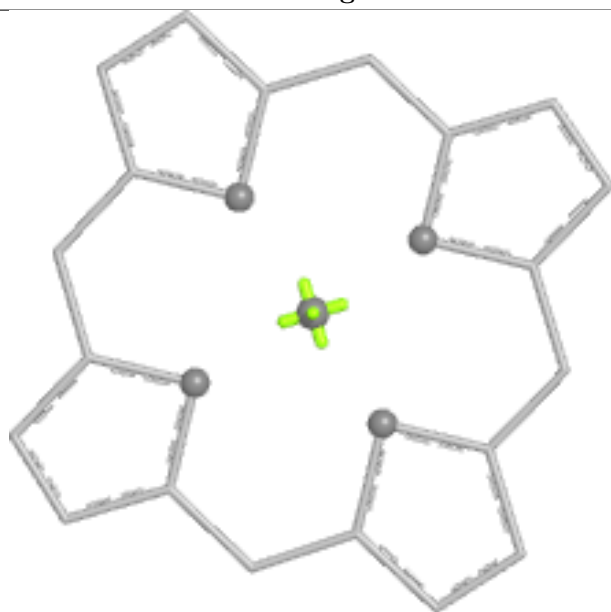
Ligand CLA B 3010



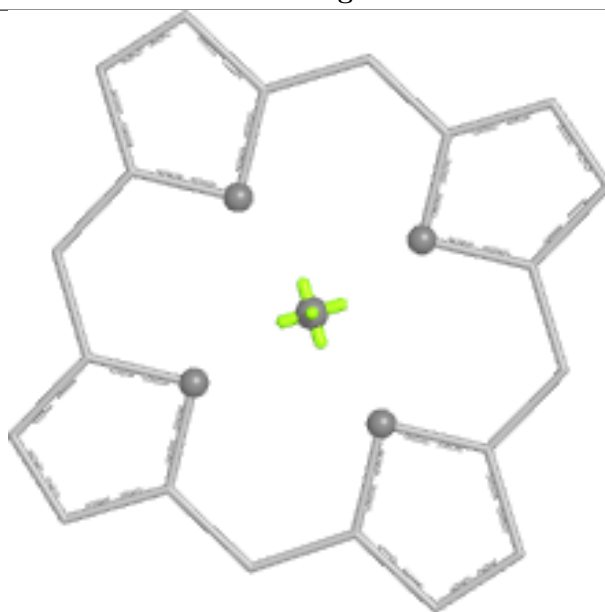
Bond lengths



Bond angles

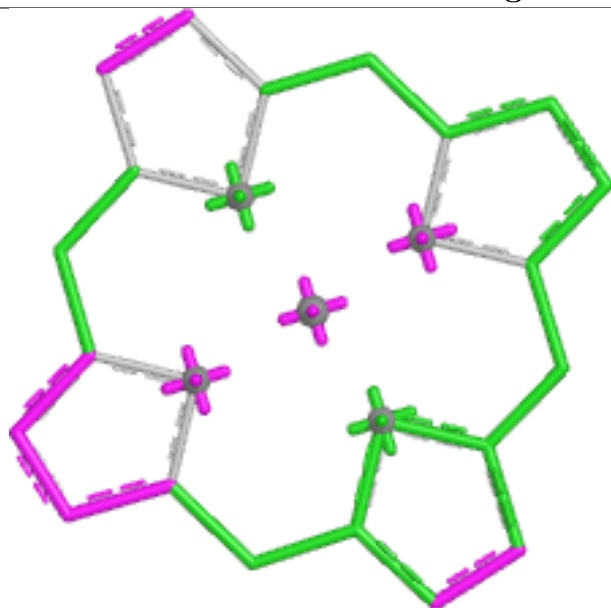


Torsions

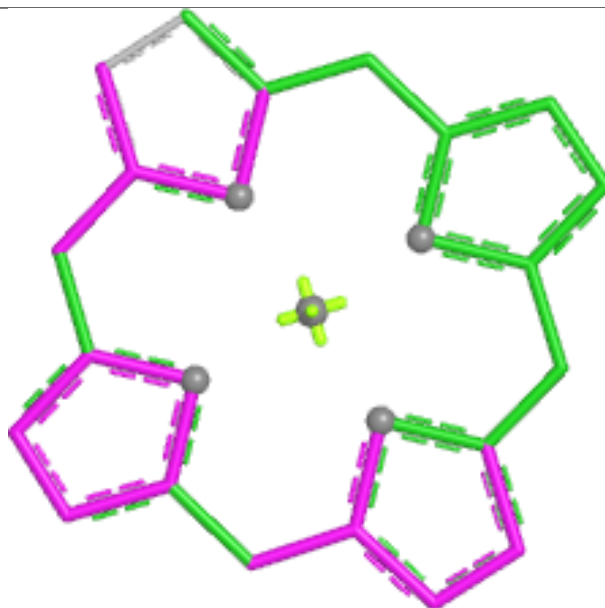


Rings

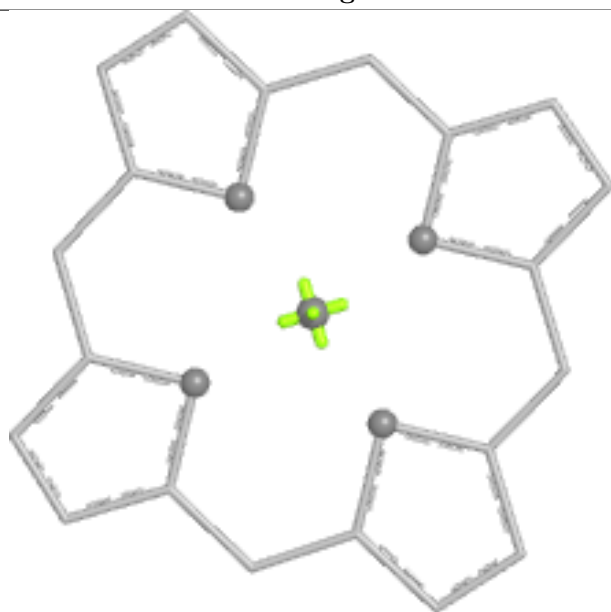
Ligand CLA A 3016



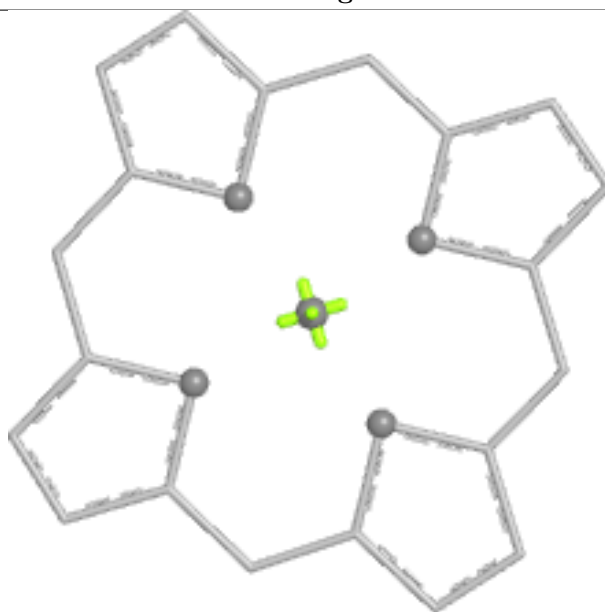
Bond lengths



Bond angles

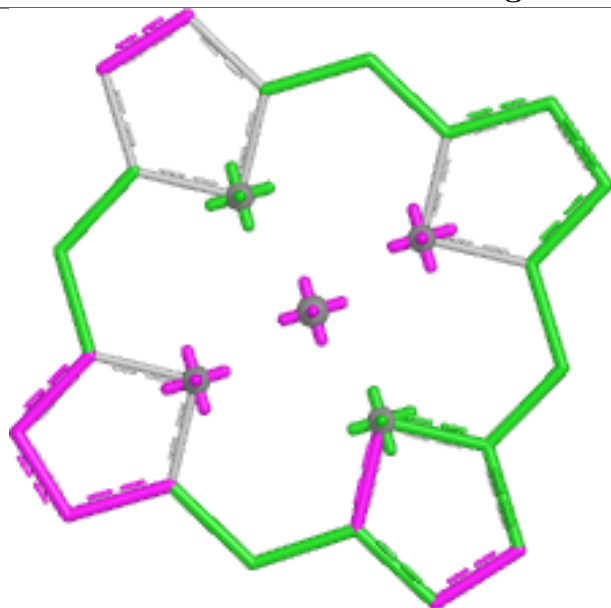


Torsions

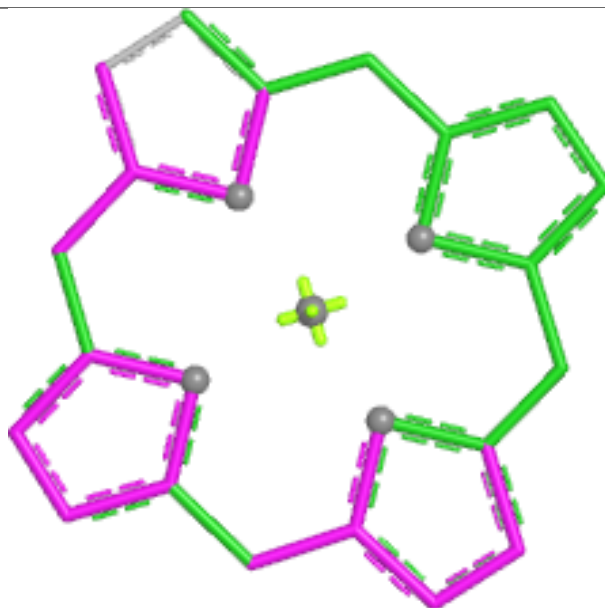


Rings

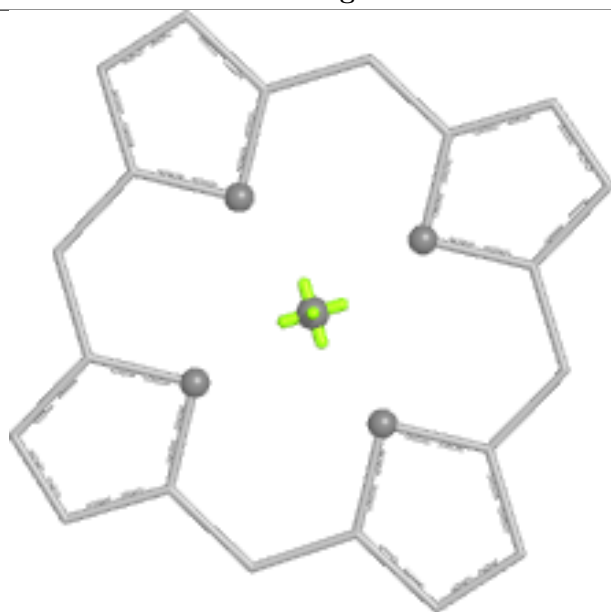
Ligand CLA A 3007



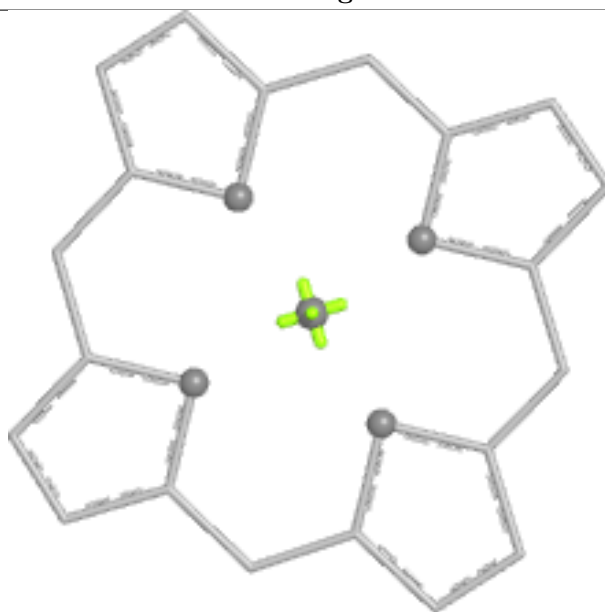
Bond lengths



Bond angles

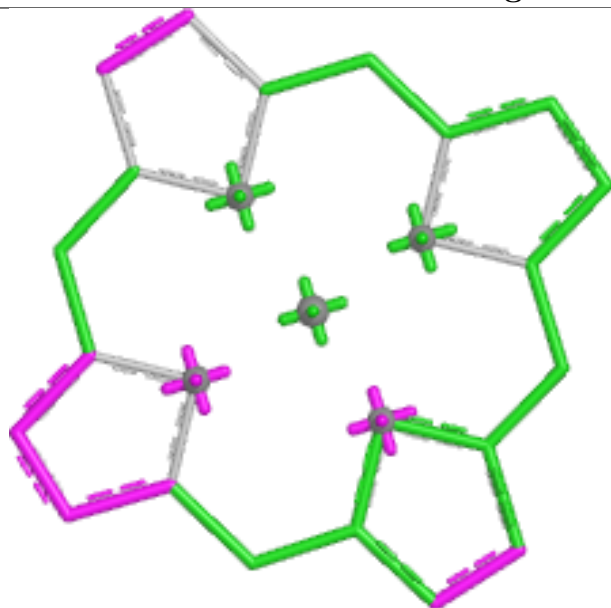


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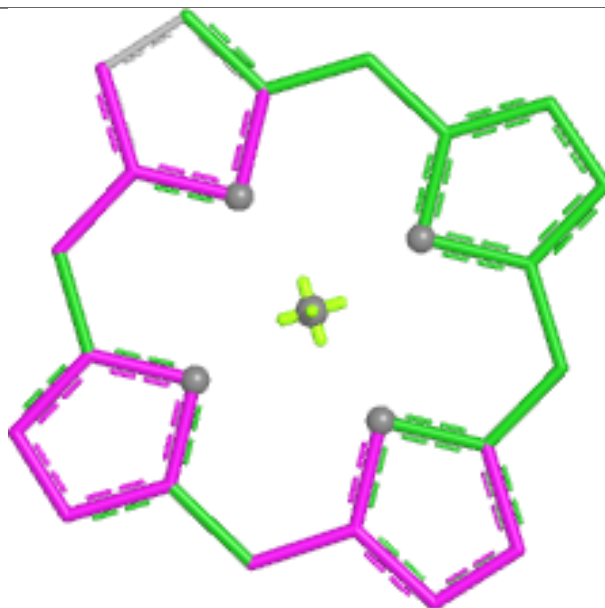


