



## Full wwPDB EM Validation Report ⓘ

Sep 23, 2025 – 04:02 pm BST

PDB ID : 8OH5 / pdb\_00008oh5  
EMDB ID : EMD-16878  
Title : Cryo-EM structure of the electron bifurcating transhydrogenase StnABC complex from *Sporomusa Ovata* (state 2)  
Authors : Kumar, A.; Kremp, F.; Mueller, V.; Schuller, J.M.  
Deposited on : 2023-03-20  
Resolution : 3.00 Å(reported)

This is a Full wwPDB EM Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

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

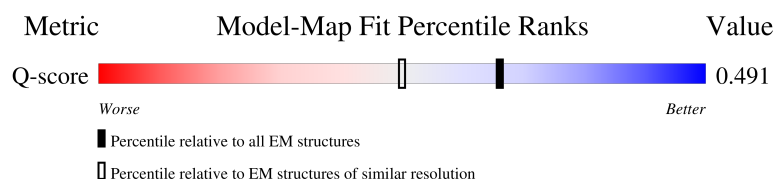
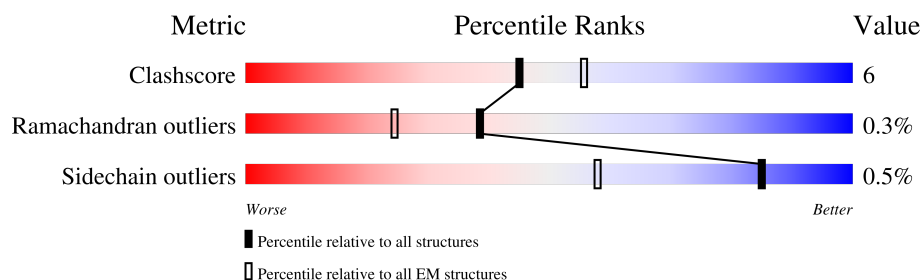
EMDB validation analysis : 0.0.1.dev129  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4-5-2 with Phenix2.0  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.46

# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:  
*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.00 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<br>(#Entries) | EM structures<br>(#Entries) | Similar EM resolution<br>(#Entries, resolution range(Å)) |
|-----------------------|-----------------------------|-----------------------------|----------------------------------------------------------|
| Clashscore            | 210492                      | 15764                       | -                                                        |
| Ramachandran outliers | 207382                      | 16835                       | -                                                        |
| Sidechain outliers    | 206894                      | 16415                       | -                                                        |
| Q-score               | -                           | 25397                       | 14081 ( 2.50 - 3.50 )                                    |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

| Mol | Chain | Length | Quality of chain                                      |
|-----|-------|--------|-------------------------------------------------------|
| 1   | A     | 178    | <div> <div>43%</div> <div>65% 17% .. 16%</div> </div> |
| 1   | D     | 178    | <div> <div>42%</div> <div>65% 18% • 16%</div> </div>  |
| 1   | G     | 178    | <div> <div>42%</div> <div>65% 18% .. 16%</div> </div> |
| 1   | J     | 178    | <div> <div>42%</div> <div>65% 18% • 16%</div> </div>  |

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| Mol | Chain | Length | Quality of chain |
|-----|-------|--------|------------------|
| 2   | B     | 584    |                  |
| 2   | E     | 584    |                  |
| 2   | H     | 584    |                  |
| 2   | K     | 584    |                  |
| 3   | C     | 1172   |                  |
| 3   | F     | 1172   |                  |
| 3   | I     | 1172   |                  |
| 3   | L     | 1172   |                  |

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   | SF4  | B     | 604 | -         | -        | X       | -                |
| 7   | SF4  | E     | 604 | -         | -        | X       | -                |
| 7   | SF4  | H     | 604 | -         | -        | X       | -                |
| 7   | SF4  | K     | 604 | -         | -        | X       | -                |

## 2 Entry composition [i](#)

There are 10 unique types of molecules in this entry. The entry contains 58624 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 NAD-dependent formate dehydrogenase gamma subunit.

| Mol | Chain | Residues | Atoms |     |     |     |   | AltConf | Trace |
|-----|-------|----------|-------|-----|-----|-----|---|---------|-------|
| 1   | A     | 150      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1118  | 717 | 182 | 212 | 7 |         |       |
| 1   | D     | 150      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1118  | 717 | 182 | 212 | 7 |         |       |
| 1   | G     | 150      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1118  | 717 | 182 | 212 | 7 |         |       |
| 1   | J     | 150      | Total | C   | N   | O   | S | 0       | 0     |
|     |       |          | 1118  | 717 | 182 | 212 | 7 |         |       |

- Molecule 2 is a protein called NAD-reducing hydrogenase subunit HoxF.