Rings

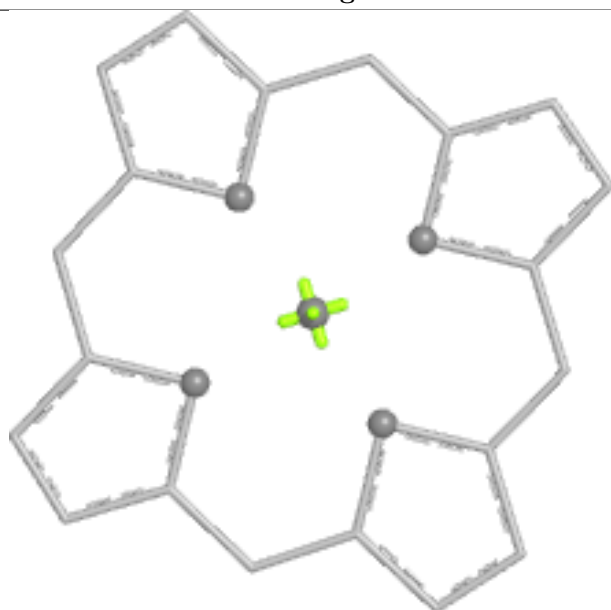
Ligand CLA A 2001



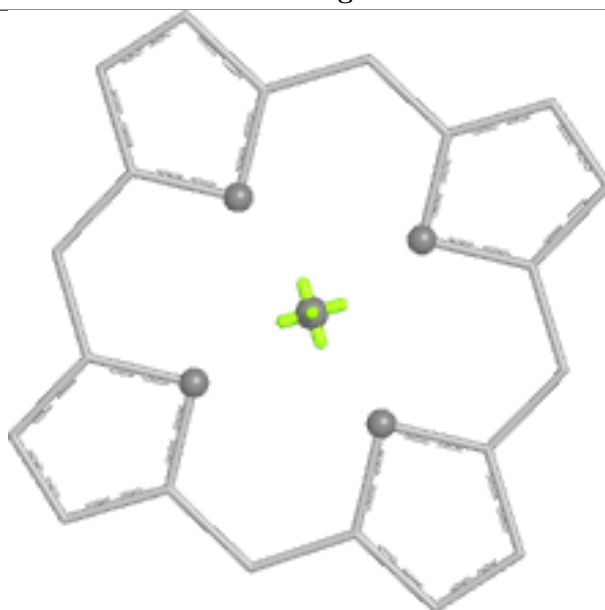
Bond lengths



Bond angles

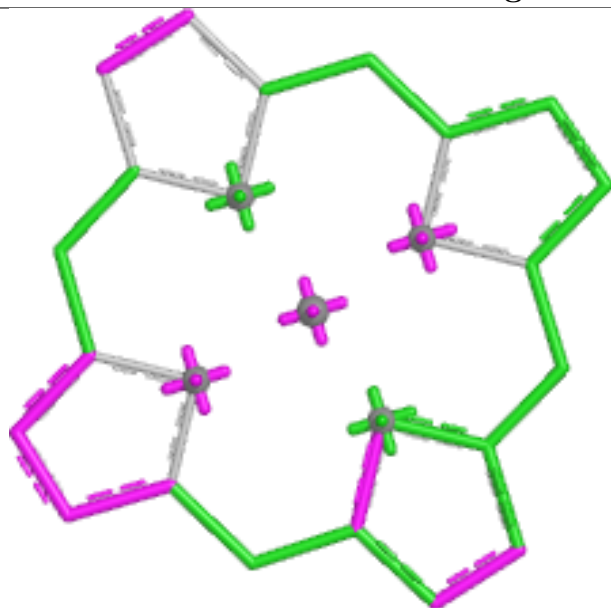


Torsions

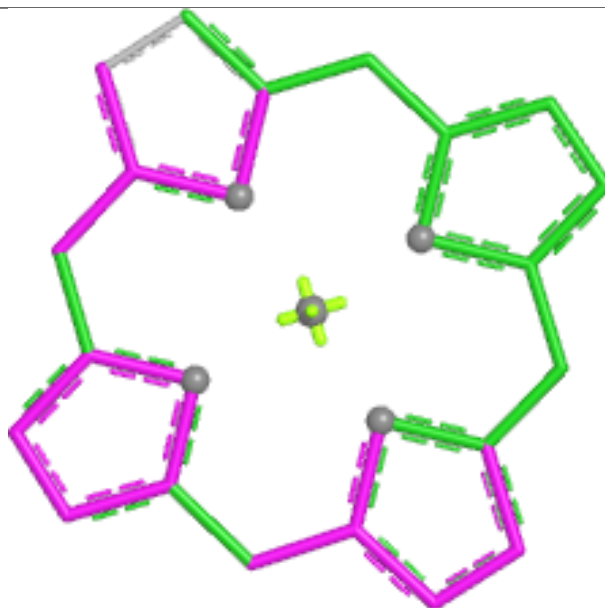


Rings

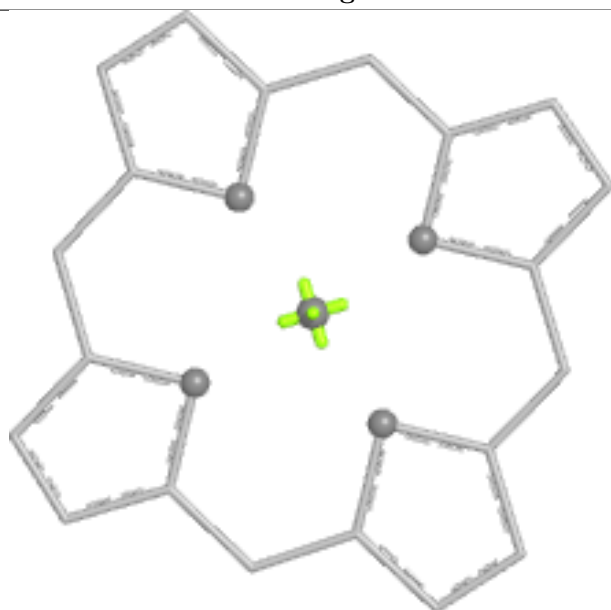
Ligand CLA A 3062



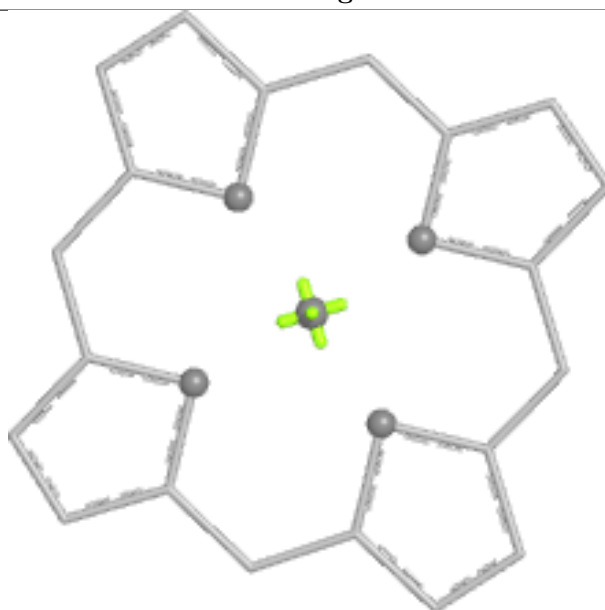
Bond lengths



Bond angles

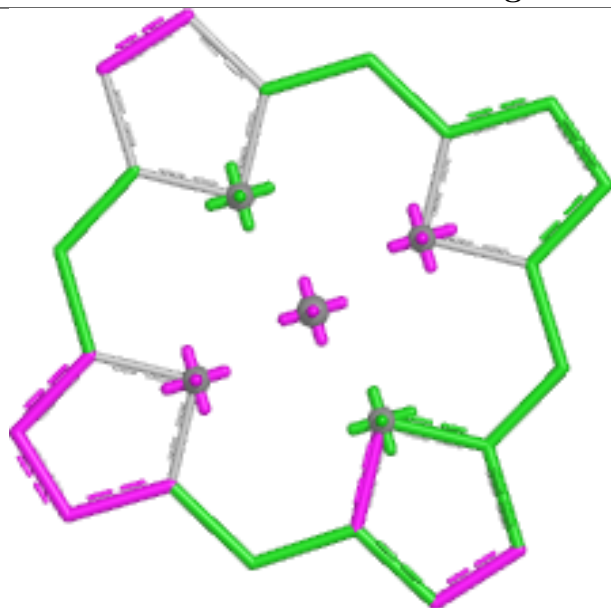


Torsions

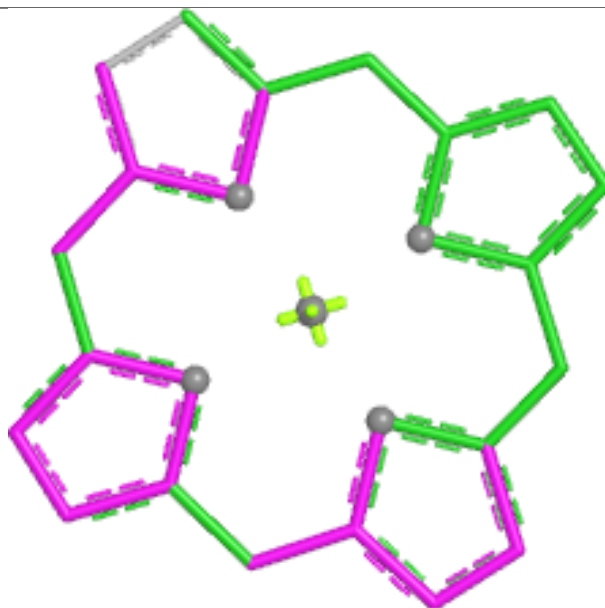


Rings

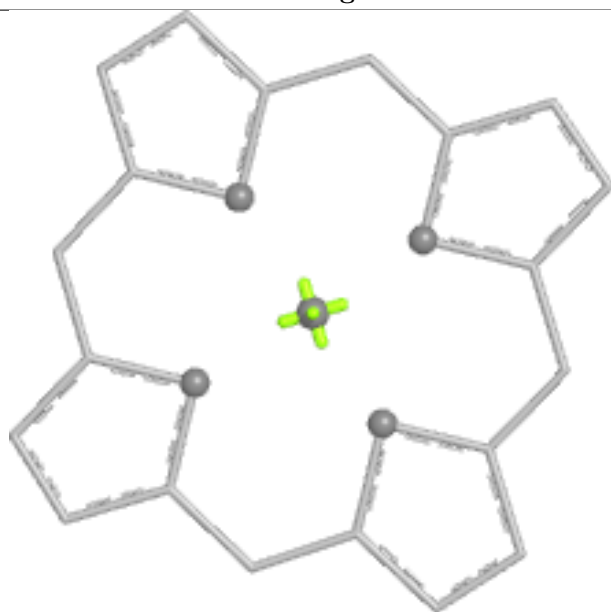
Ligand CLA K 3050



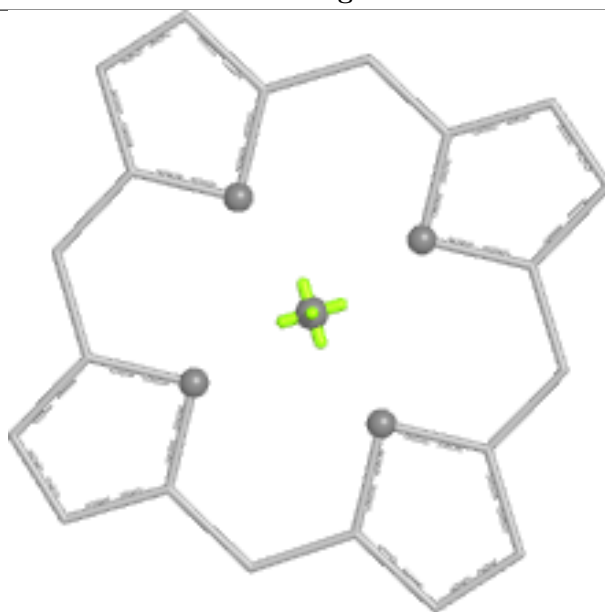
Bond lengths



Bond angles

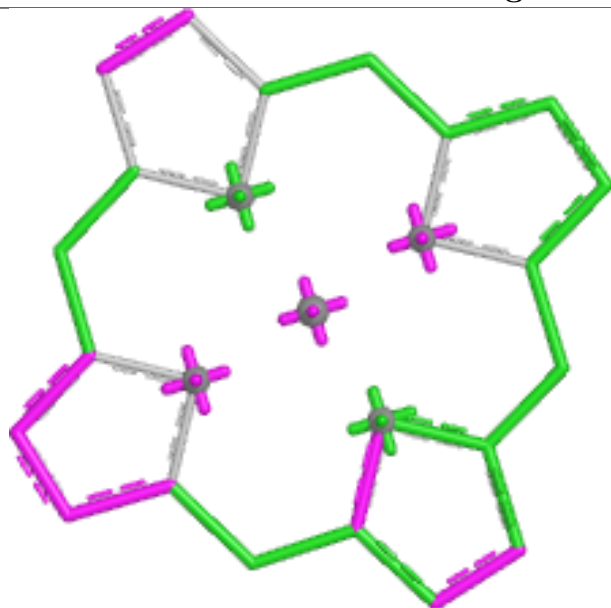


Torsions

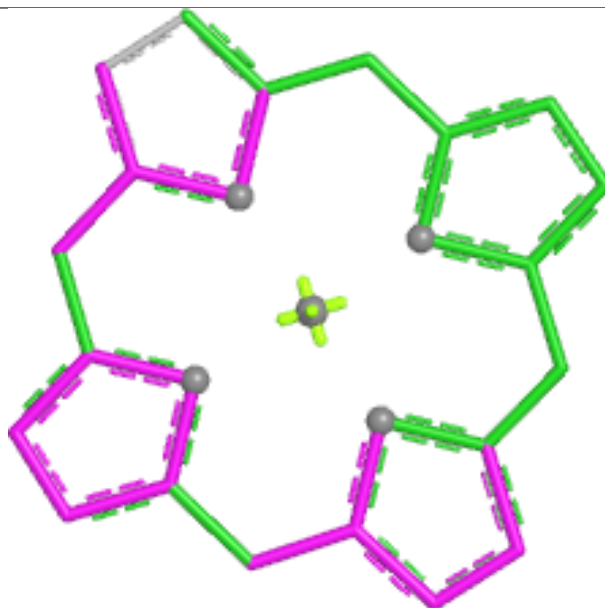


Rings

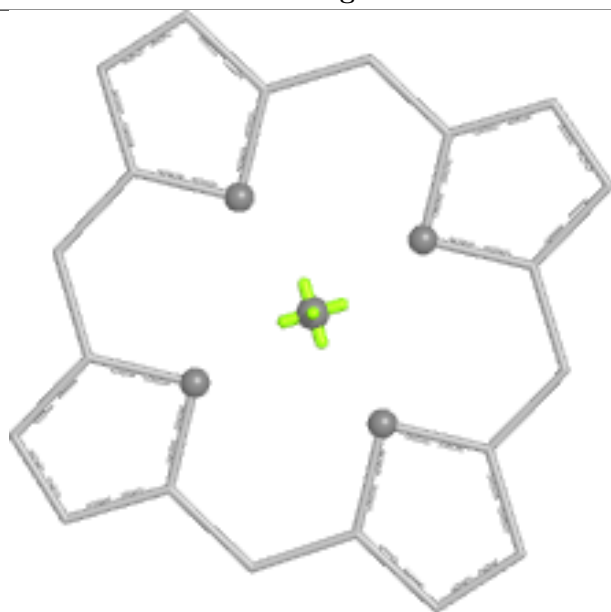
Ligand CLA B 3006



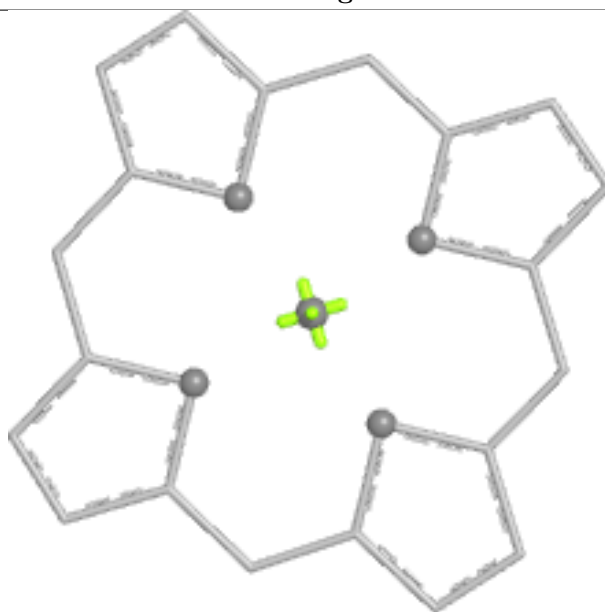
Bond lengths



Bond angles

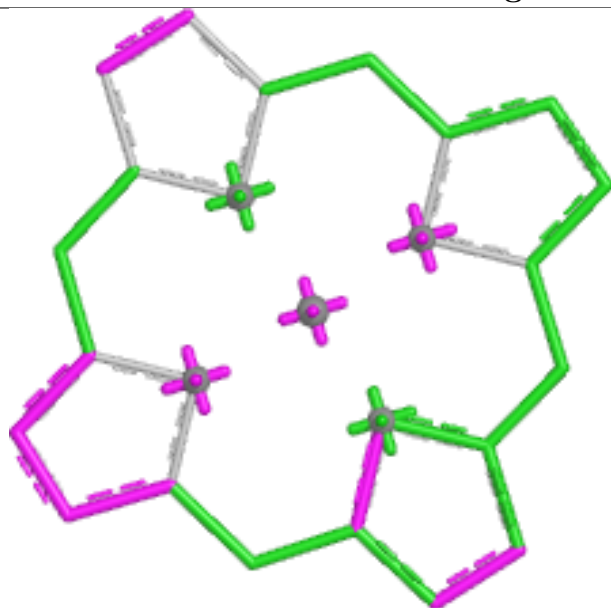


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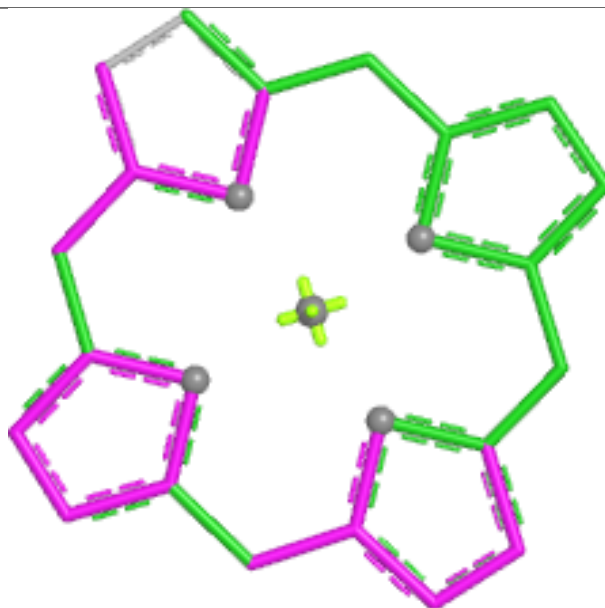