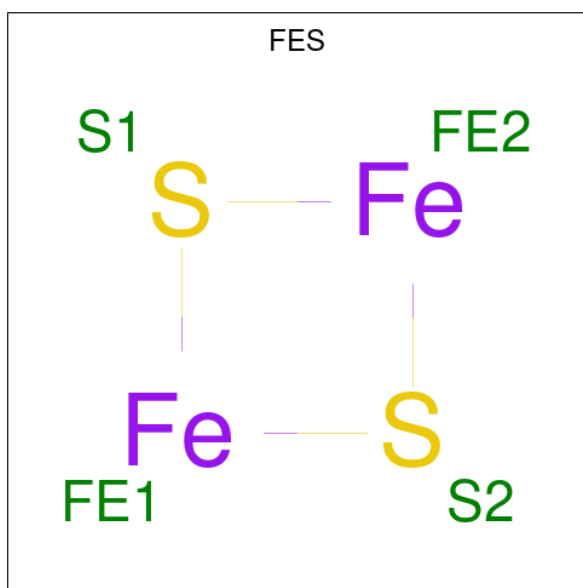
| Mol | Chain | Residues | Atoms |      |     |     |    | AltConf | Trace |
|-----|-------|----------|-------|------|-----|-----|----|---------|-------|
| 2   | B     | 584      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 4431  | 2789 | 758 | 839 | 45 |         |       |
| 2   | E     | 584      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 4431  | 2789 | 758 | 839 | 45 |         |       |
| 2   | H     | 584      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 4431  | 2789 | 758 | 839 | 45 |         |       |
| 2   | K     | 584      | Total | C    | N   | O   | S  | 0       | 0     |
|     |       |          | 4431  | 2789 | 758 | 839 | 45 |         |       |

- Molecule 3 is a protein called Formate dehydrogenase-O, major subunit.

| Mol | Chain | Residues | Atoms |      |      |      |    | AltConf | Trace |
|-----|-------|----------|-------|------|------|------|----|---------|-------|
| 3   | C     | 1172     | Total | C    | N    | O    | S  | 0       | 0     |
|     |       |          | 8846  | 5554 | 1522 | 1710 | 60 |         |       |
| 3   | F     | 1172     | Total | C    | N    | O    | S  | 0       | 0     |
|     |       |          | 8846  | 5554 | 1522 | 1710 | 60 |         |       |
| 3   | I     | 1172     | Total | C    | N    | O    | S  | 0       | 0     |
|     |       |          | 8846  | 5554 | 1522 | 1710 | 60 |         |       |
| 3   | L     | 1172     | Total | C    | N    | O    | S  | 0       | 0     |
|     |       |          | 8846  | 5554 | 1522 | 1710 | 60 |         |       |

- Molecule 4 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: Fe<sub>2</sub>S<sub>2</sub>) (labeled

as "Ligand of Interest" by depositor).



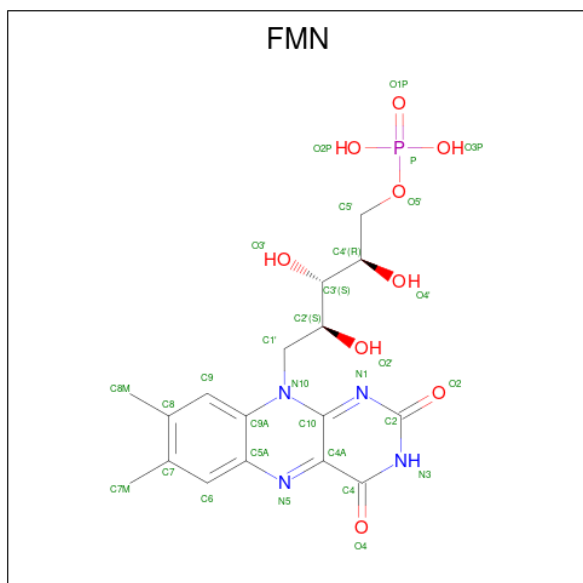
| Mol | Chain | Residues | Atoms |    |   | AltConf |
|-----|-------|----------|-------|----|---|---------|
| 4   | A     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | B     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | C     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | D     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | E     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | F     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | G     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | H     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | I     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | J     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | K     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |
| 4   | L     | 1        | Total | Fe | S | 0       |
|     |       |          | 4     | 2  | 2 |         |

- Molecule 5 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by

depositor).