Rings

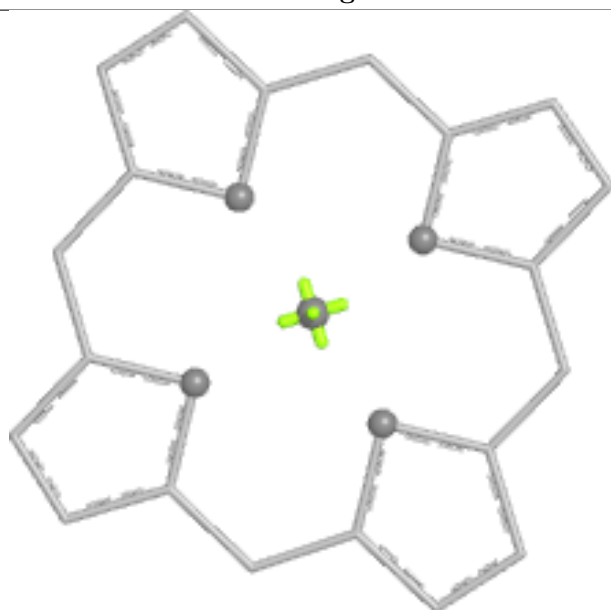
Ligand CLA A 3005



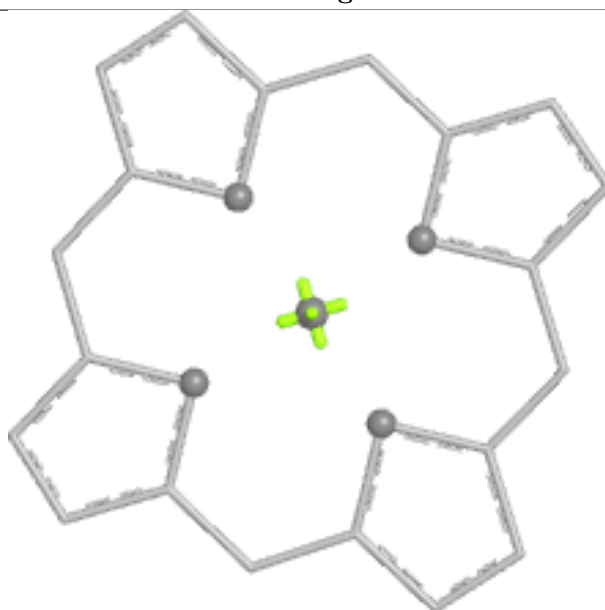
Bond lengths



Bond angles

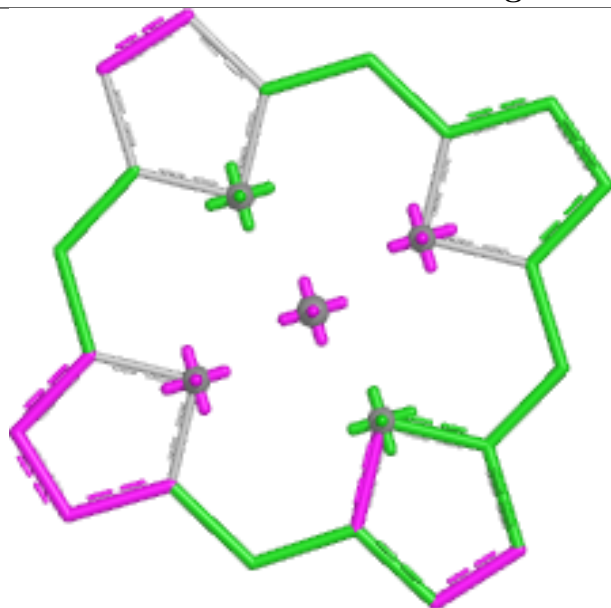


Torsions

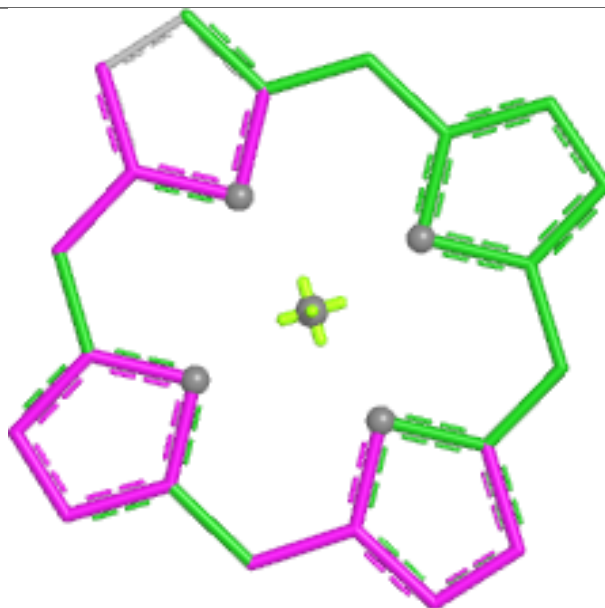


Rings

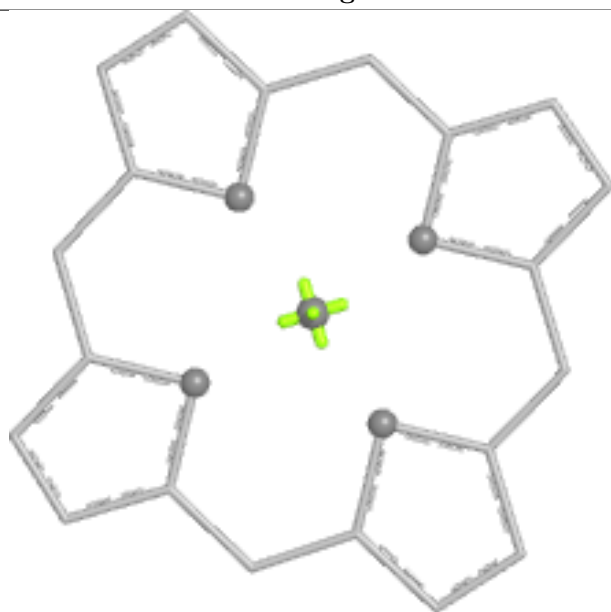
Ligand CLA A 3030



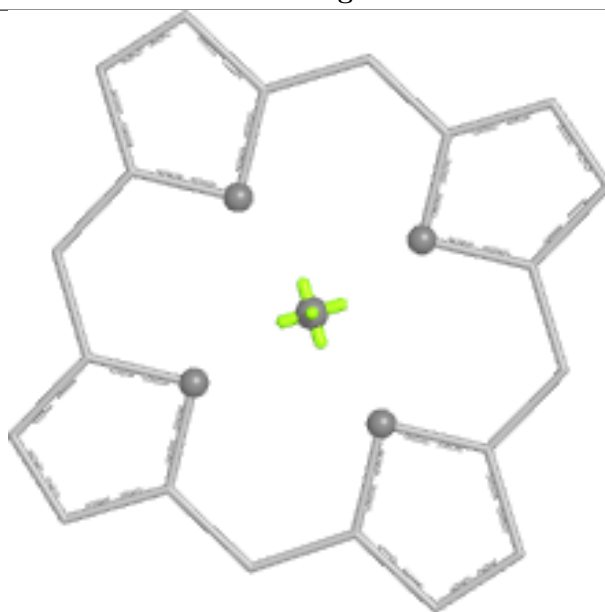
Bond lengths



Bond angles

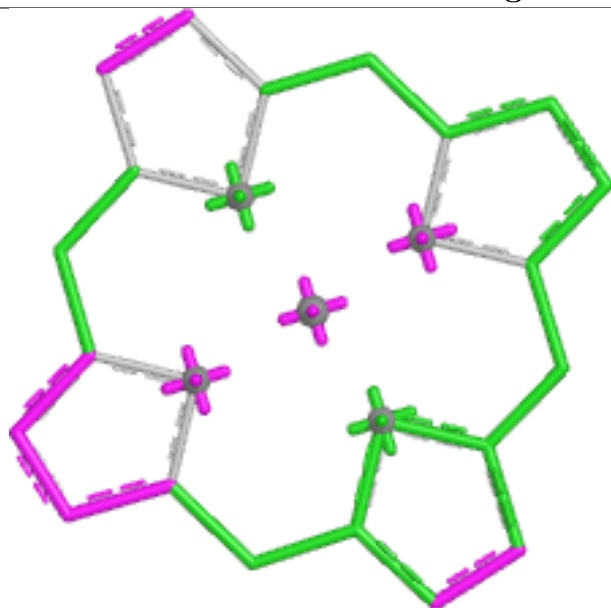


Torsions

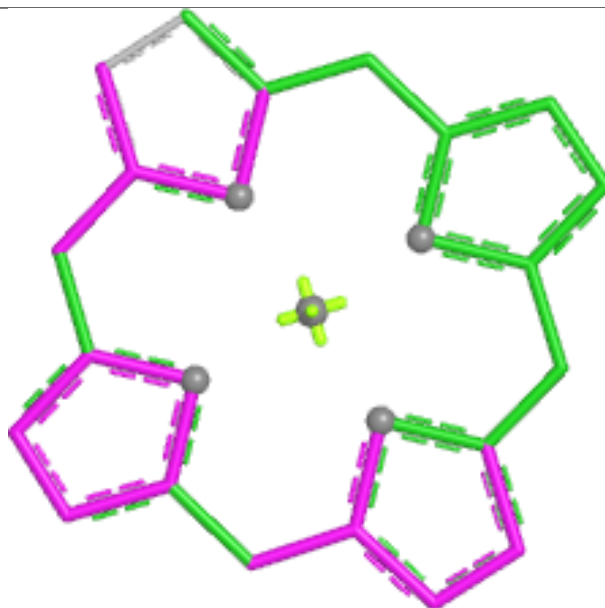


Rings

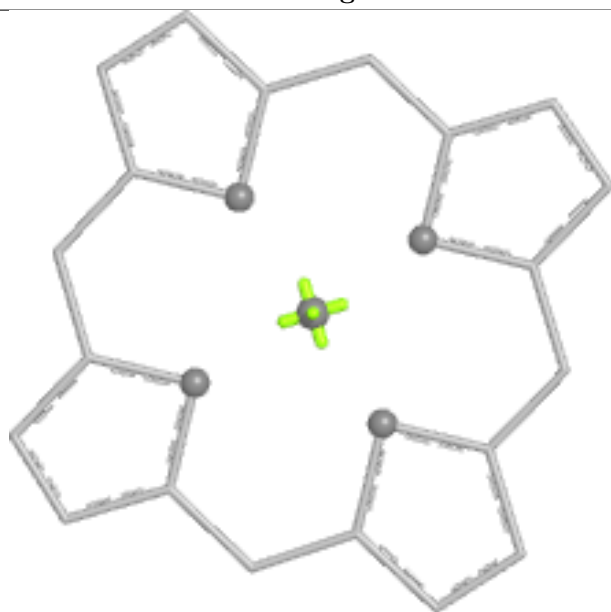
Ligand CLA A 3021



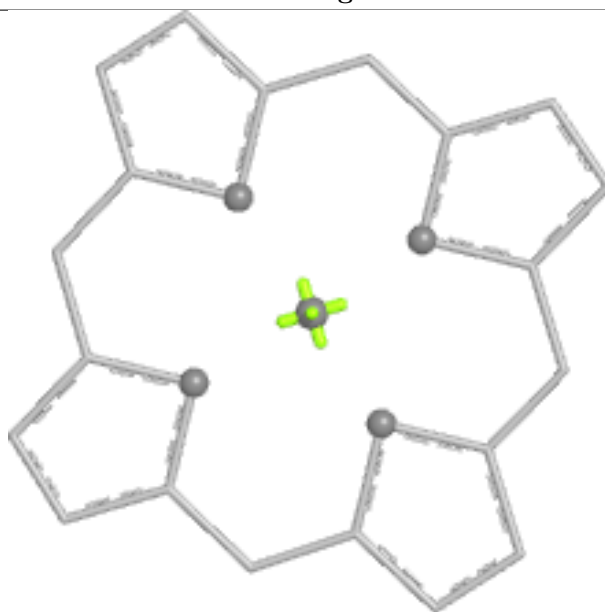
Bond lengths



Bond angles

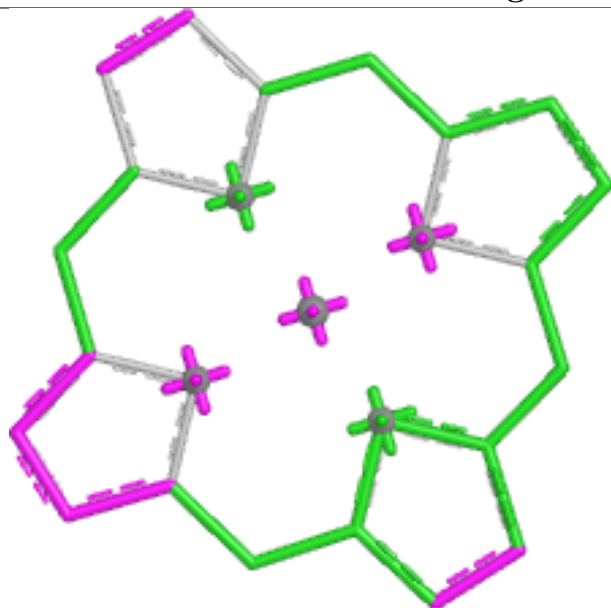


Torsions

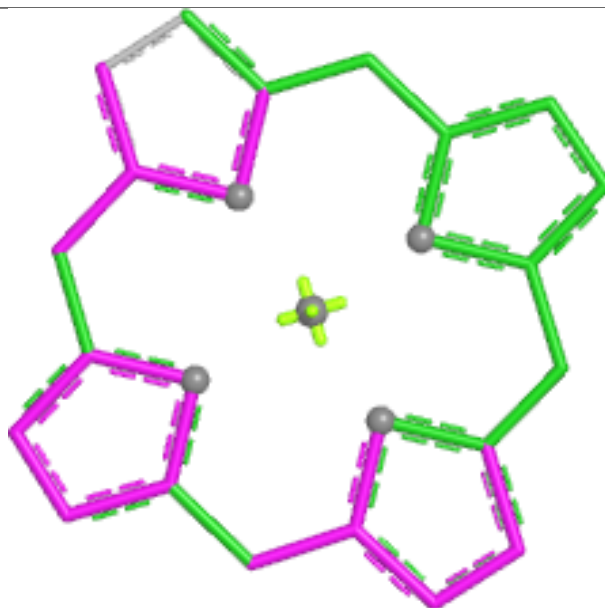


Rings

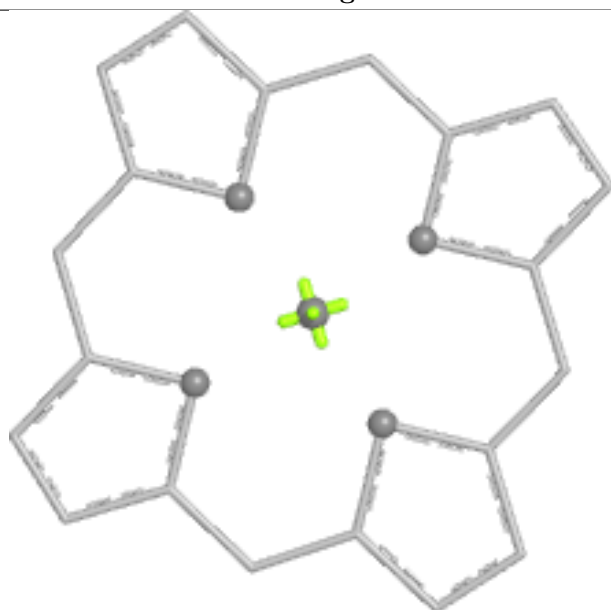
Ligand CLA F 3054



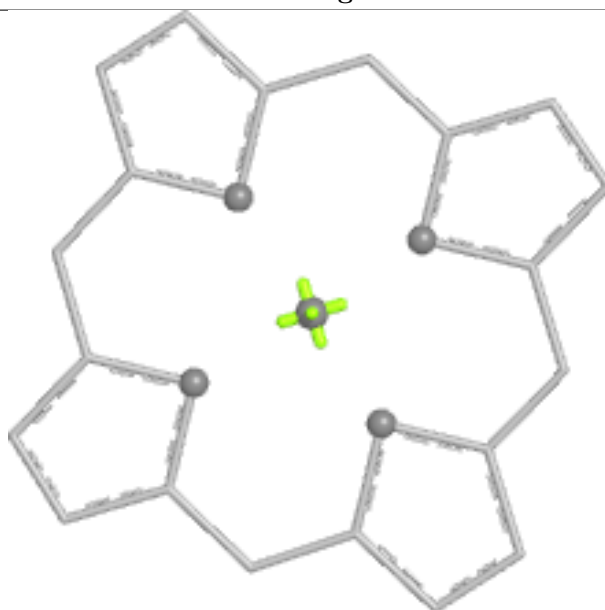
Bond lengths



Bond angles

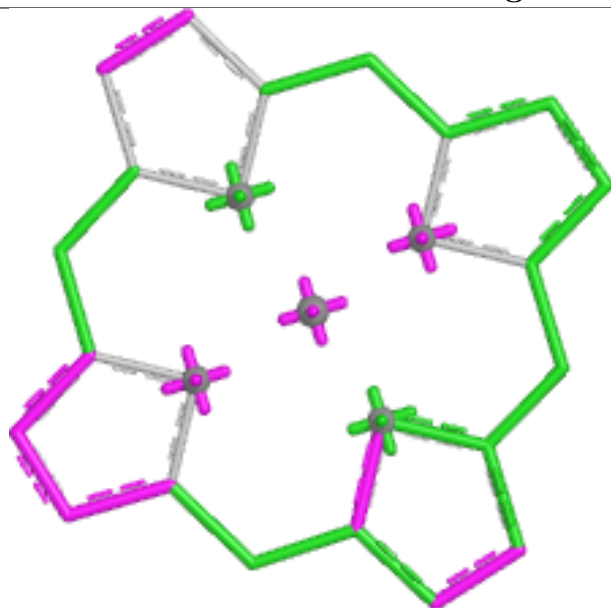


Torsions

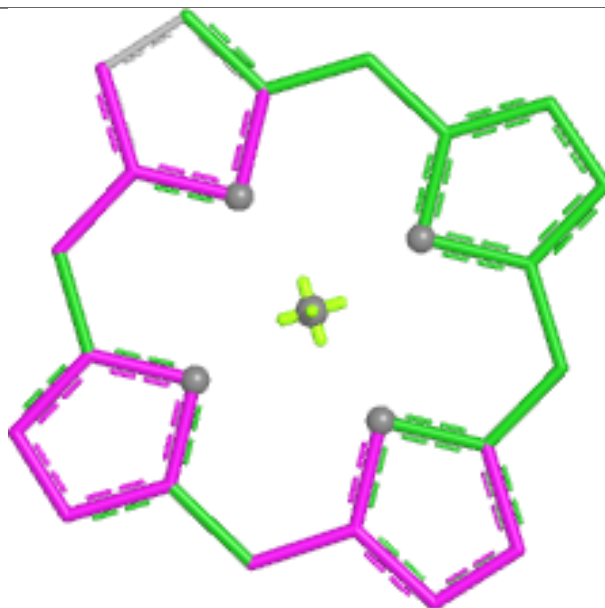


Rings

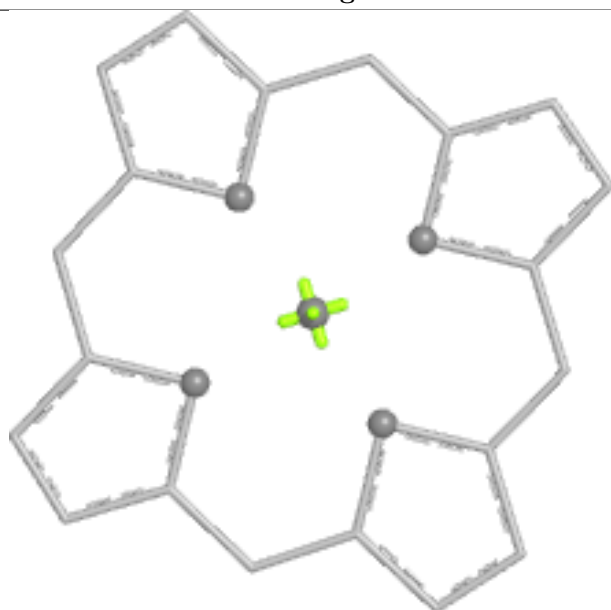
Ligand CLA B 3075



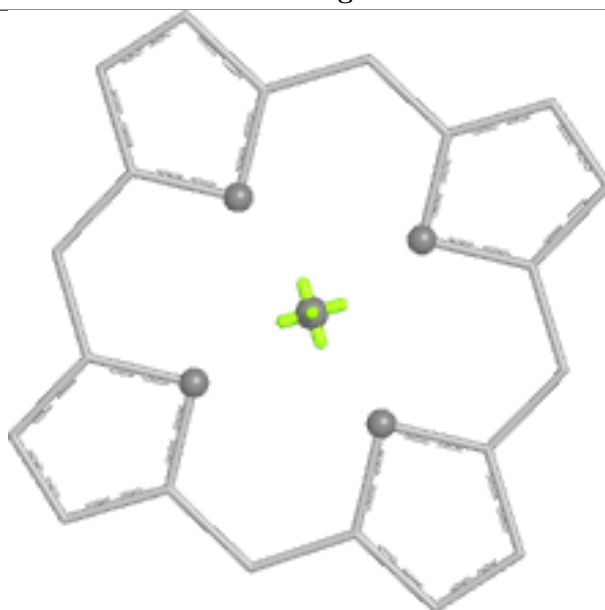
Bond lengths



Bond angles

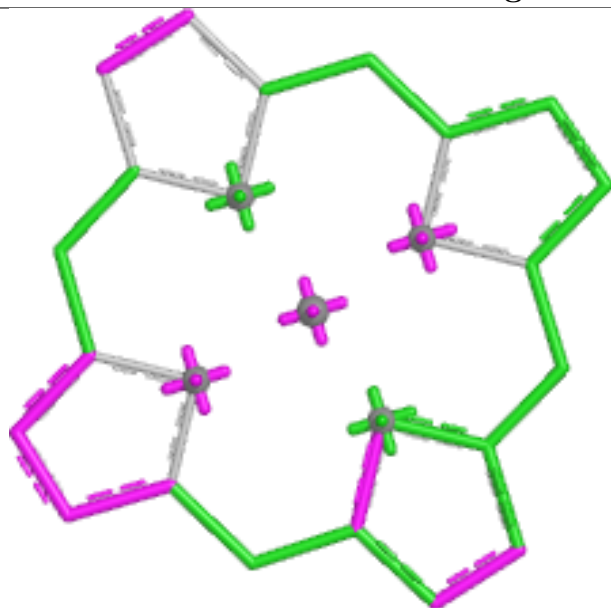


Torsions

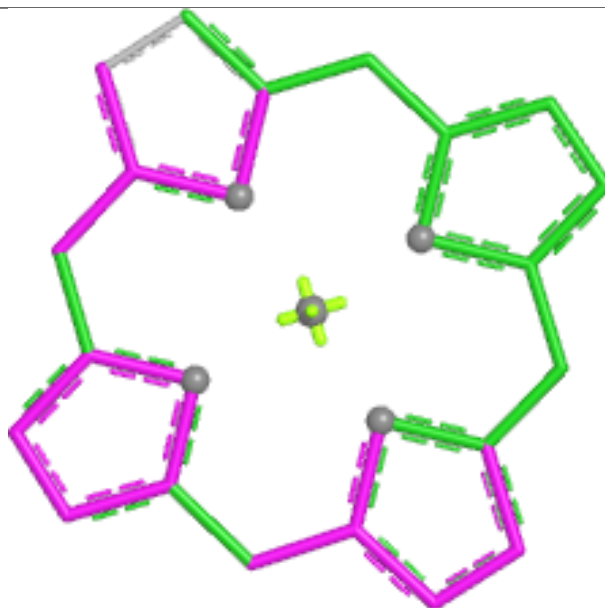


Rings

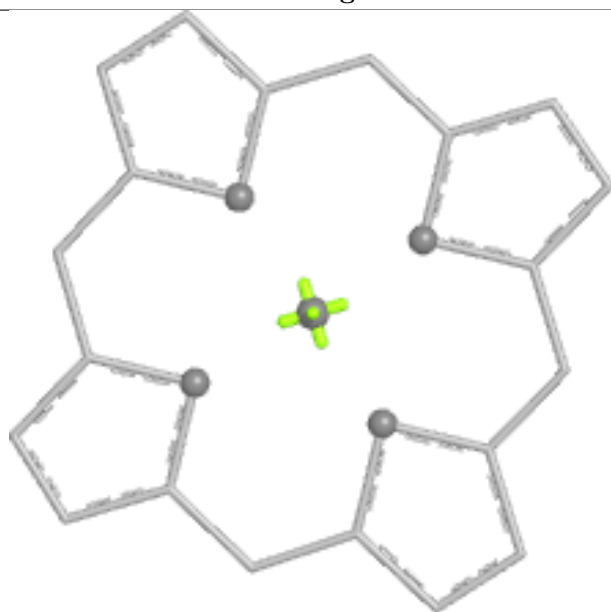
Ligand CLA A 3056