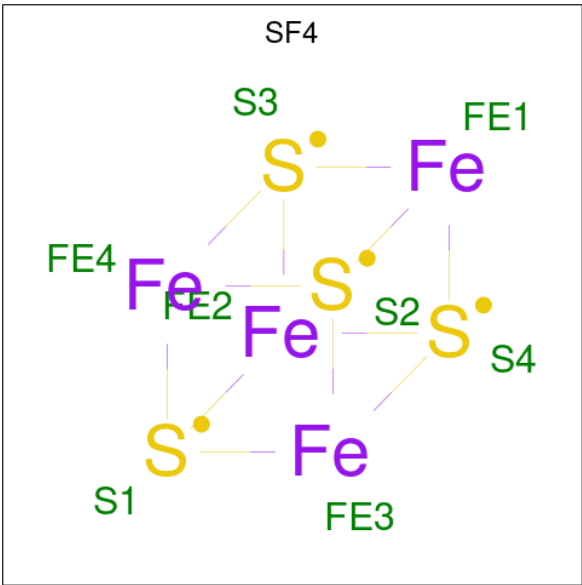
| Mol | Chain | Residues | Atoms |    | AltConf |
|-----|-------|----------|-------|----|---------|
| 5   | B     | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |
| 5   | E     | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |
| 5   | H     | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |
| 5   | K     | 1        | Total | Zn | 0       |
|     |       |          | 1     | 1  |         |

- Molecule 6 is FLAVIN MONONUCLEOTIDE (CCD ID: FMN) (formula:  $C_{17}H_{21}N_4O_9P$ ) (labeled as "Ligand of Interest" by depositor).



| Mol | Chain | Residues | Atoms |    |   |   |   | AltConf |
|-----|-------|----------|-------|----|---|---|---|---------|
| 6   | B     | 1        | Total | C  | N | O | P | 0       |
|     |       |          | 31    | 17 | 4 | 9 | 1 |         |
| 6   | E     | 1        | Total | C  | N | O | P | 0       |
|     |       |          | 31    | 17 | 4 | 9 | 1 |         |
| 6   | H     | 1        | Total | C  | N | O | P | 0       |
|     |       |          | 31    | 17 | 4 | 9 | 1 |         |
| 6   | K     | 1        | Total | C  | N | O | P | 0       |
|     |       |          | 31    | 17 | 4 | 9 | 1 |         |

- Molecule 7 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula:  $Fe_4S_4$ ) (labeled as "Ligand of Interest" by depositor).



| Mol | Chain | Residues | Atoms |    |   | AltConf |
|-----|-------|----------|-------|----|---|---------|
| 7   | B     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | B     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | B     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | C     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | C     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | C     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | C     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | C     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | E     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | E     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | E     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | F     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |
| 7   | F     | 1        | Total | Fe | S | 0       |
|     |       |          | 8     | 4  | 4 |         |