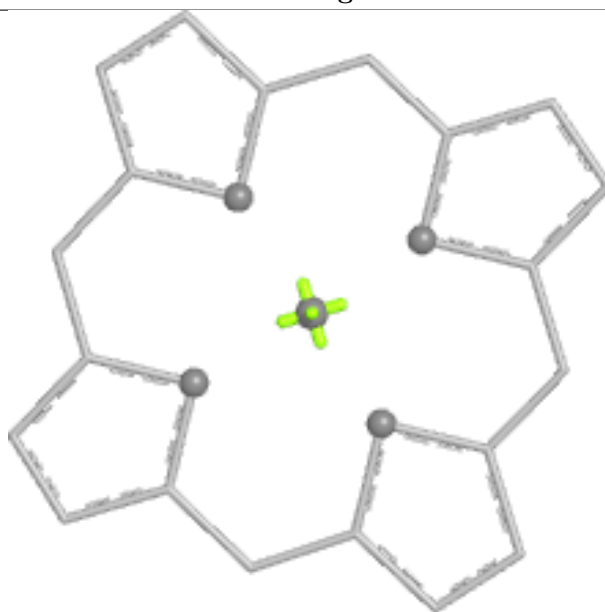
Bond lengths



Bond angles

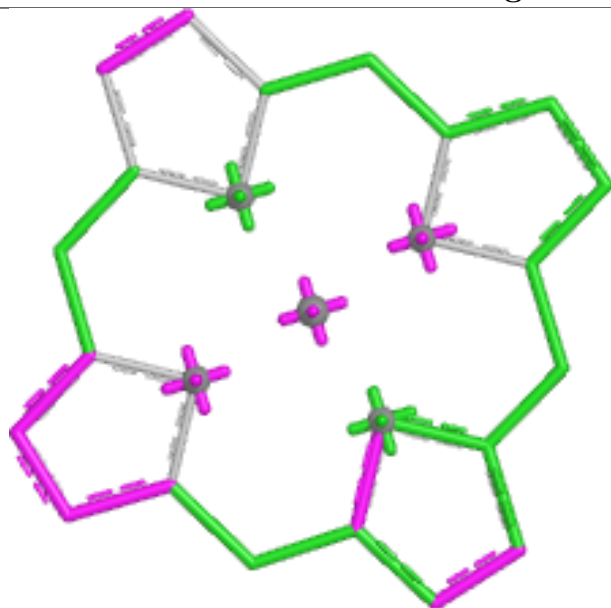


Torsions

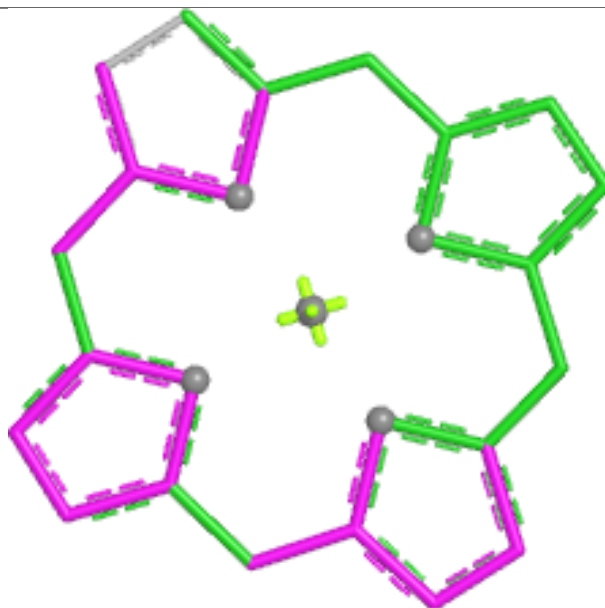


Rings

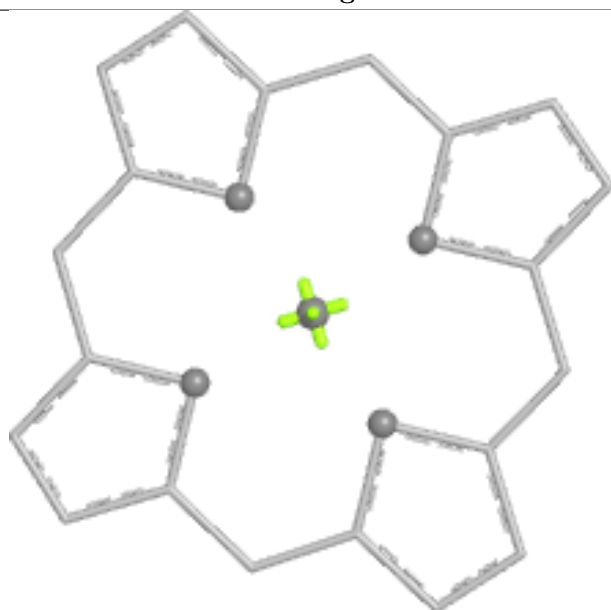
Ligand CLA A 3039



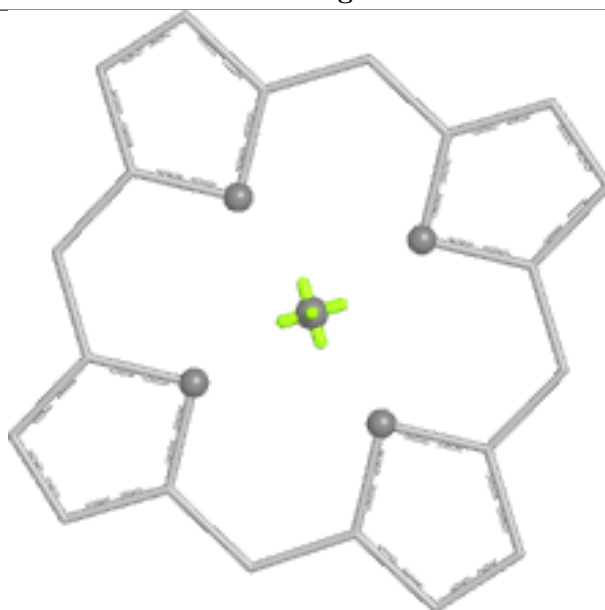
Bond lengths



Bond angles

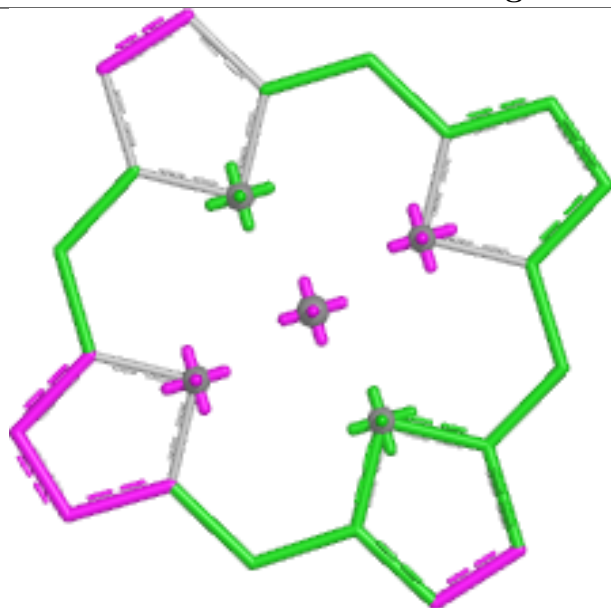


Torsions

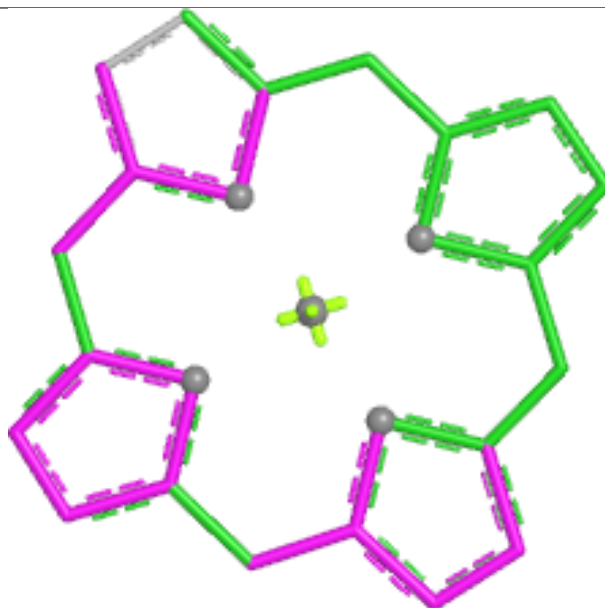


Rings

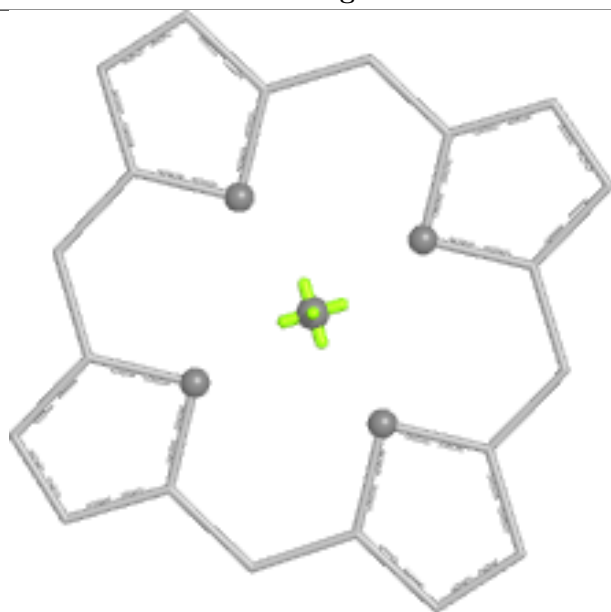
Ligand CLA B 3008



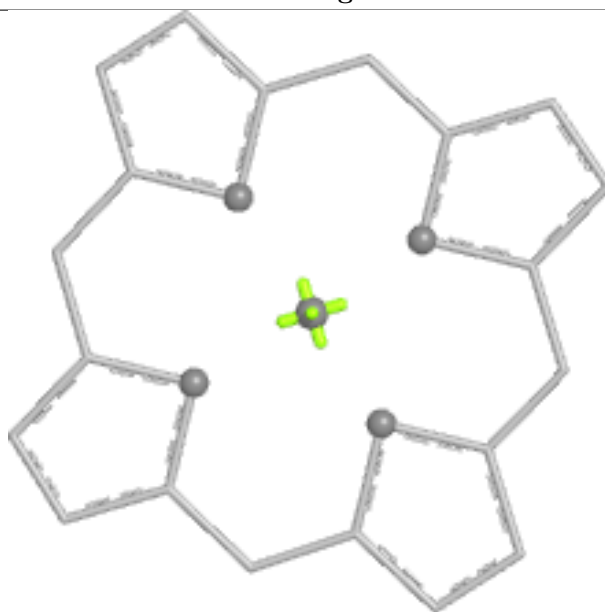
Bond lengths



Bond angles

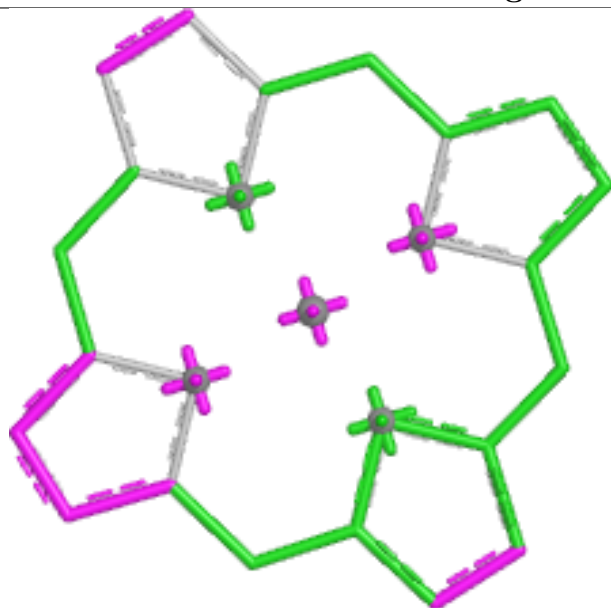


Torsions

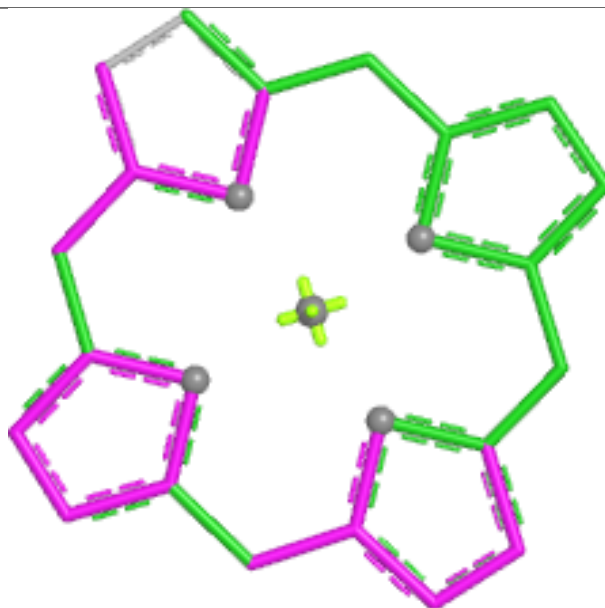


Rings

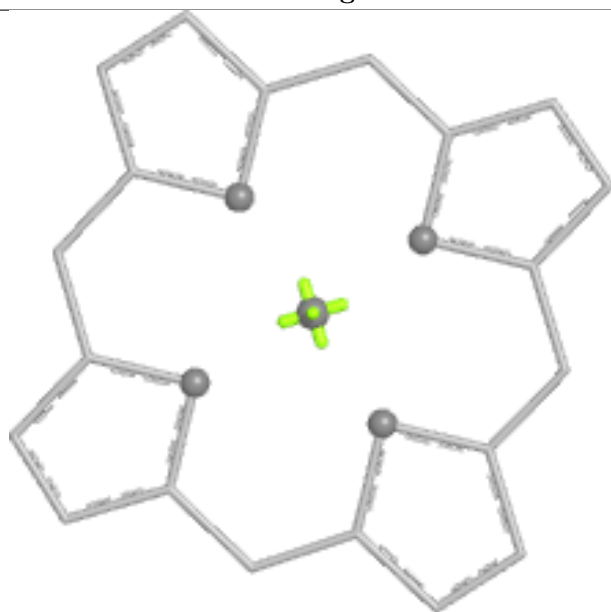
Ligand CLA B 3042



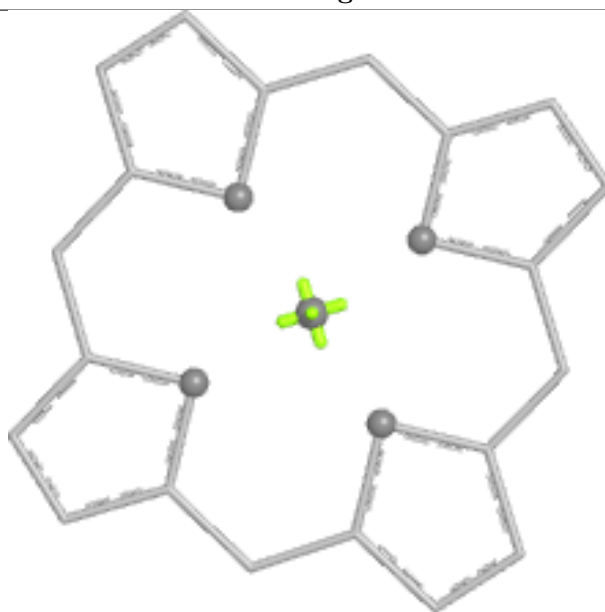
Bond lengths



Bond angles

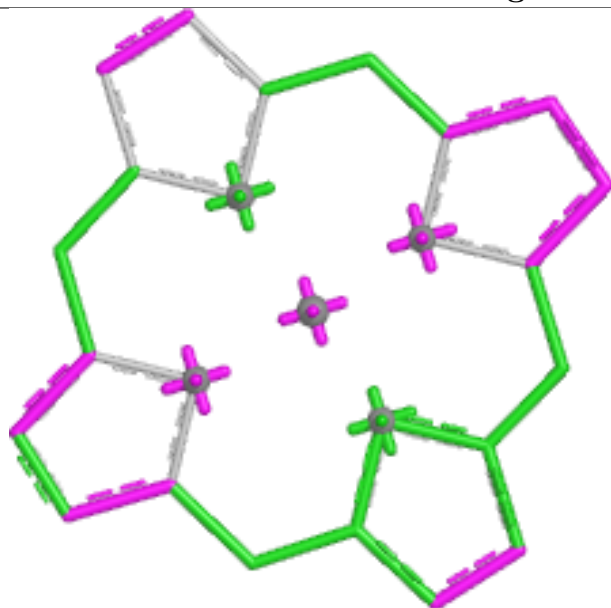


Torsions

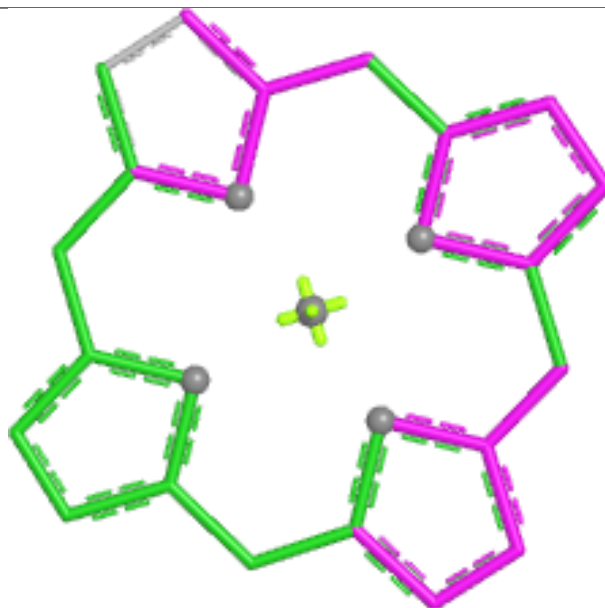


Rings

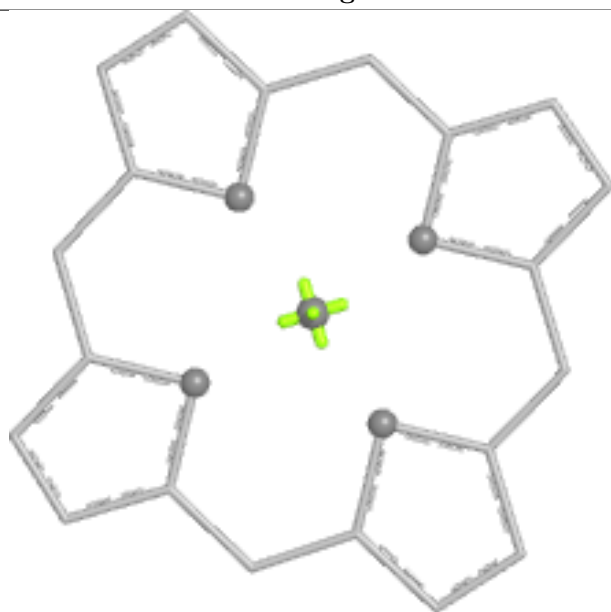
Ligand CLA L 3064



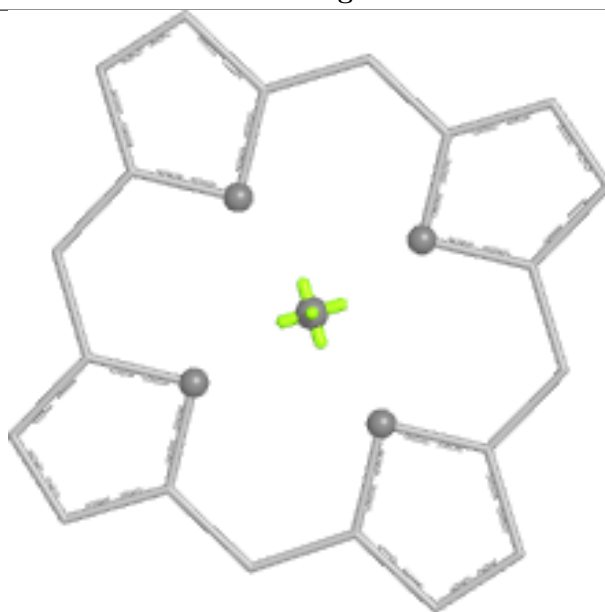
Bond lengths



Bond angles

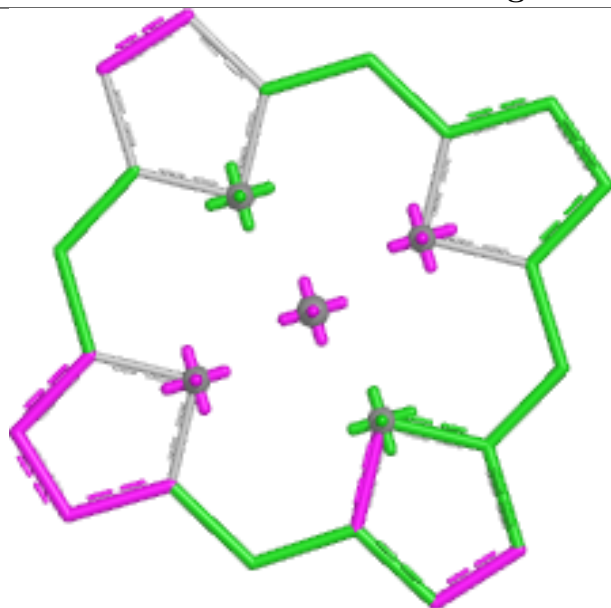


Torsions

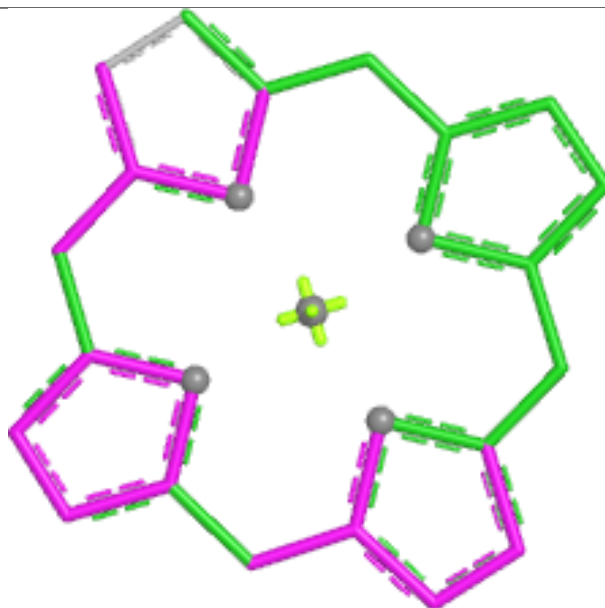


Rings

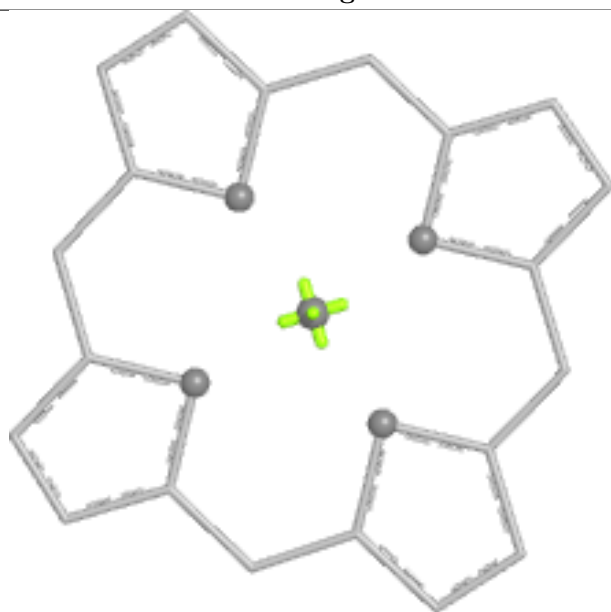
Ligand CLA L 3036



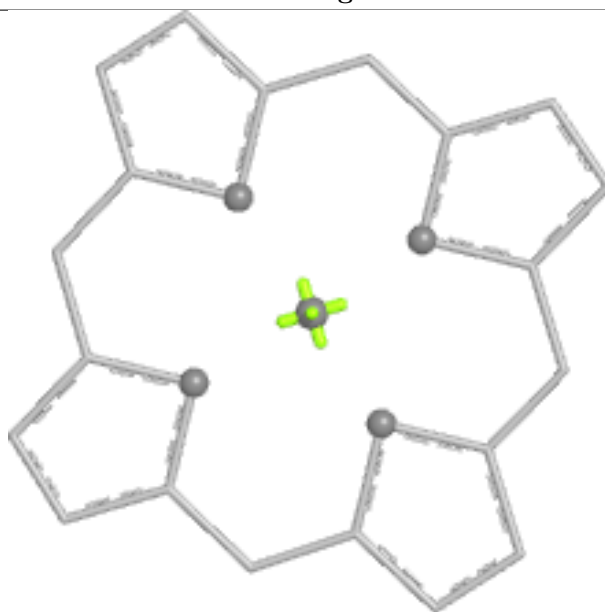
Bond lengths



Bond angles

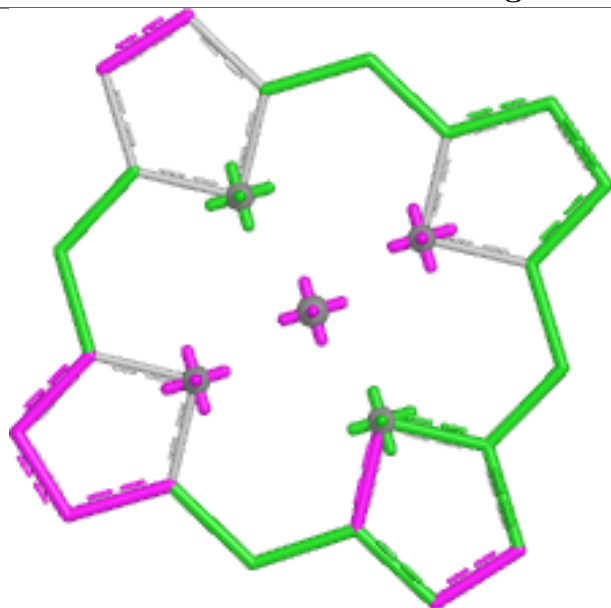