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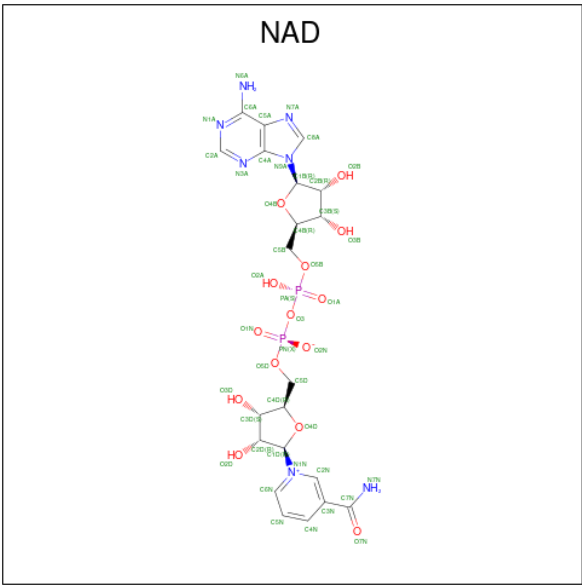
| Mol | Chain | Residues | Atoms      |         |        | AltConf |
|-----|-------|----------|------------|---------|--------|---------|
| 7   | F     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | F     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | F     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | F     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | H     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | H     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | H     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | I     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | I     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | I     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | I     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | I     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | I     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | I     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | K     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | K     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | K     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | L     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | L     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | L     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | L     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |
| 7   | L     | 1        | Total<br>8 | Fe<br>4 | S<br>4 | 0       |

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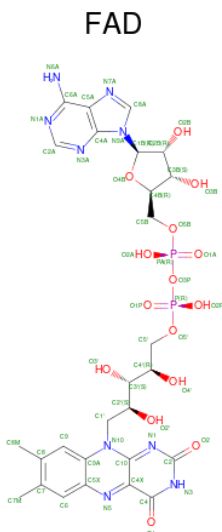
| Mol | Chain | Residues | Atoms |    |   | AltConf |
|-----|-------|----------|-------|----|---|---------|
|     |       |          | Total | Fe | S |         |
| 7   | L     | 1        | 8     | 4  | 4 | 0       |

- Molecule 8 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (CCD ID: NAD) (formula:  $C_{21}H_{27}N_7O_{14}P_2$ ) (labeled as "Ligand of Interest" by depositor).



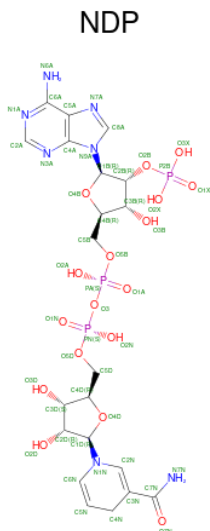
| Mol | Chain | Residues | Atoms |    |   |    |   | AltConf |
|-----|-------|----------|-------|----|---|----|---|---------|
|     |       |          | Total | C  | N | O  | P |         |
| 8   | B     | 1        | 44    | 21 | 7 | 14 | 2 | 0       |
| 8   | E     | 1        | 44    | 21 | 7 | 14 | 2 | 0       |
| 8   | H     | 1        | 44    | 21 | 7 | 14 | 2 | 0       |
| 8   | K     | 1        | 44    | 21 | 7 | 14 | 2 | 0       |

- Molecule 9 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula:  $C_{27}H_{33}N_9O_{15}P_2$ ) (labeled as "Ligand of Interest" by depositor).



| Mol | Chain | Residues | Atoms       |         |        |         |        | AltConf |
|-----|-------|----------|-------------|---------|--------|---------|--------|---------|
| 9   | C     | 1        | Total<br>53 | C<br>27 | N<br>9 | O<br>15 | P<br>2 | 0       |
| 9   | F     | 1        | Total<br>53 | C<br>27 | N<br>9 | O<br>15 | P<br>2 | 0       |
| 9   | I     | 1        | Total<br>53 | C<br>27 | N<br>9 | O<br>15 | P<br>2 | 0       |
| 9   | L     | 1        | Total<br>53 | C<br>27 | N<br>9 | O<br>15 | P<br>2 | 0       |

- Molecule 10 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (CCD ID: NDP) (formula:  $\text{C}_{21}\text{H}_{30}\text{N}_7\text{O}_{17}\text{P}_3$ ) (labeled as "Ligand of Interest" by depositor).