Torsions

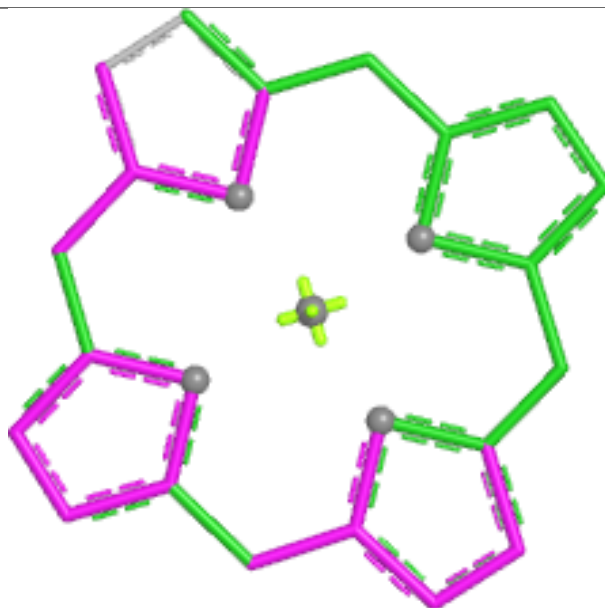


Rings

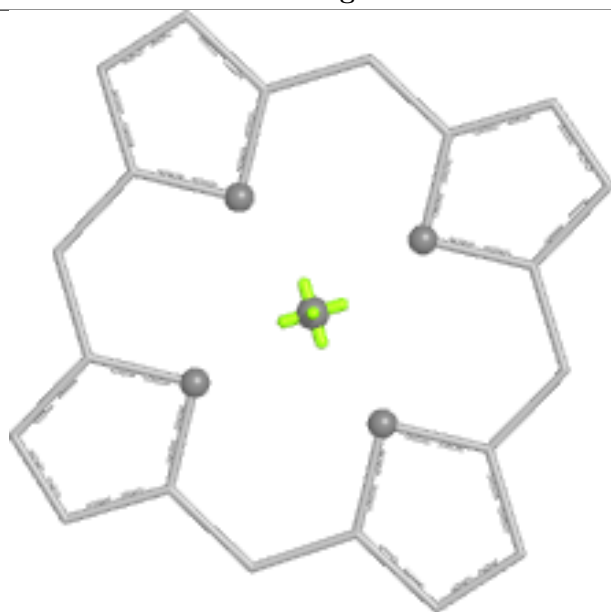
Ligand CLA A 3052



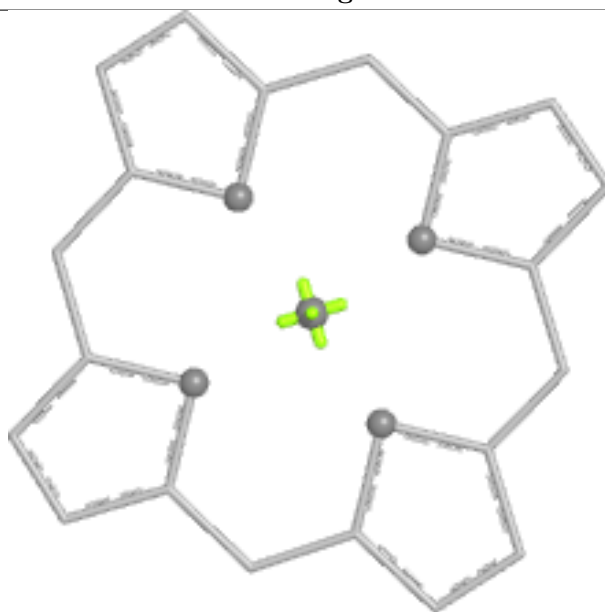
Bond lengths



Bond angles

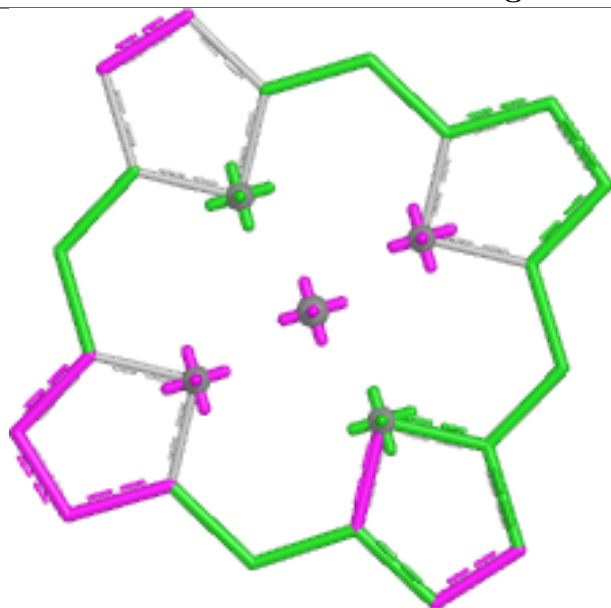


Torsions

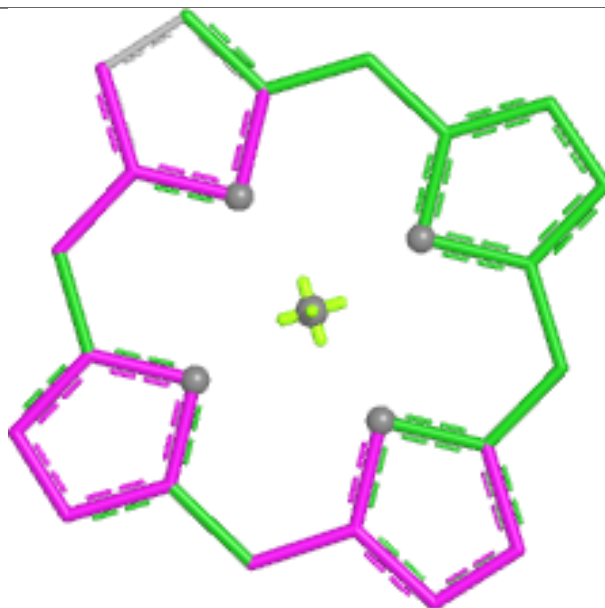


Rings

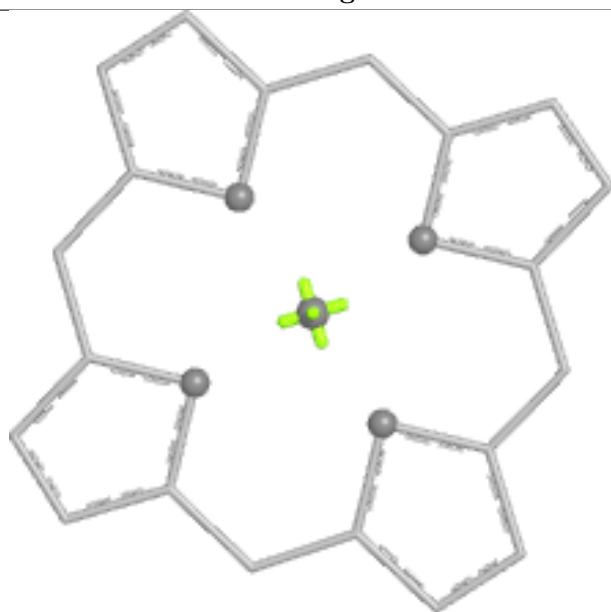
Ligand CLA A 3053



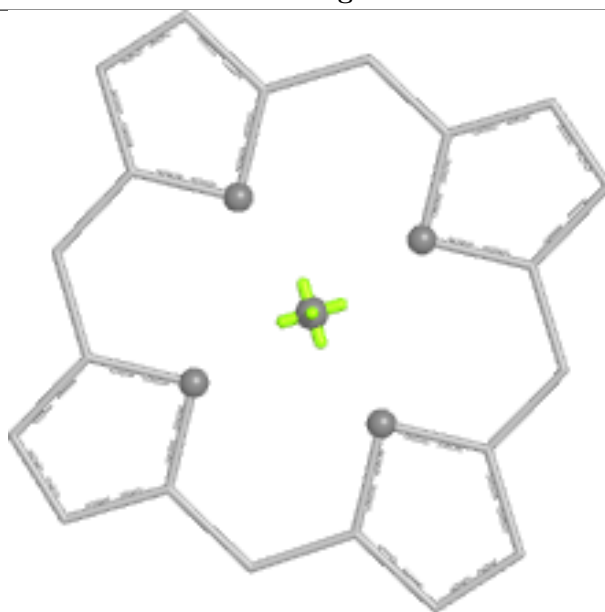
Bond lengths



Bond angles

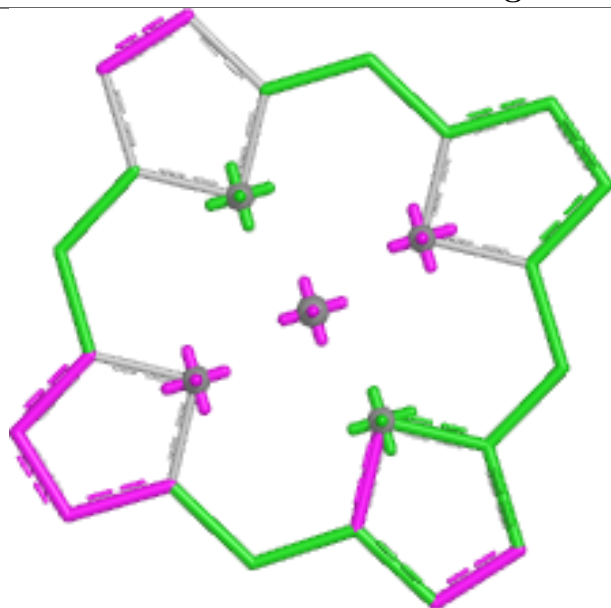


Torsions

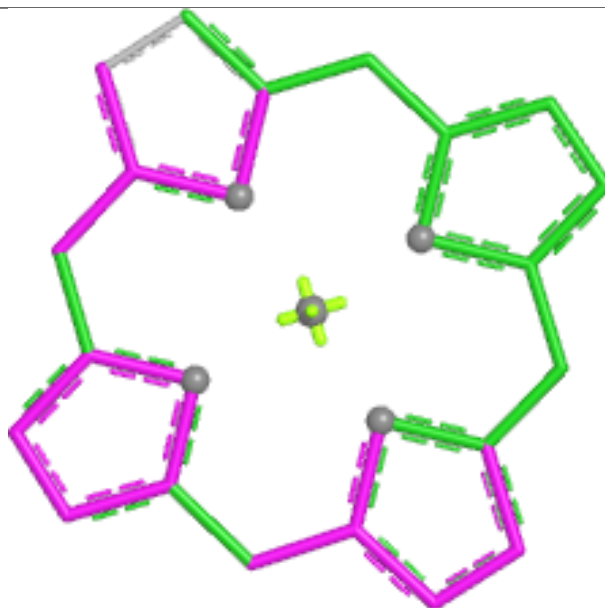


Rings

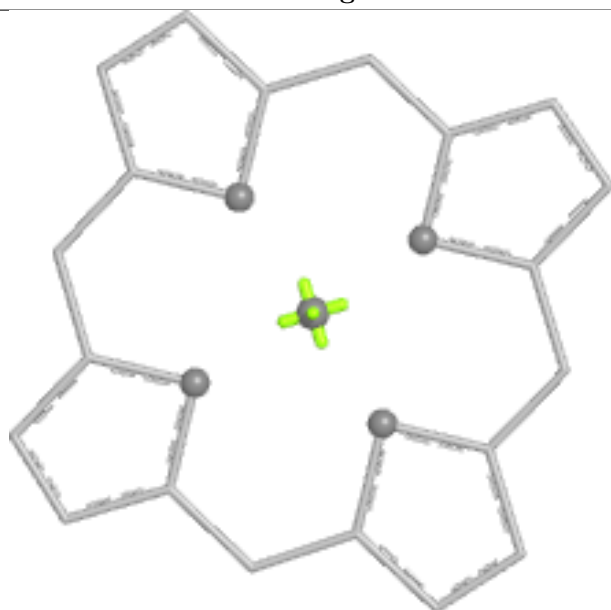
Ligand CLA K 3051



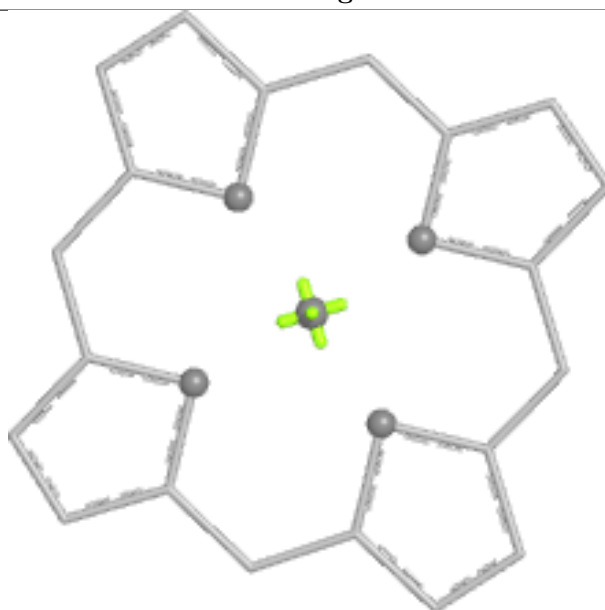
Bond lengths



Bond angles

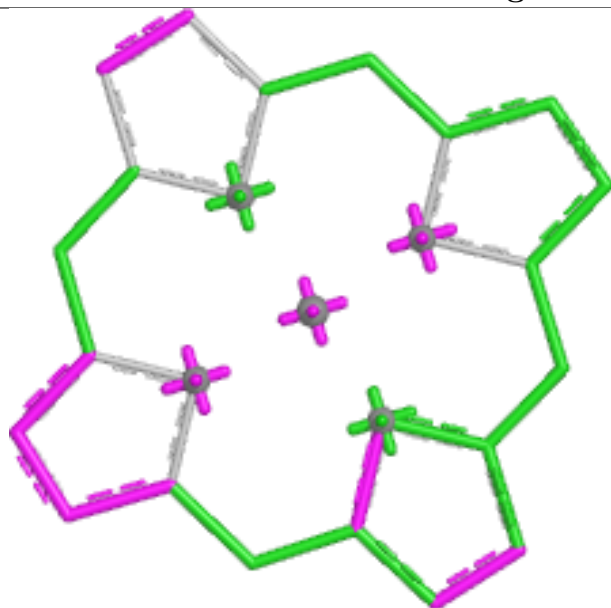


Torsions

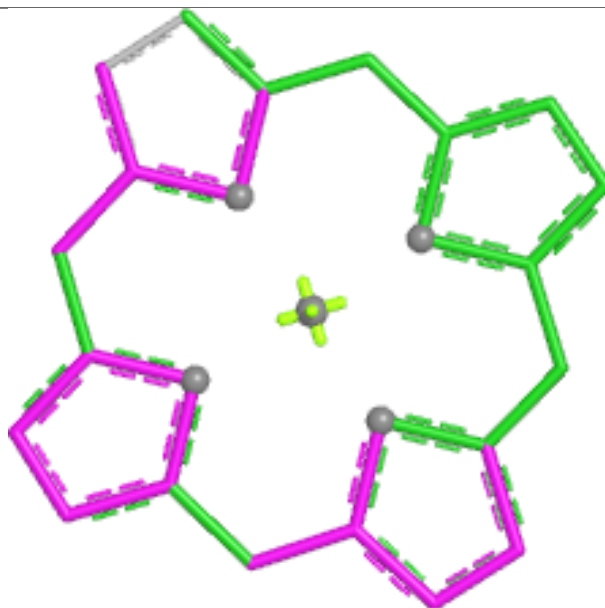


Rings

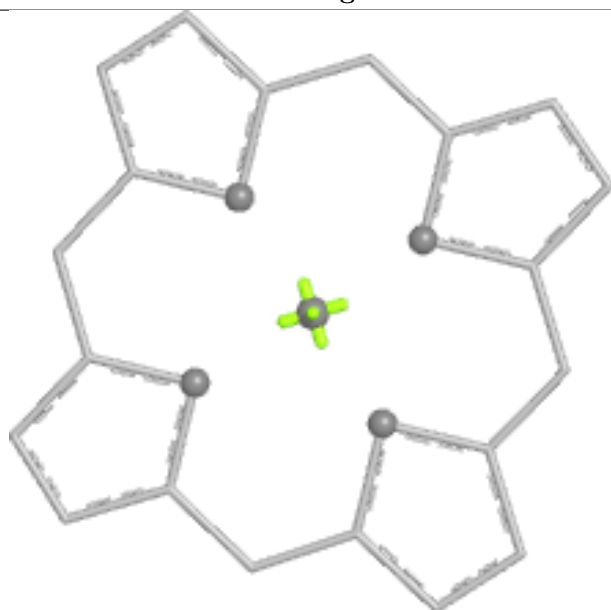
Ligand CLA F 3012



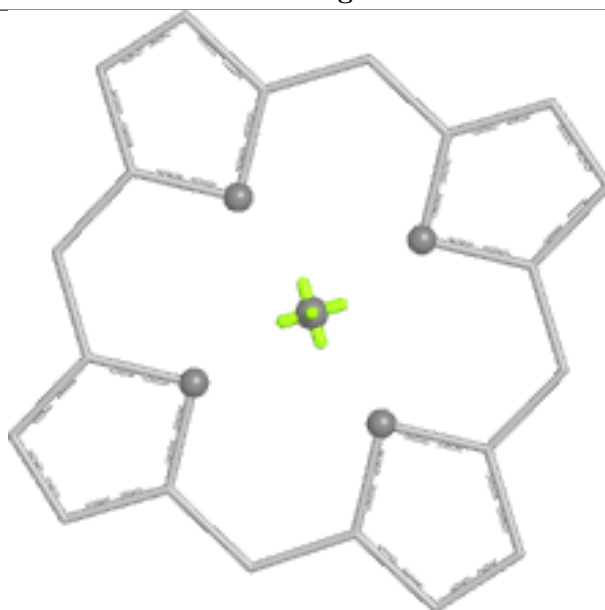
Bond lengths



Bond angles

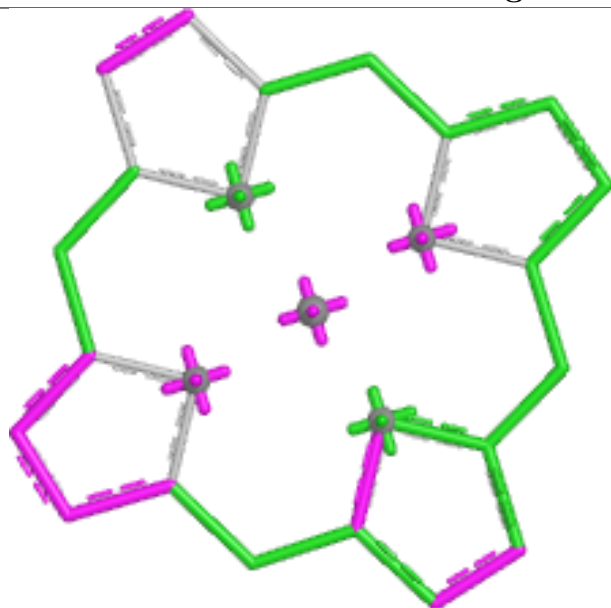


Torsions

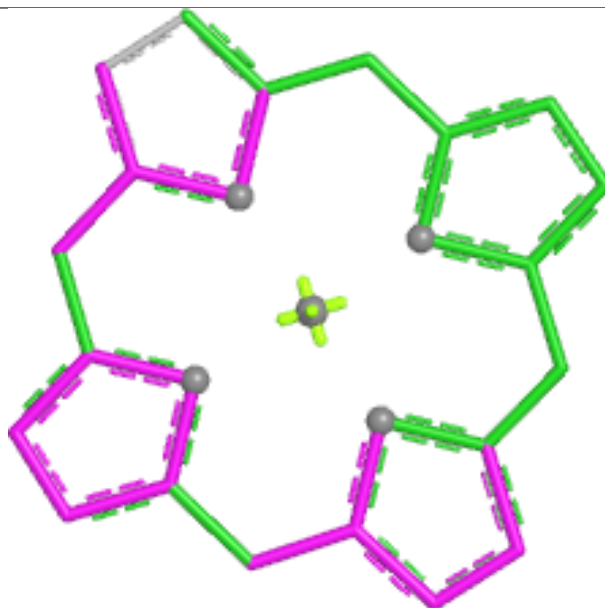


Rings

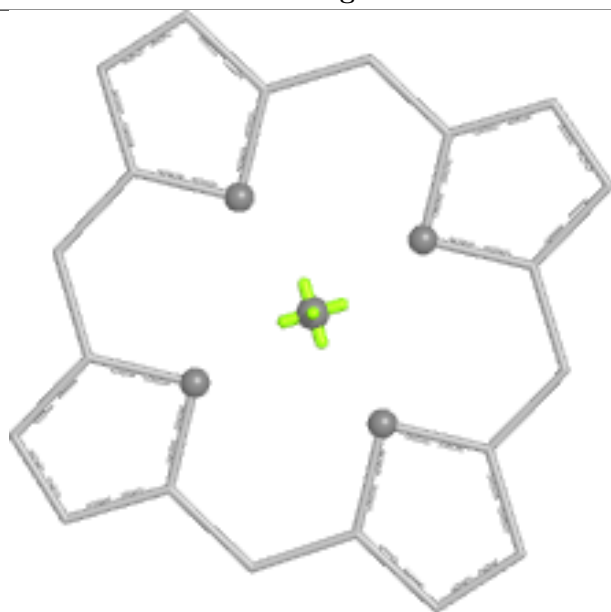
Ligand CLA B 3055



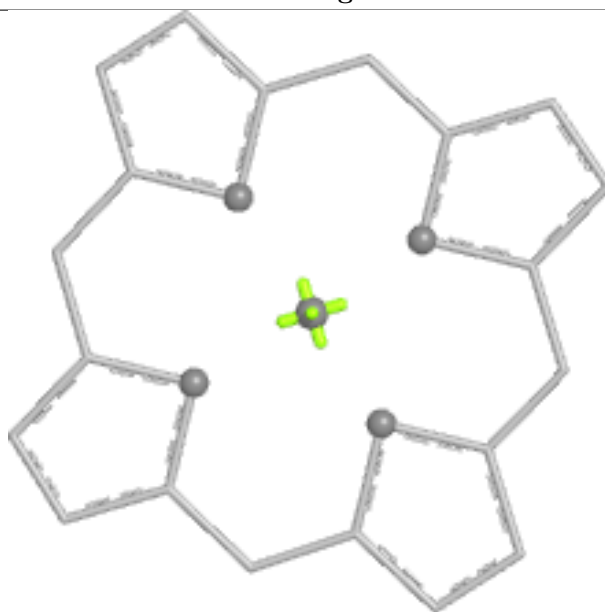
Bond lengths



Bond angles

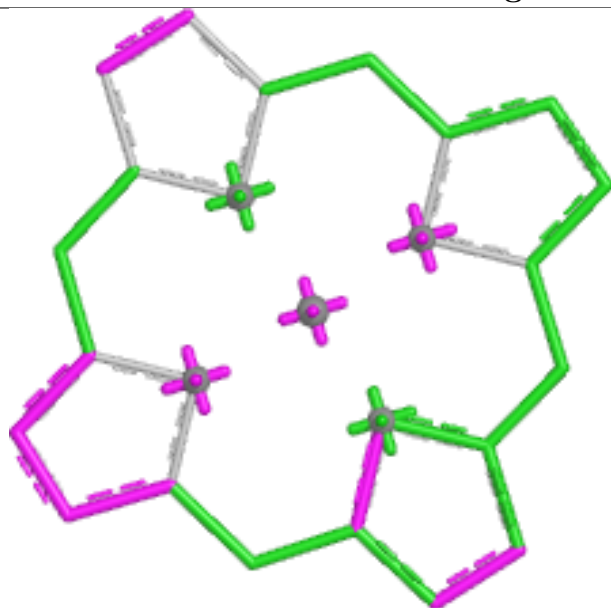


Torsions

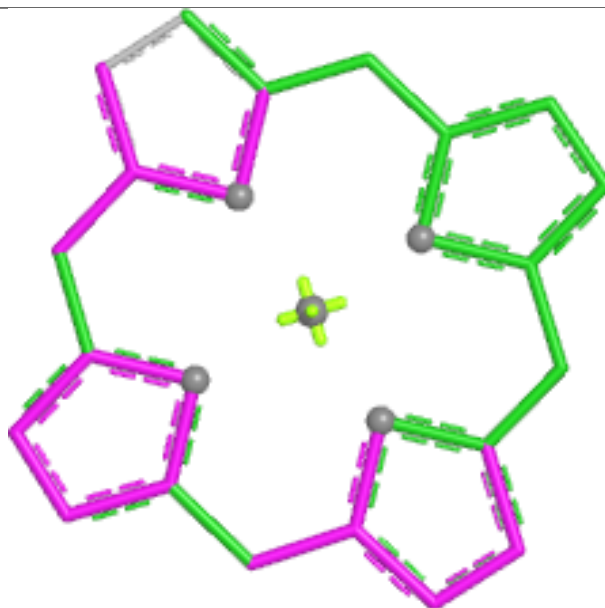


Rings

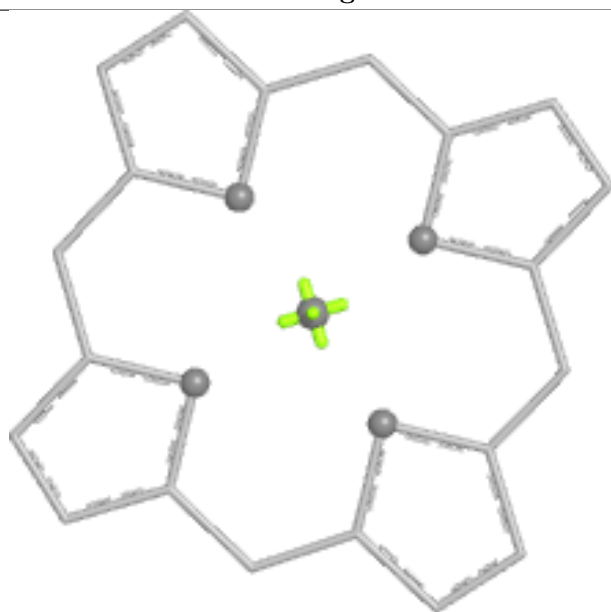
Ligand CLA A 3009



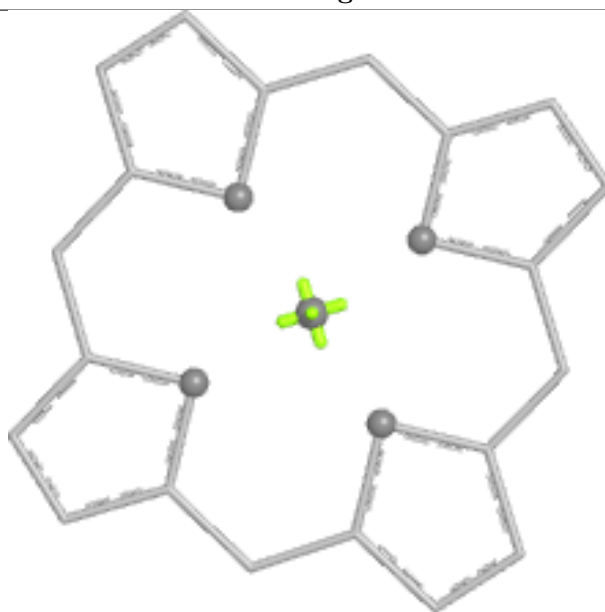
Bond lengths



Bond angles

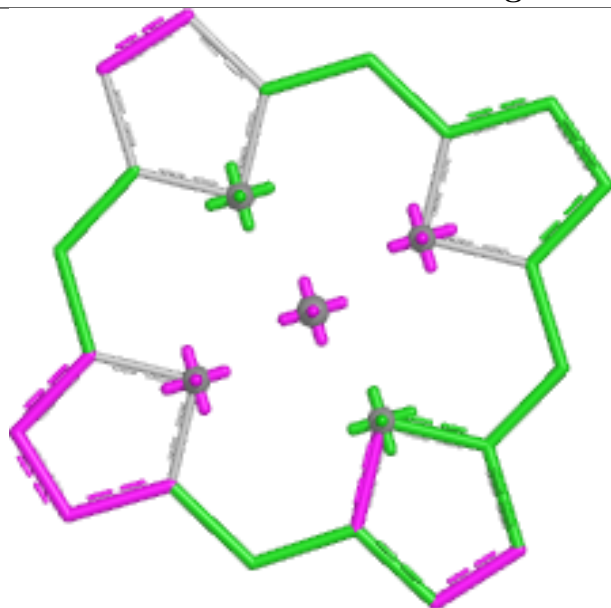


Torsions

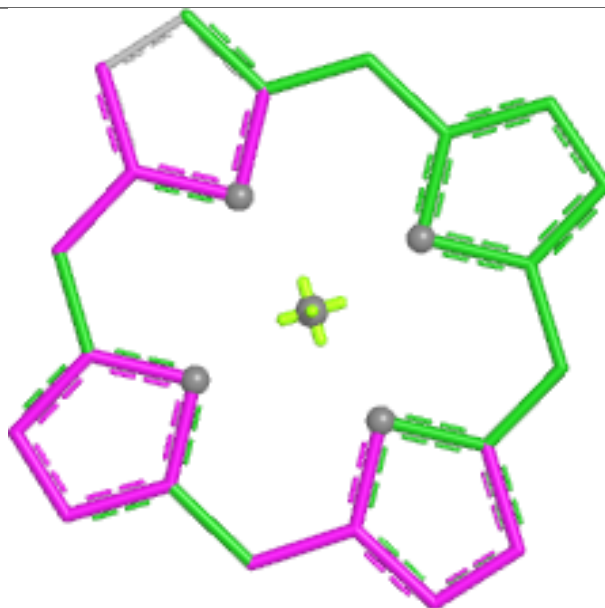


Rings

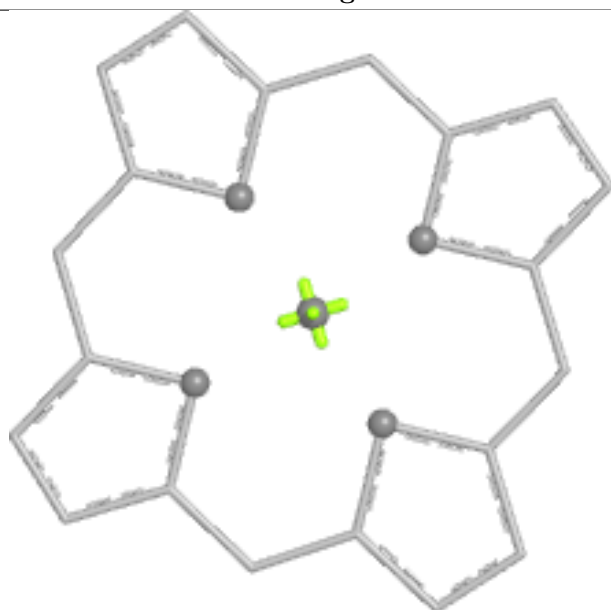
Ligand CLA A 3079



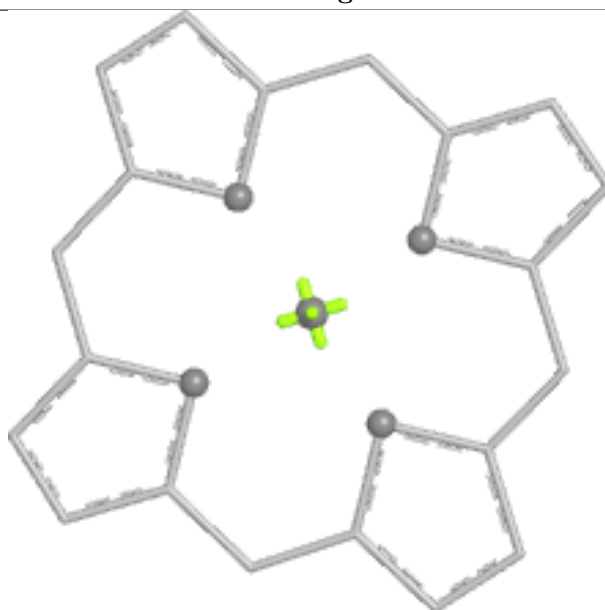
Bond lengths



Bond angles

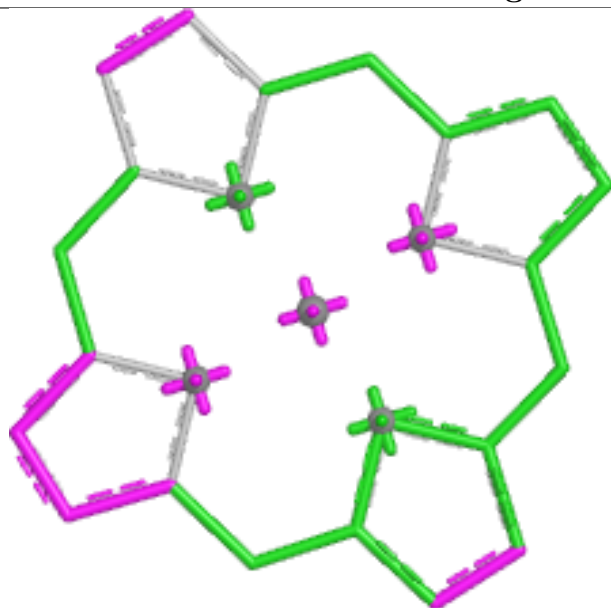


Torsions

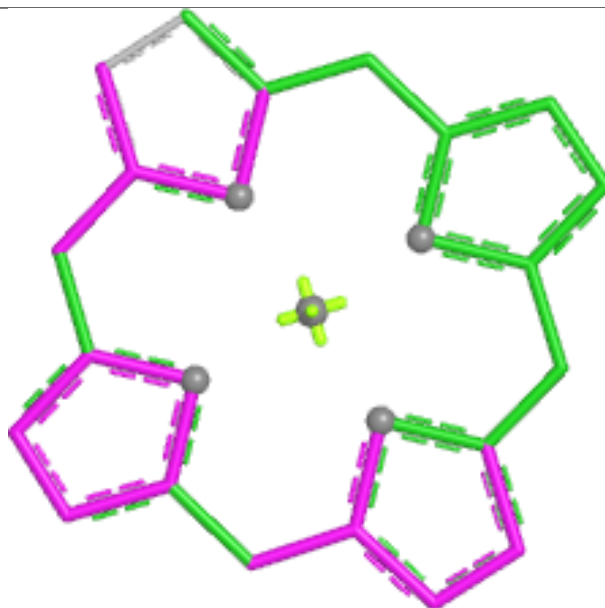


Rings

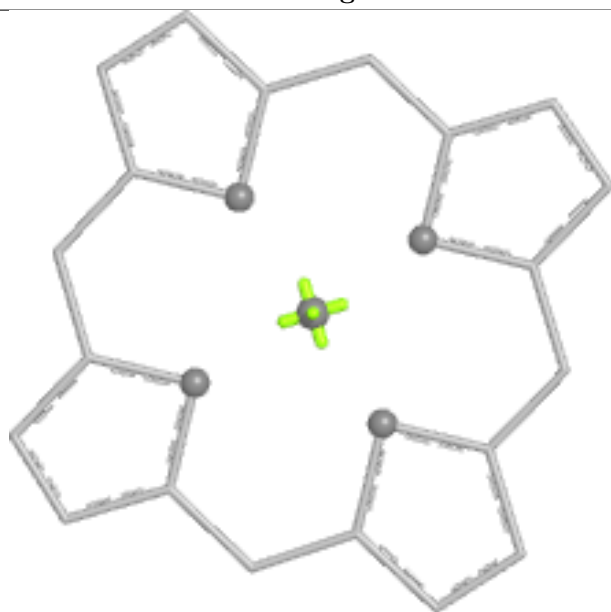
Ligand CLA B 3074



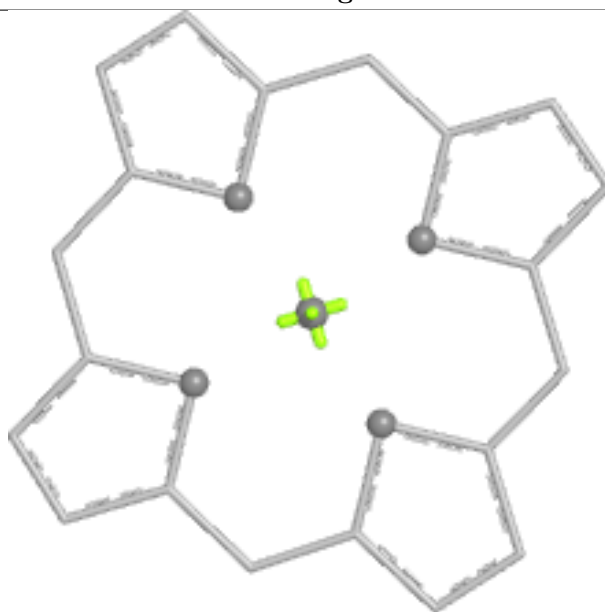
Bond lengths



Bond angles

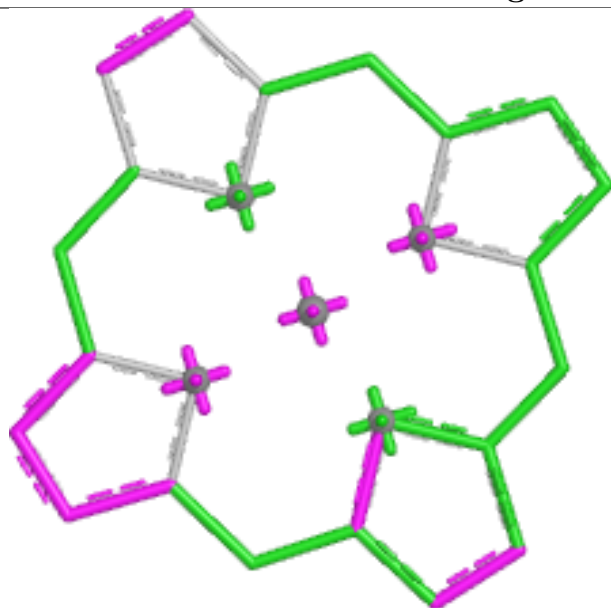


Torsions

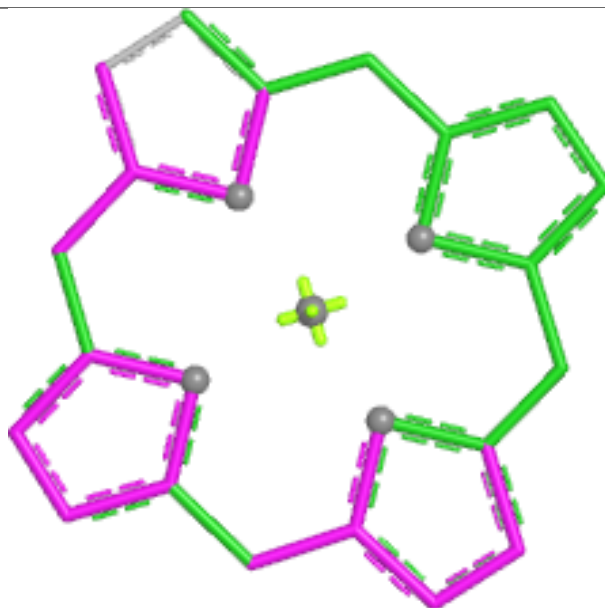


Rings

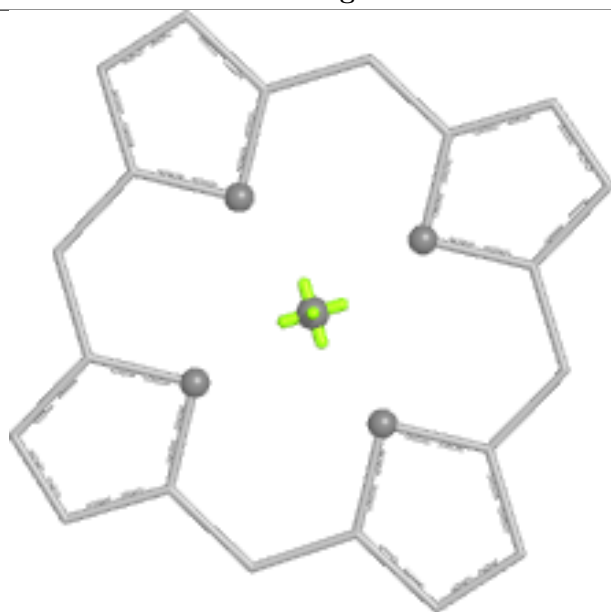
Ligand CLA L 3049



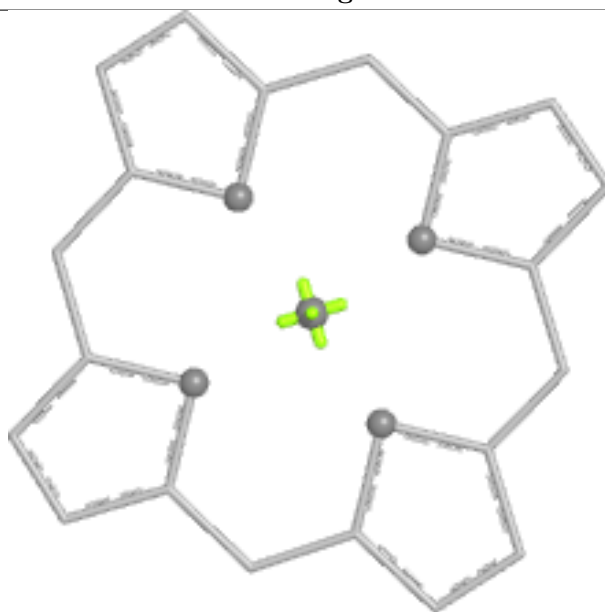
Bond lengths



Bond angles

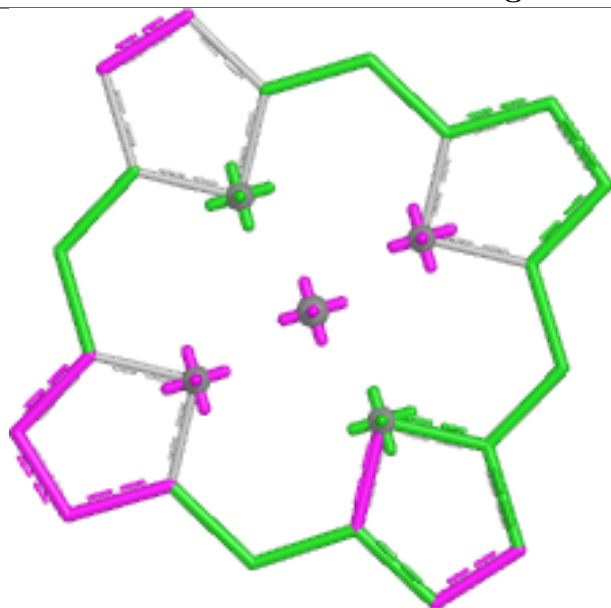


Torsions

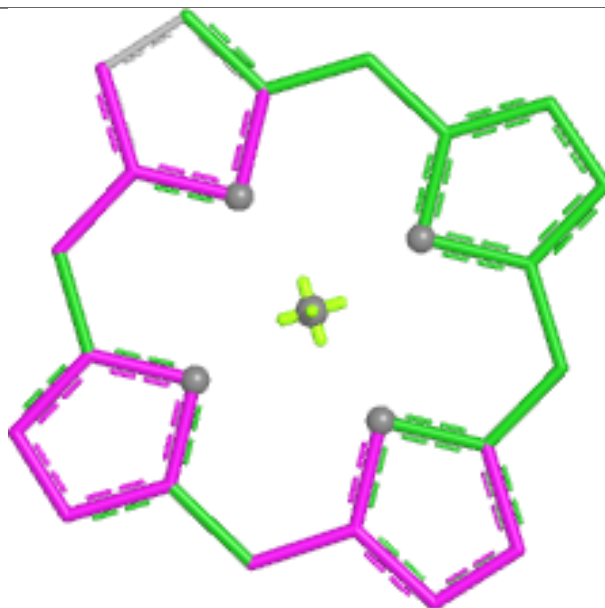


Rings

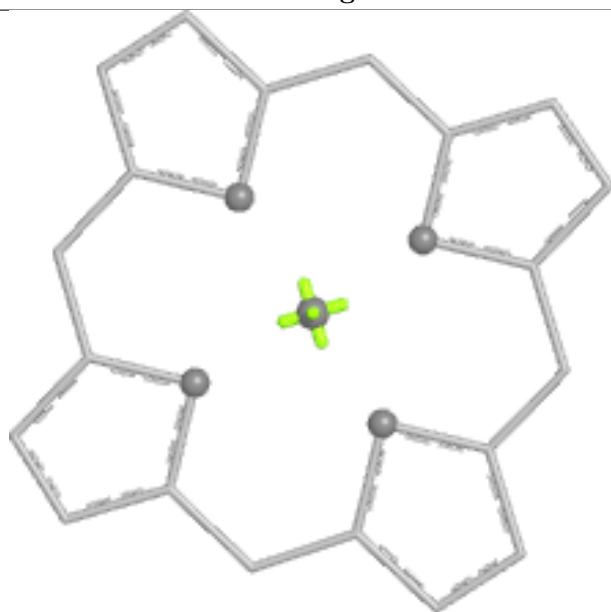
Ligand CLA A 3029



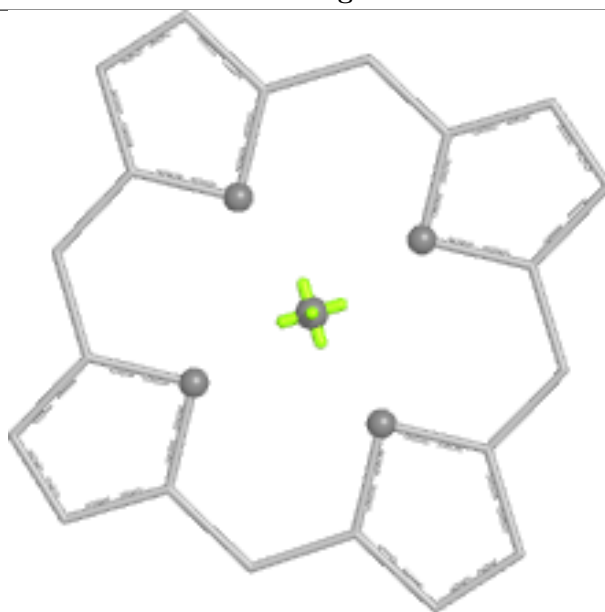
Bond lengths



Bond angles

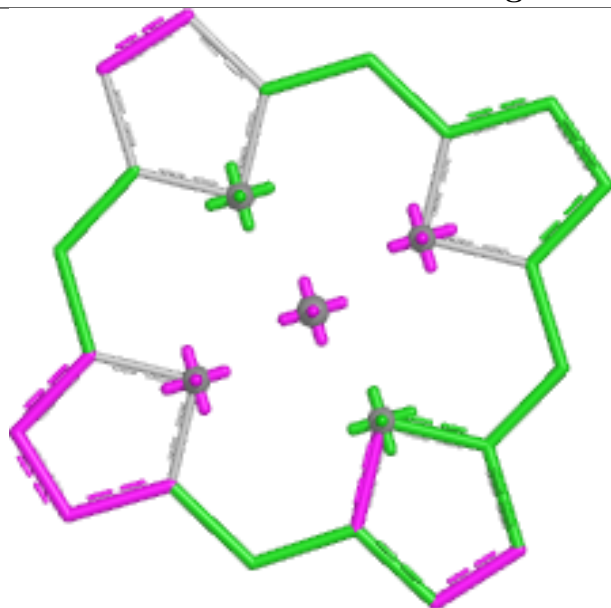


Torsions

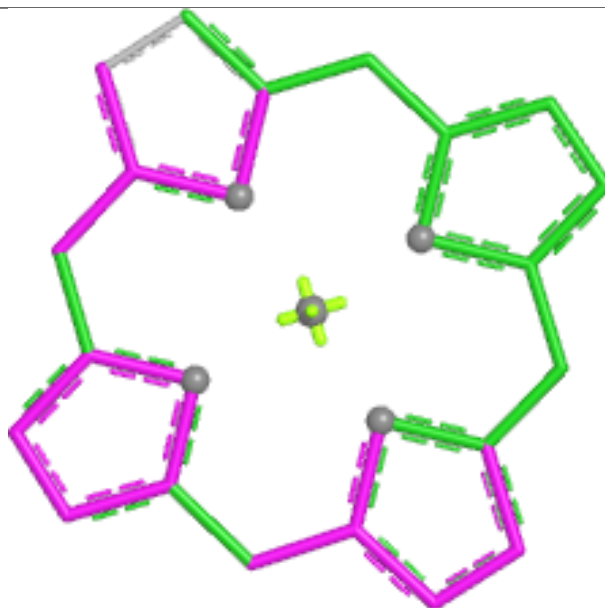


Rings

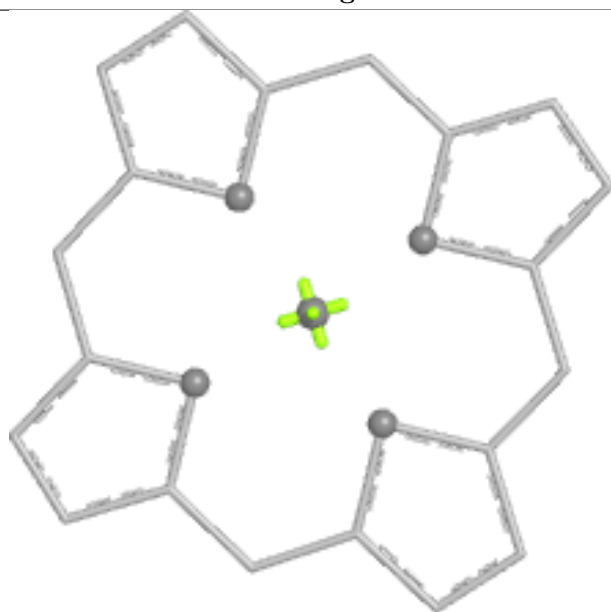
Ligand CLA B 3023



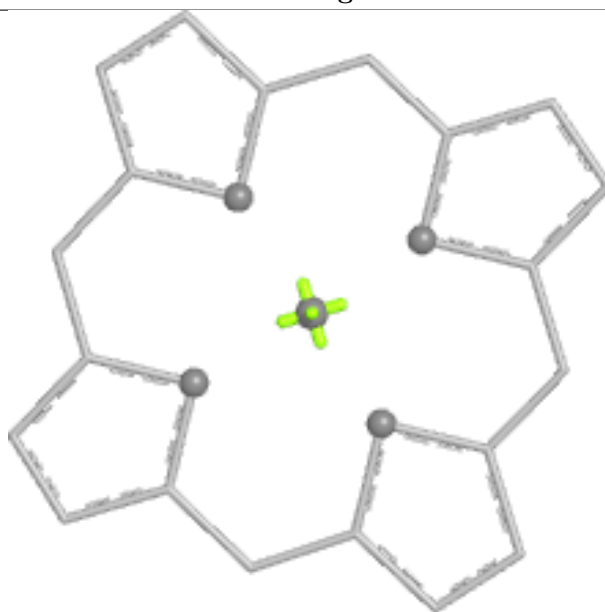