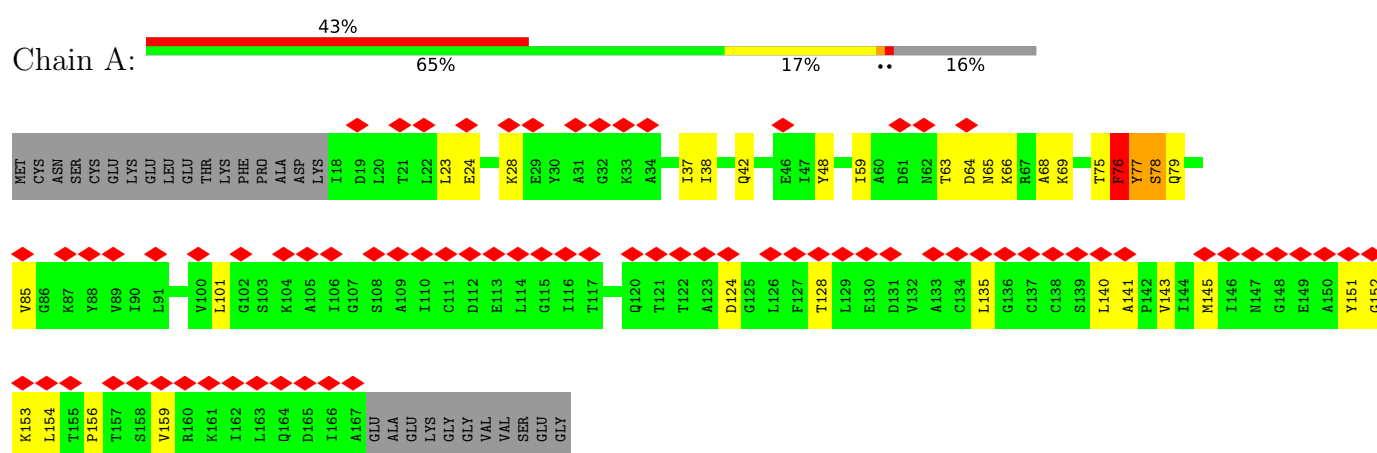


| Mol | Chain | Residues | Atoms       |         |        |         |        | AltConf |
|-----|-------|----------|-------------|---------|--------|---------|--------|---------|
| 10  | C     | 1        | Total<br>48 | C<br>21 | N<br>7 | O<br>17 | P<br>3 | 0       |
| 10  | F     | 1        | Total<br>48 | C<br>21 | N<br>7 | O<br>17 | P<br>3 | 0       |
| 10  | I     | 1        | Total<br>48 | C<br>21 | N<br>7 | O<br>17 | P<br>3 | 0       |
| 10  | L     | 1        | Total<br>48 | C<br>21 | N<br>7 | O<br>17 | P<br>3 | 0       |

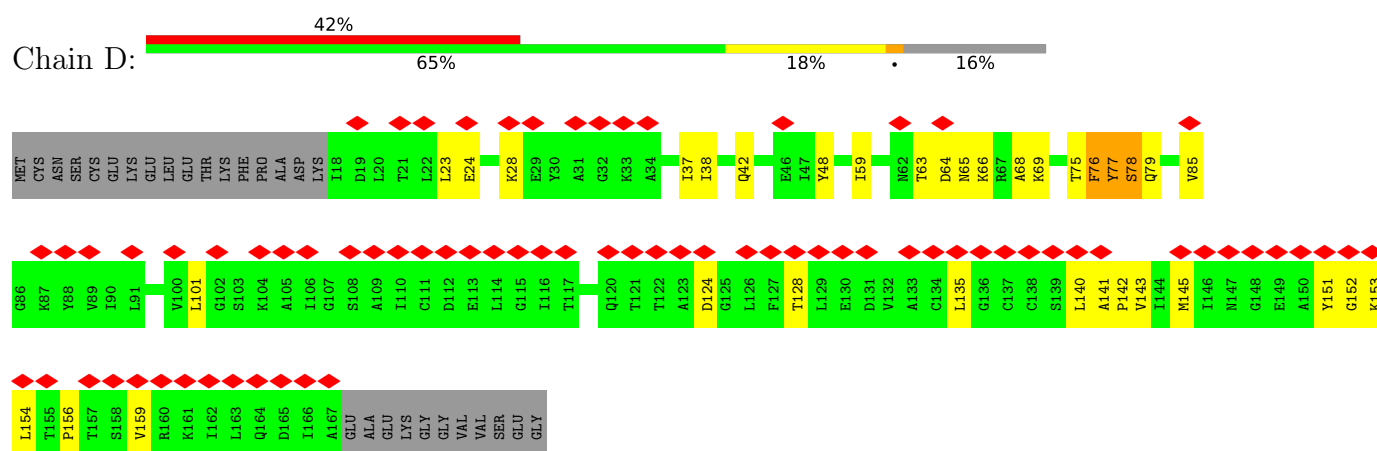
### 3 Residue-property plots

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 and atom inclusion in map density. 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. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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.