Bond lengths



Bond angles

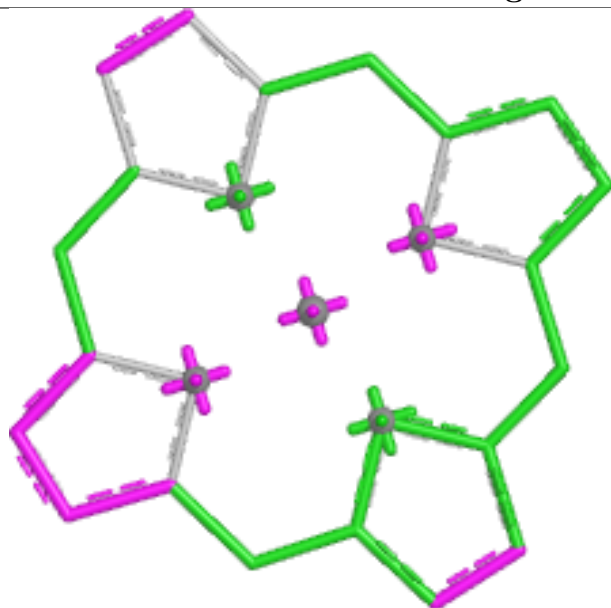


Torsions

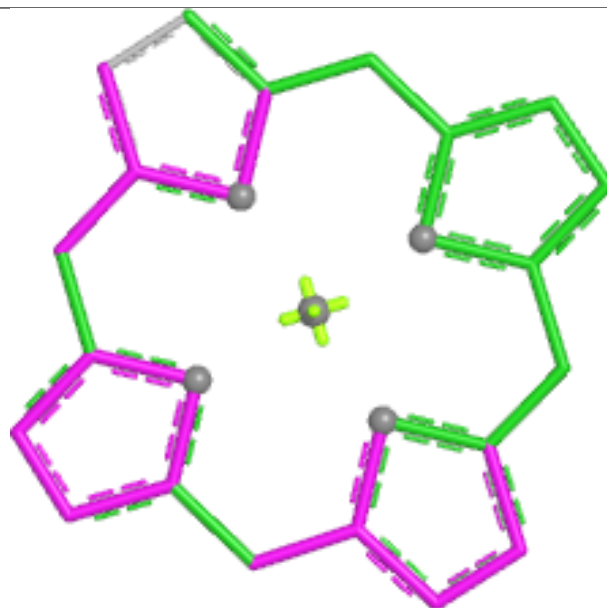


Rings

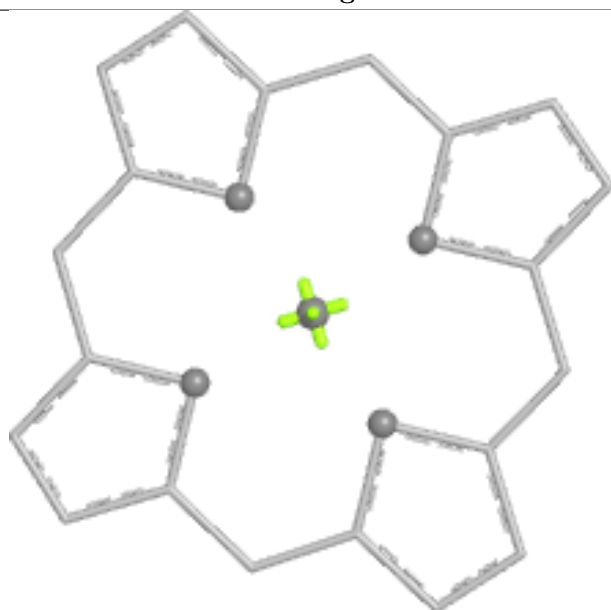
Ligand CLA B 3034



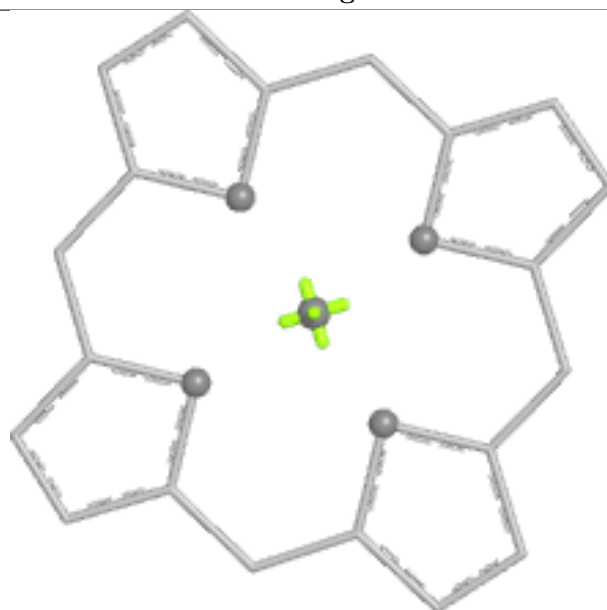
Bond lengths



Bond angles

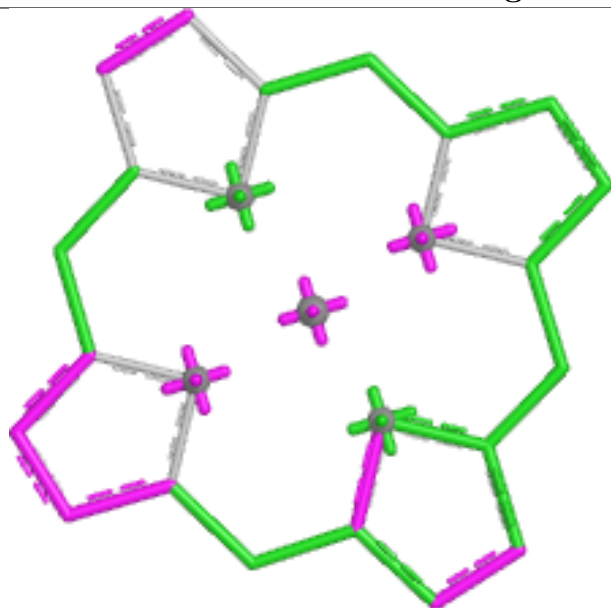


Torsions

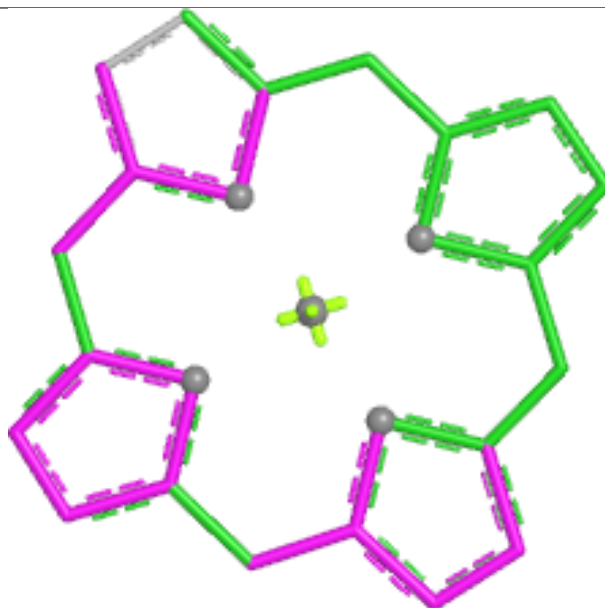


Rings

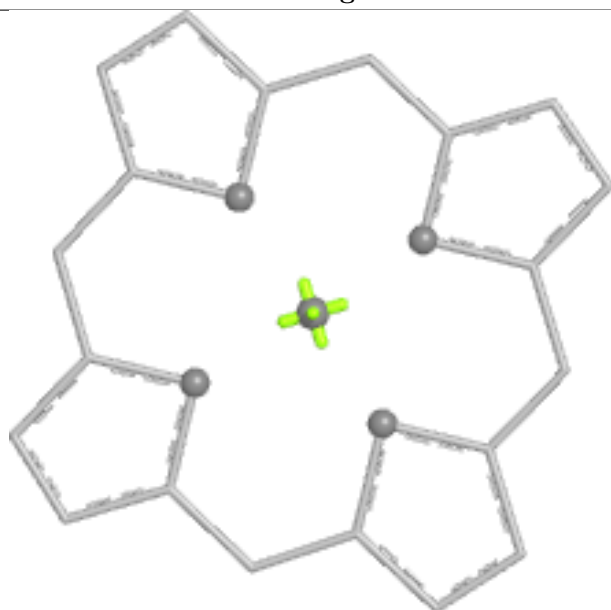
Ligand CLA A 3013



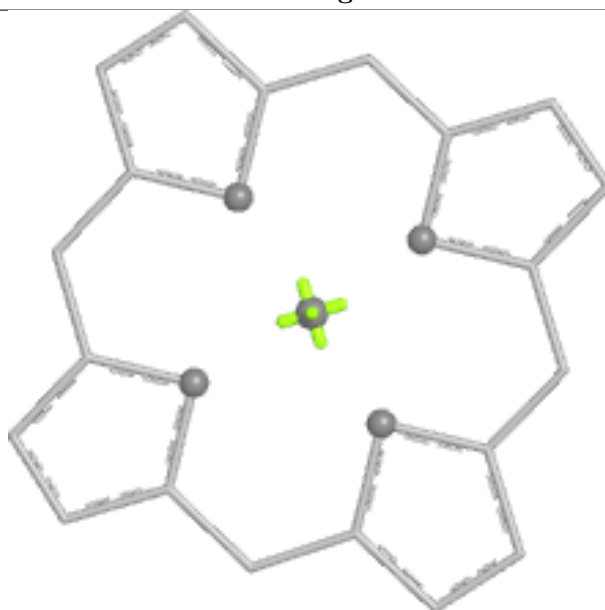
Bond lengths



Bond angles

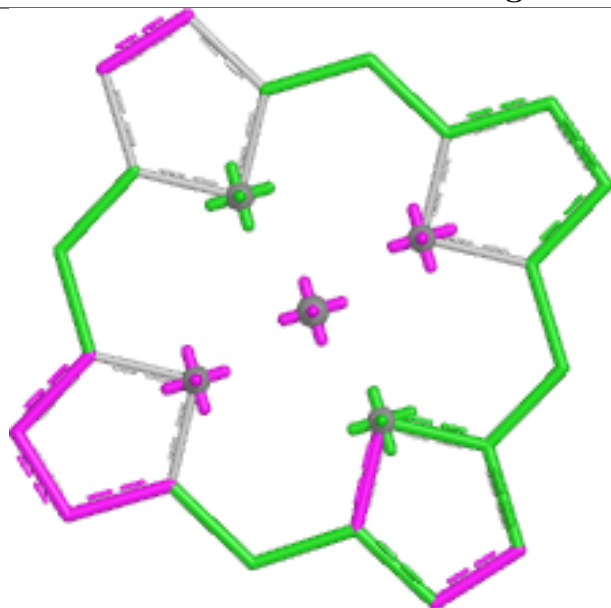


Torsions

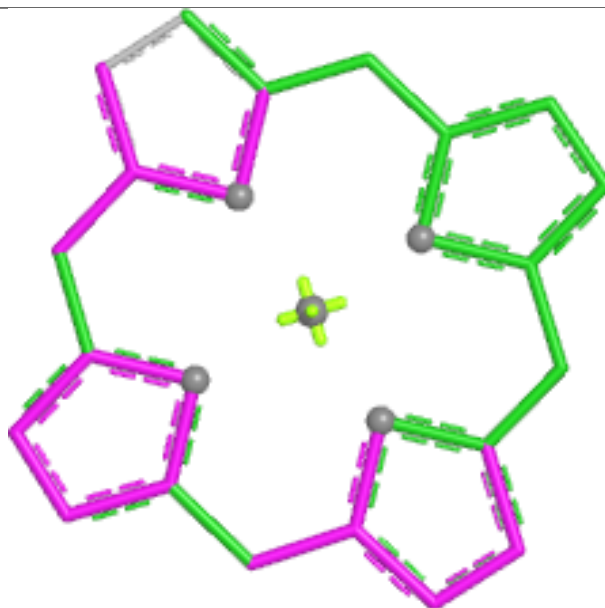


Rings

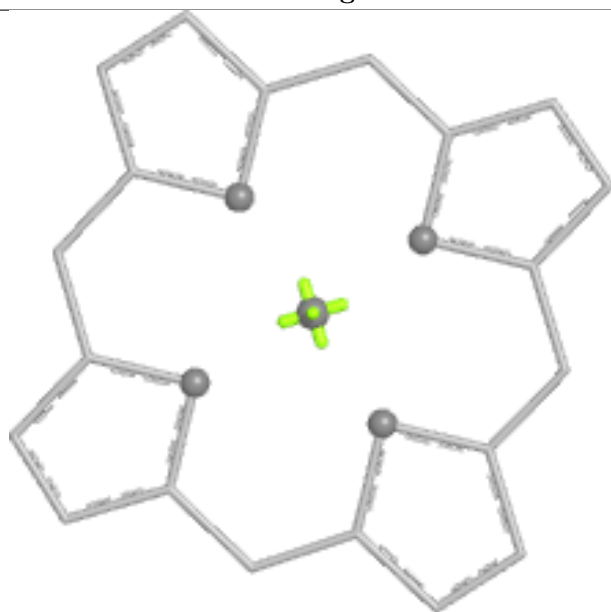
Ligand CLA B 3001



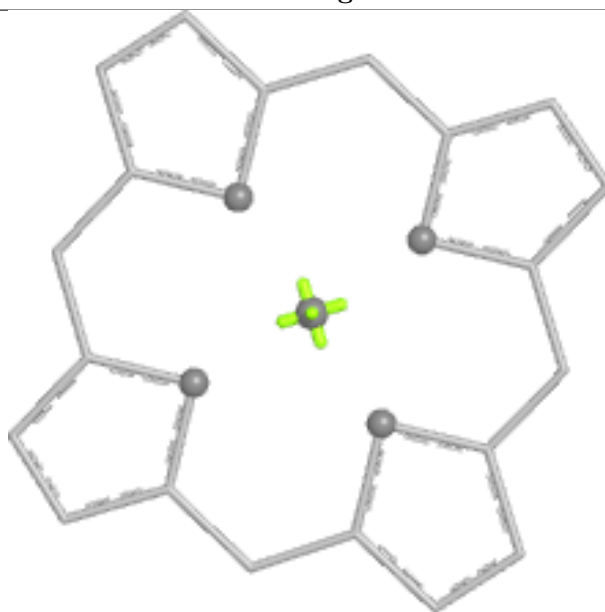
Bond lengths



Bond angles

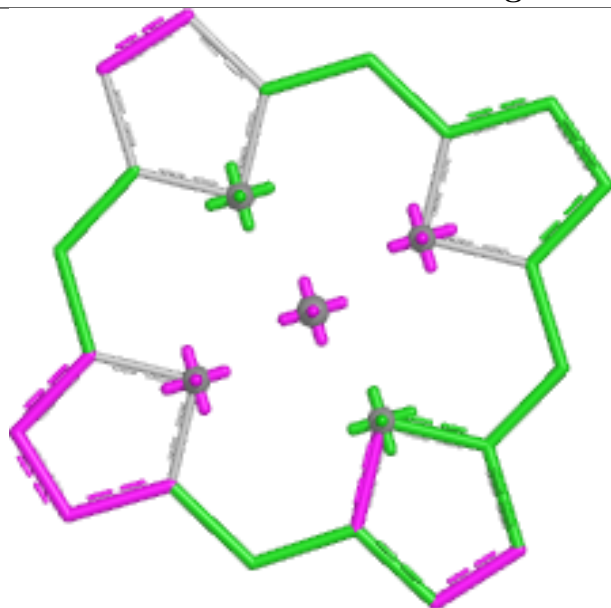


Torsions

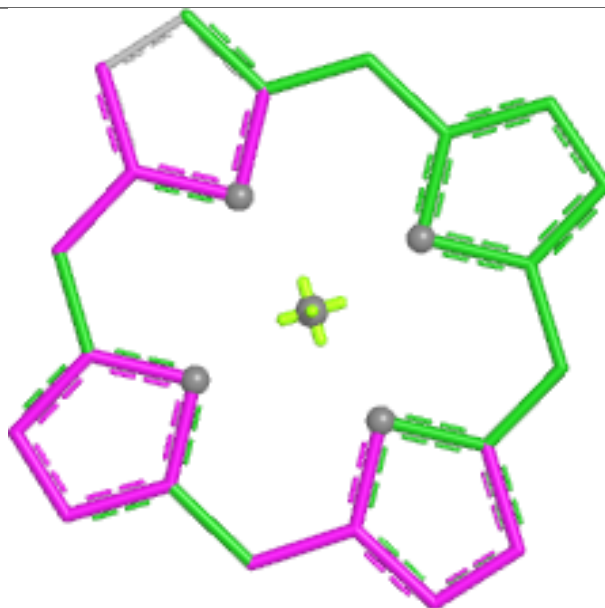


Rings

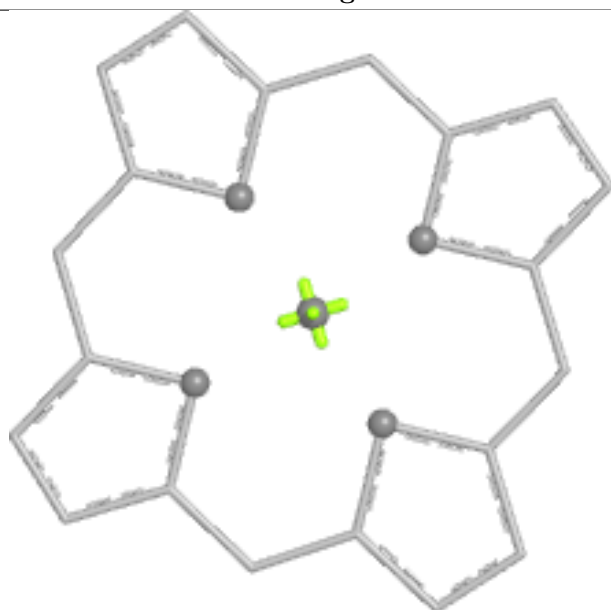
Ligand CLA A 3072



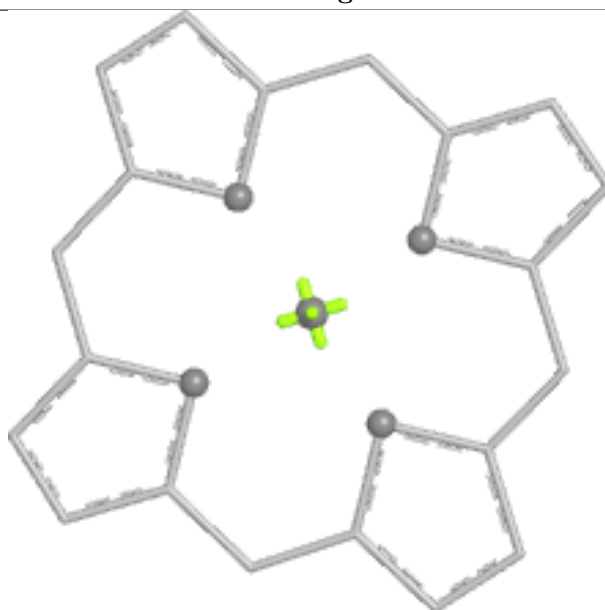
Bond lengths



Bond angles

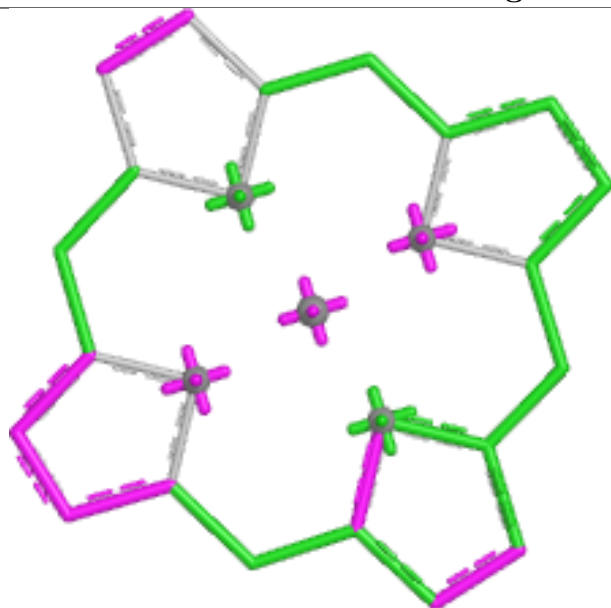


Torsions

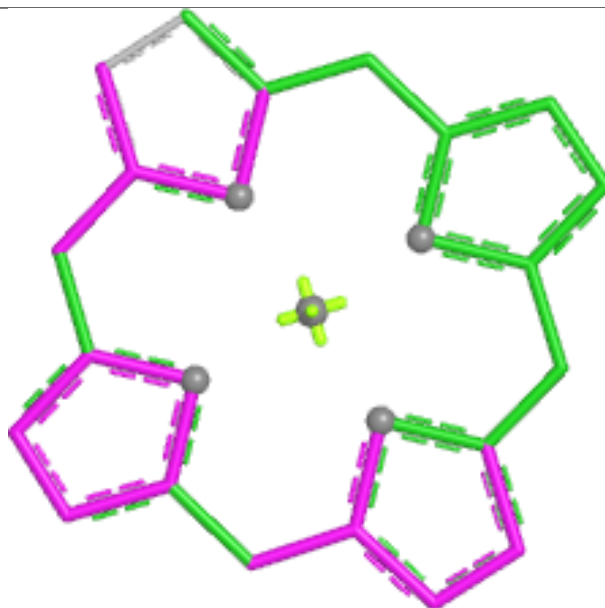


Rings

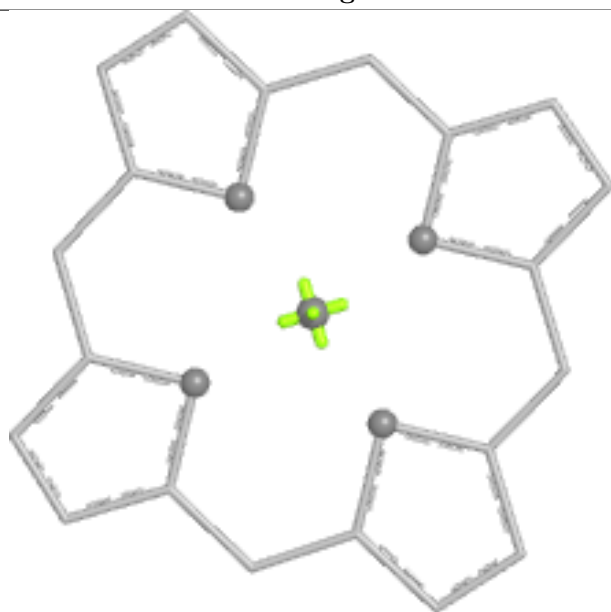
Ligand CLA B 3003



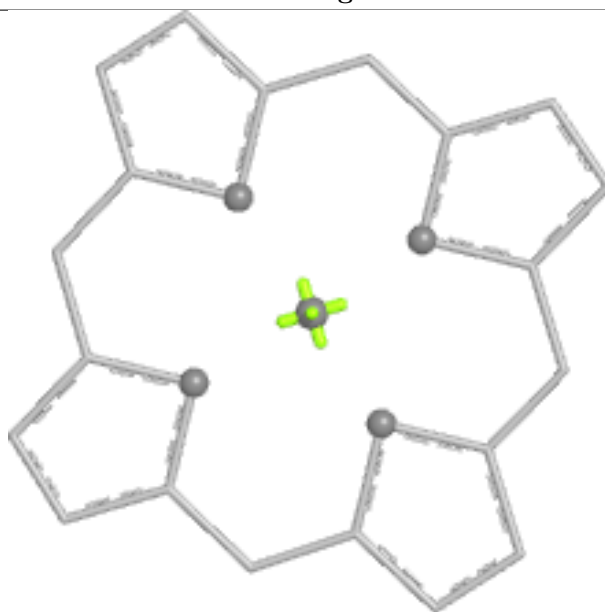
Bond lengths



Bond angles

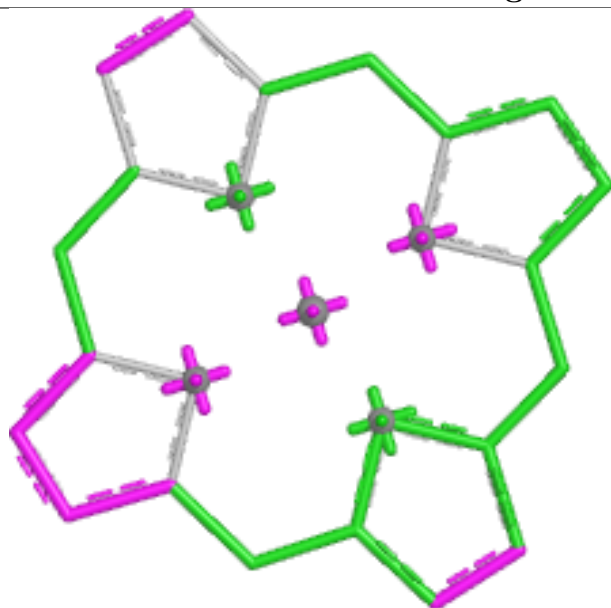


Torsions

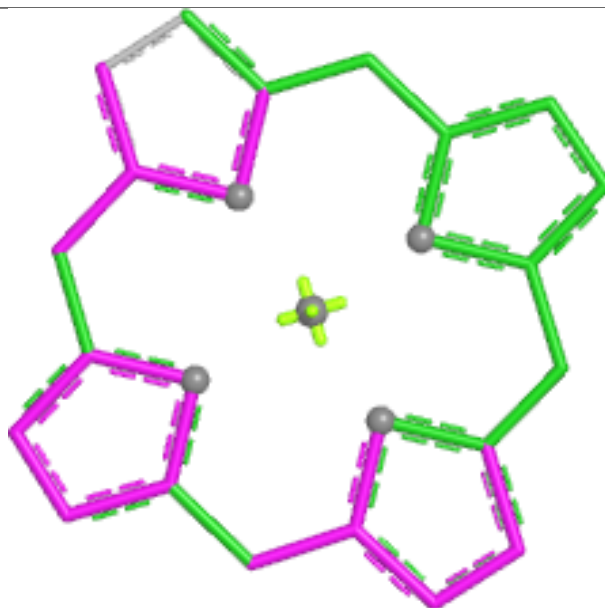


Rings

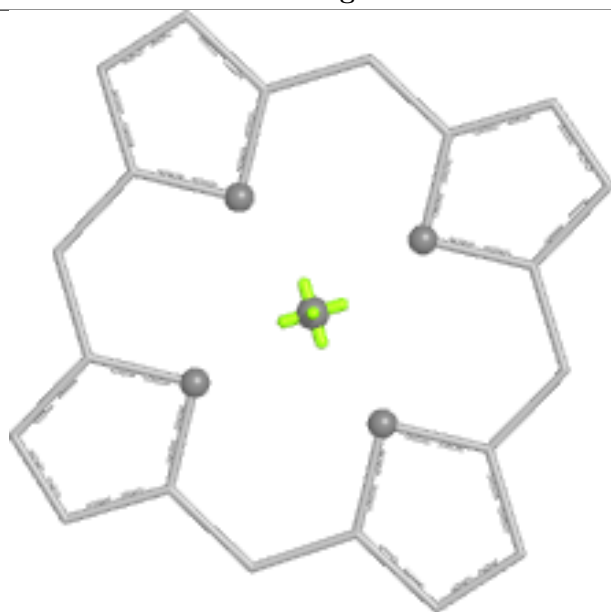
Ligand CLA B 3066



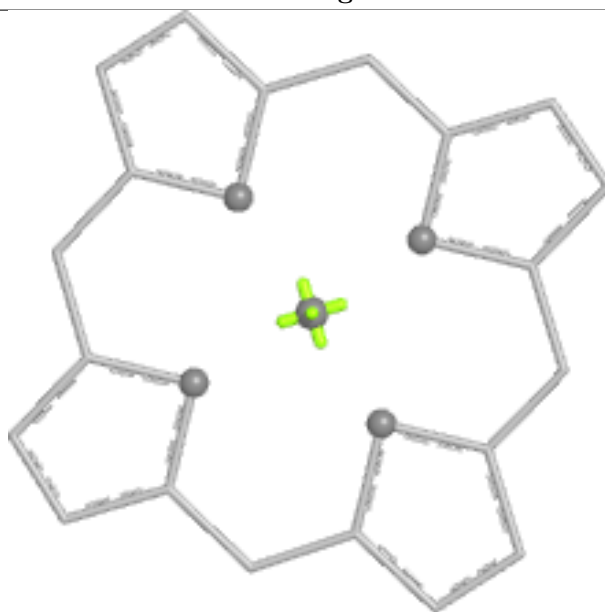
Bond lengths



Bond angles

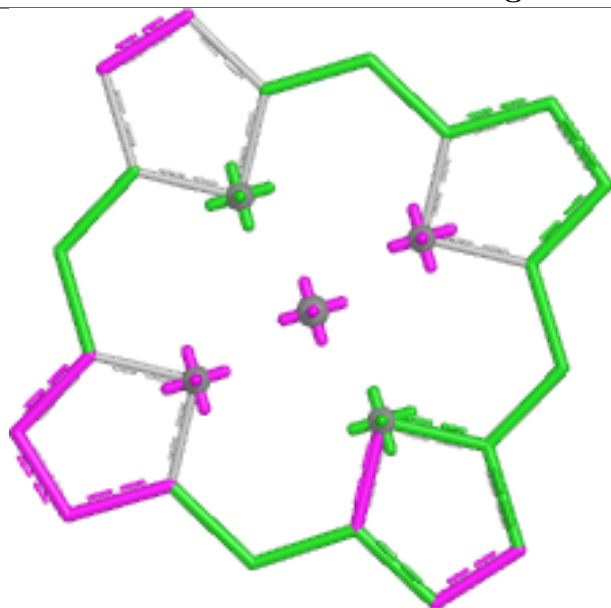


Torsions

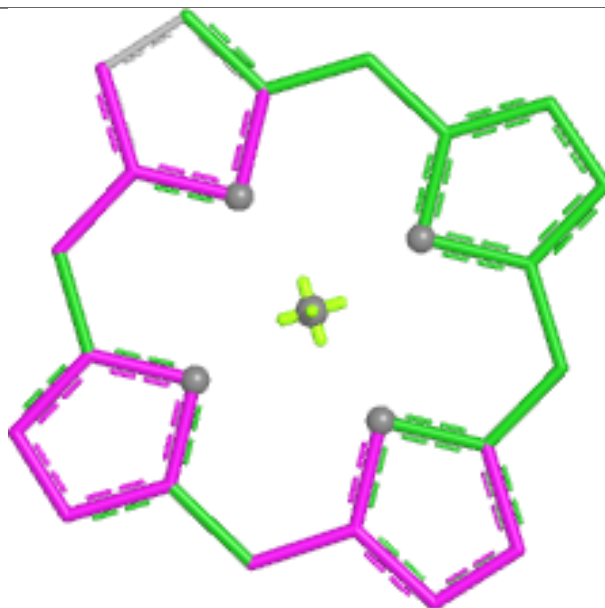


Rings

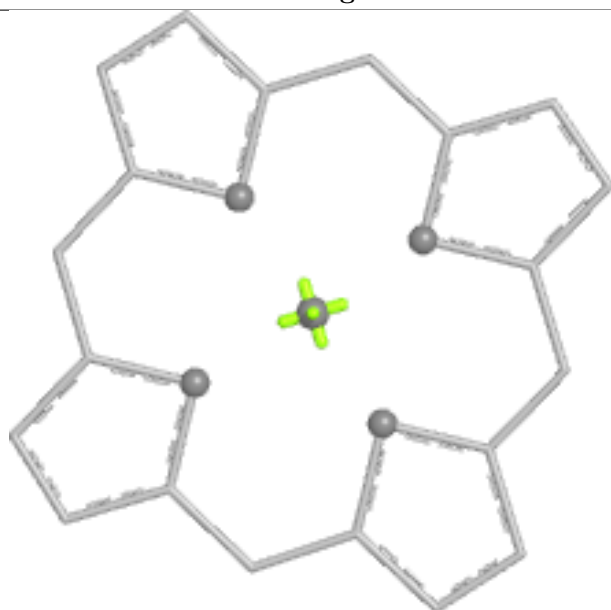
Ligand CLA A 3018



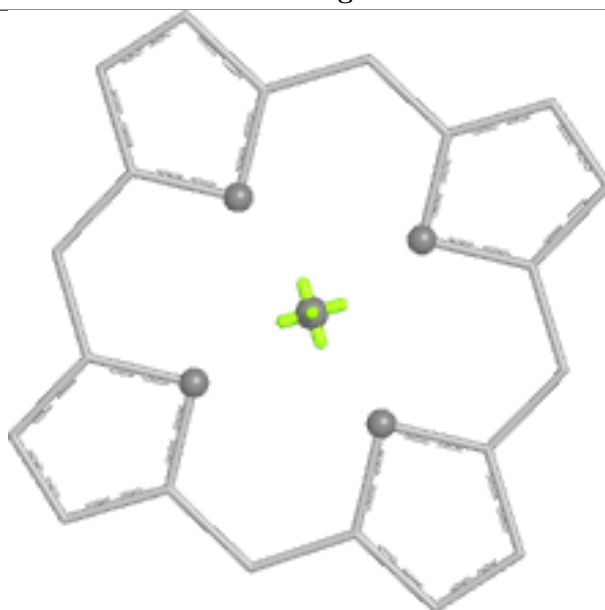
Bond lengths



Bond angles

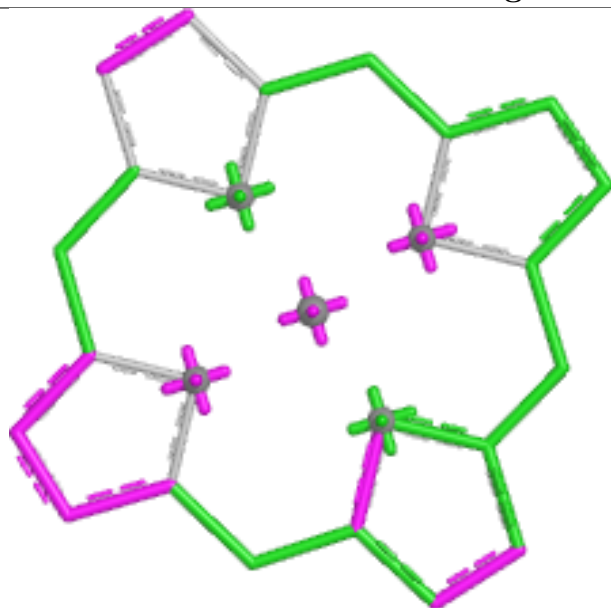


Torsions

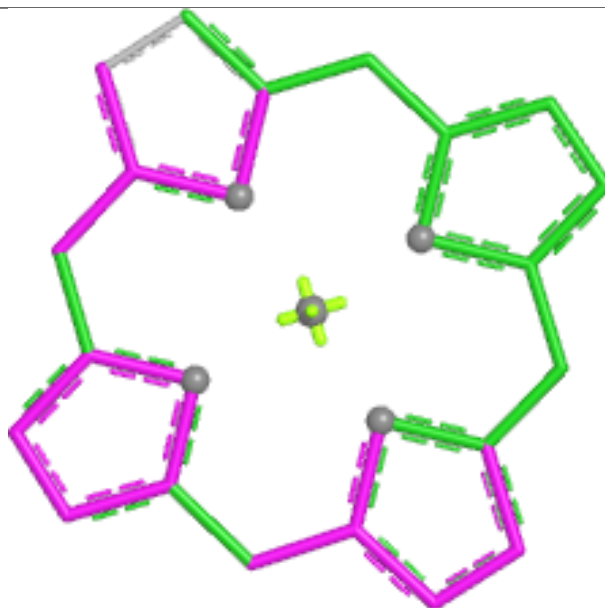


Rings

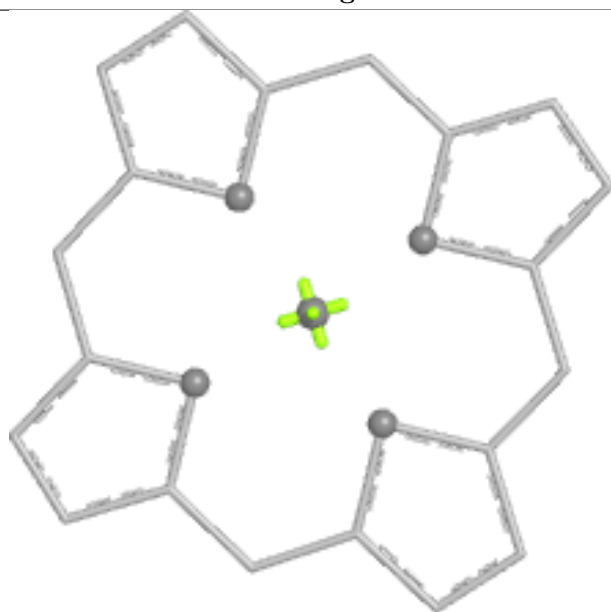
Ligand CLA A 3071



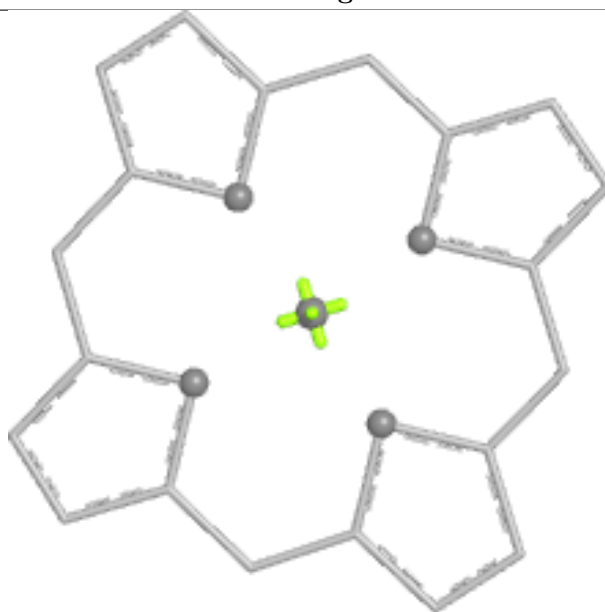
Bond lengths



Bond angles

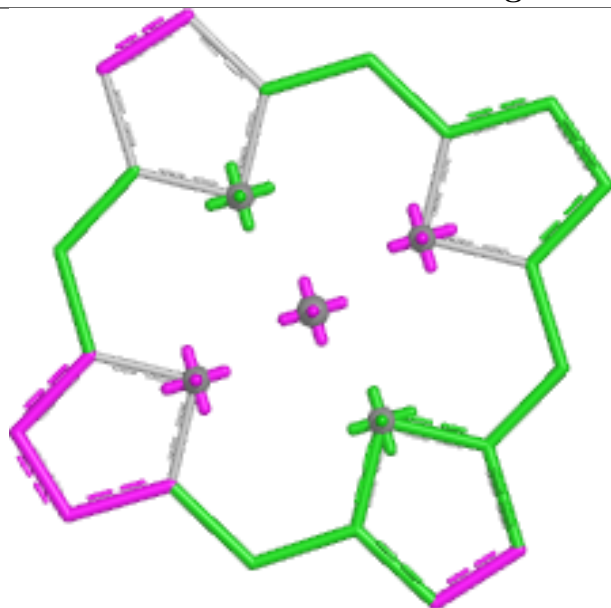


Torsions

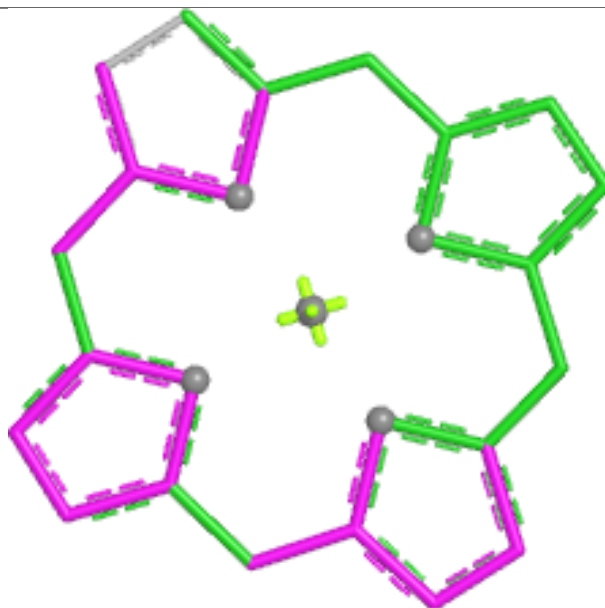


Rings

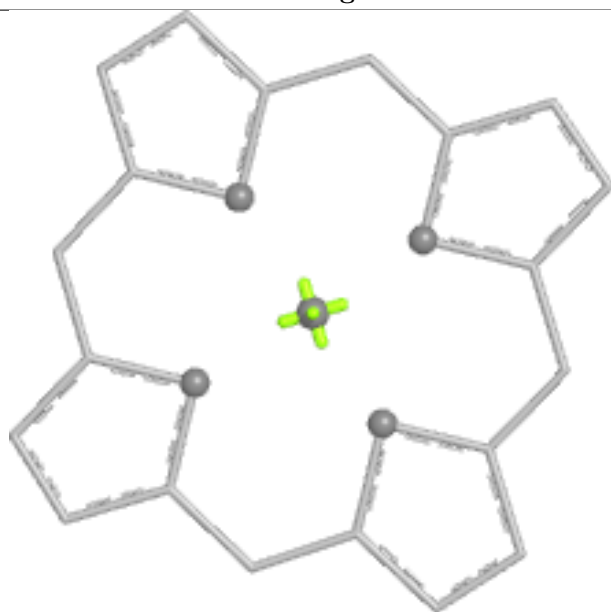
Ligand CLA A 3043



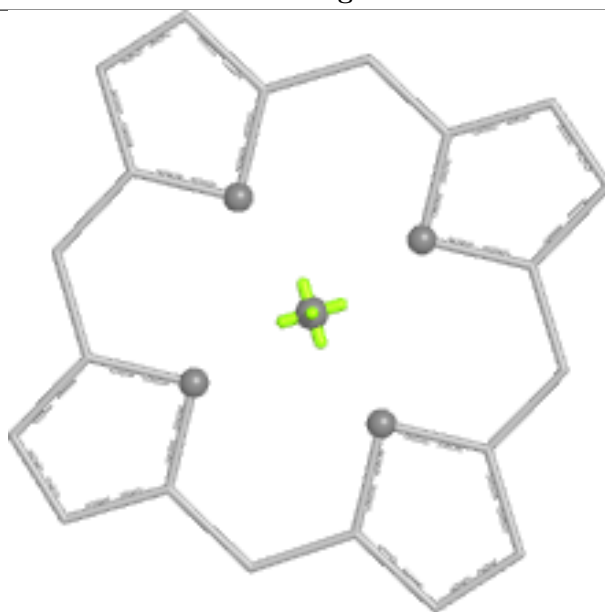
Bond lengths



Bond angles

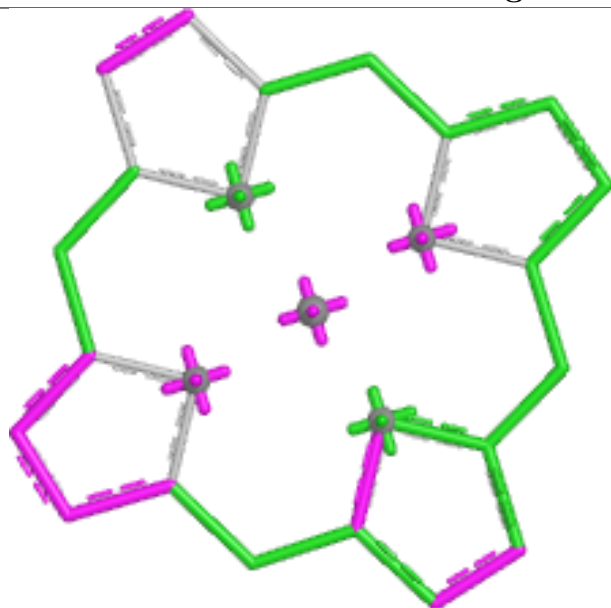


Torsions

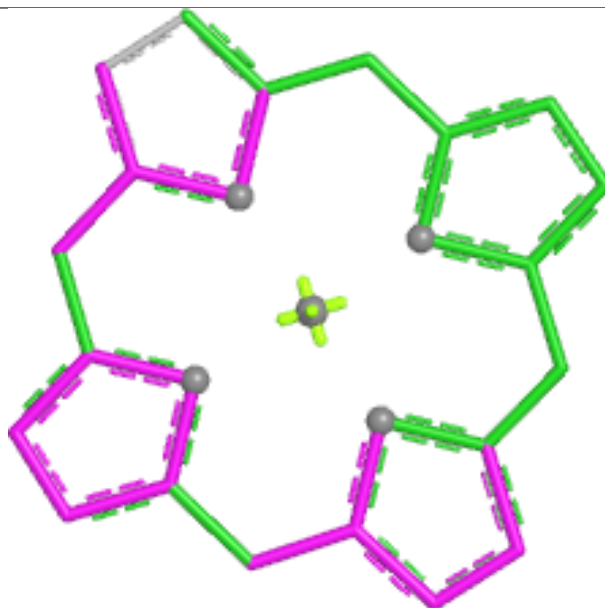


Rings

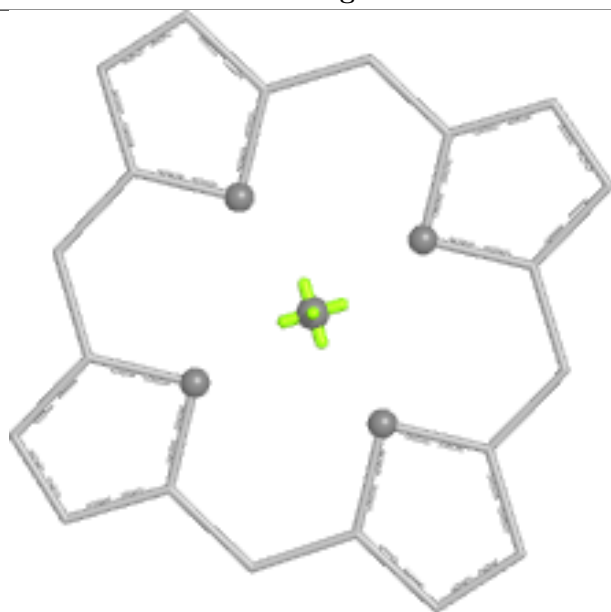
Ligand CLA B 3076



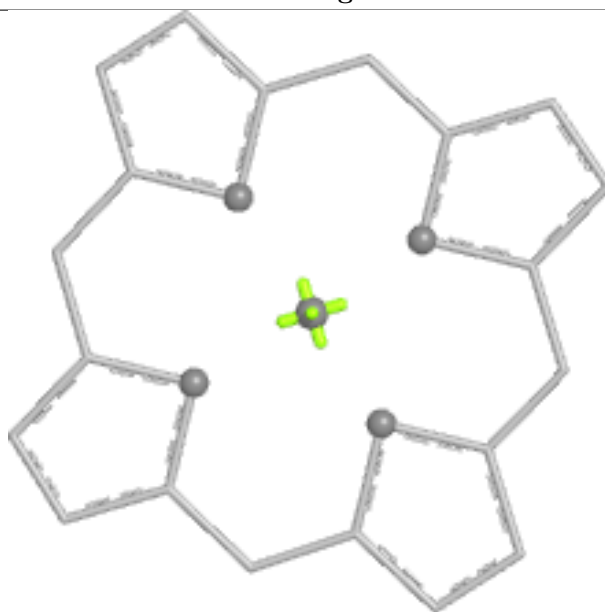
Bond lengths



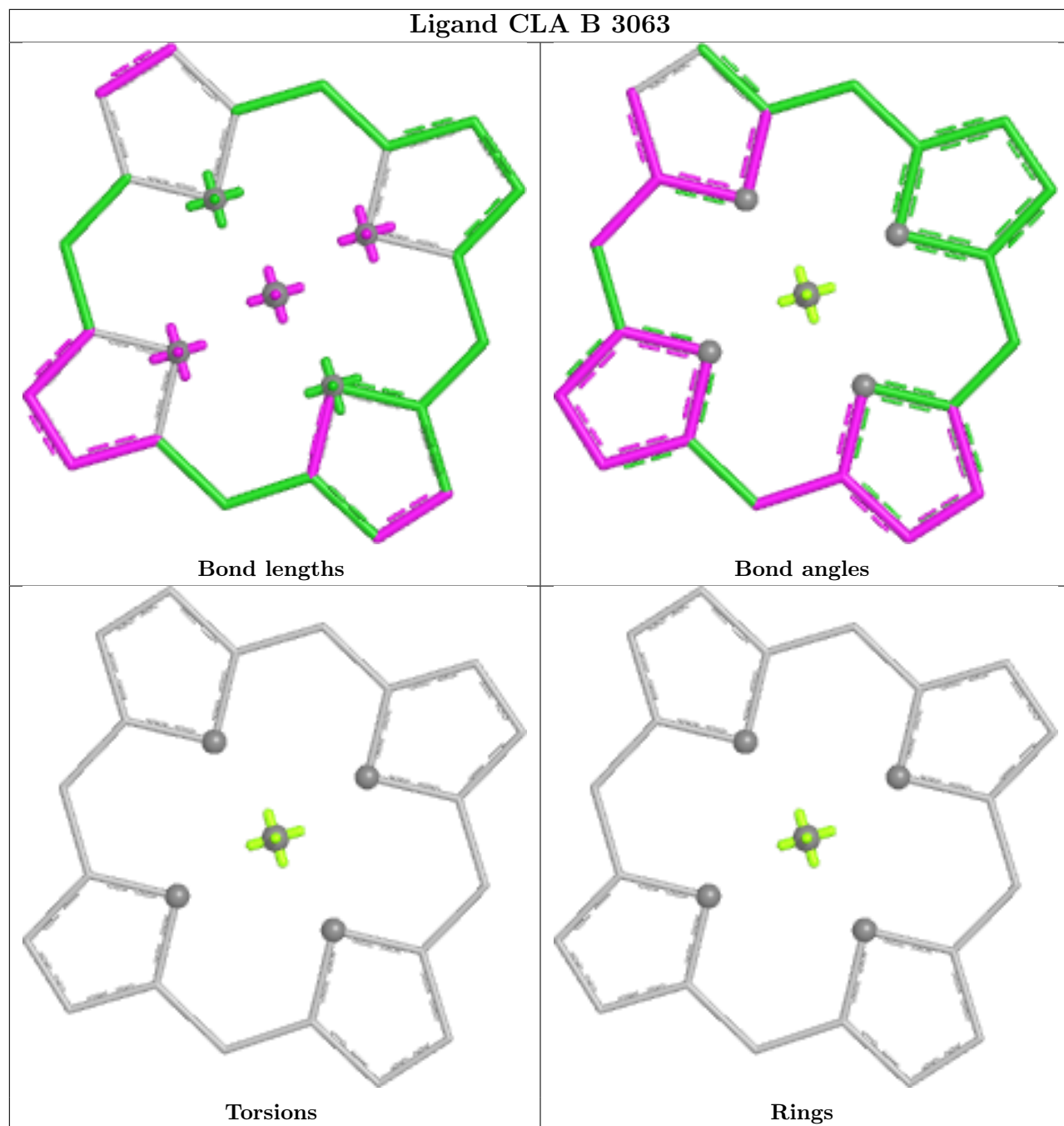
Bond angles



Torsions



Rings



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.