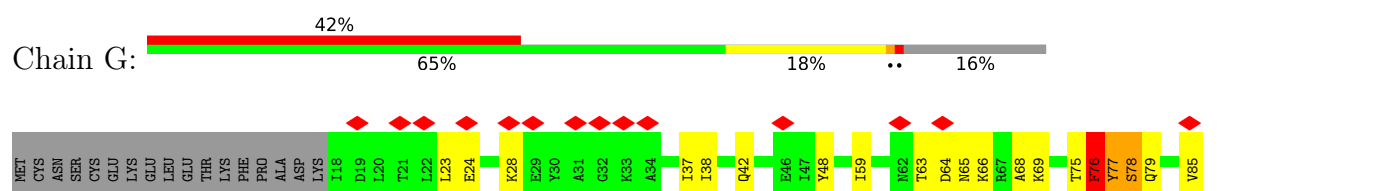
- Molecule 1: NAD-dependent formate dehydrogenase gamma subunit

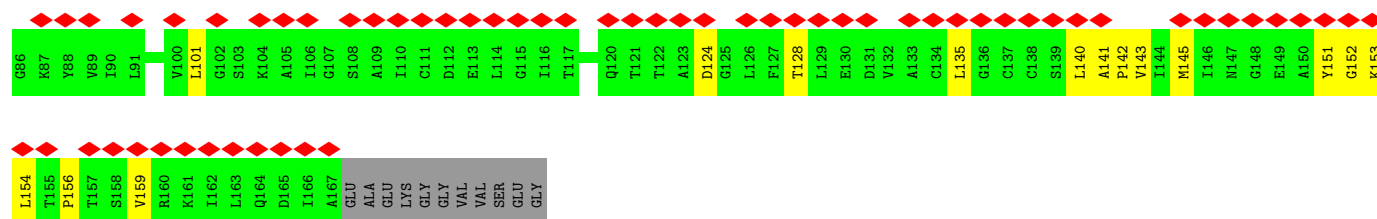


- Molecule 1: NAD-dependent formate dehydrogenase gamma subunit

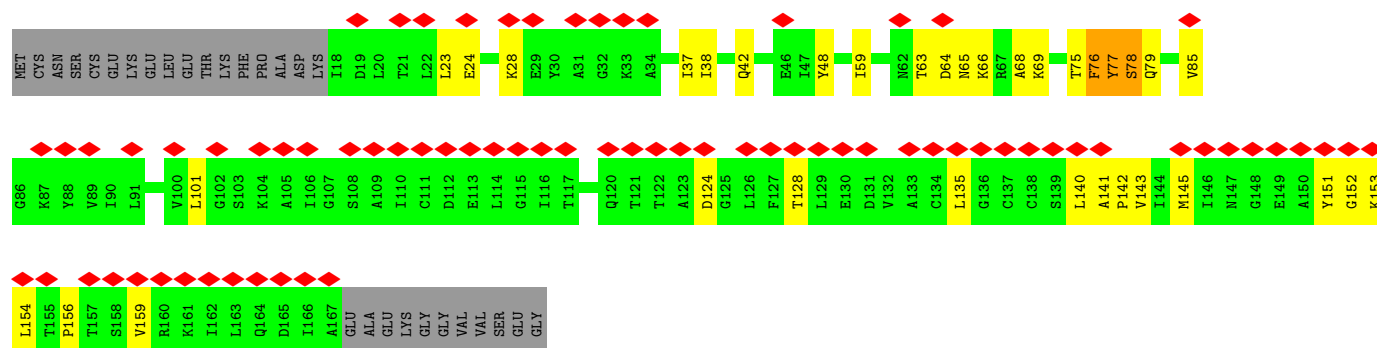
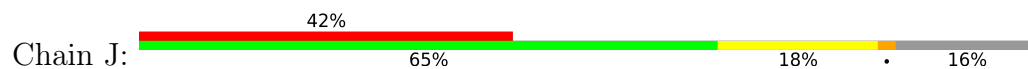


- Molecule 1: NAD-dependent formate dehydrogenase gamma subunit

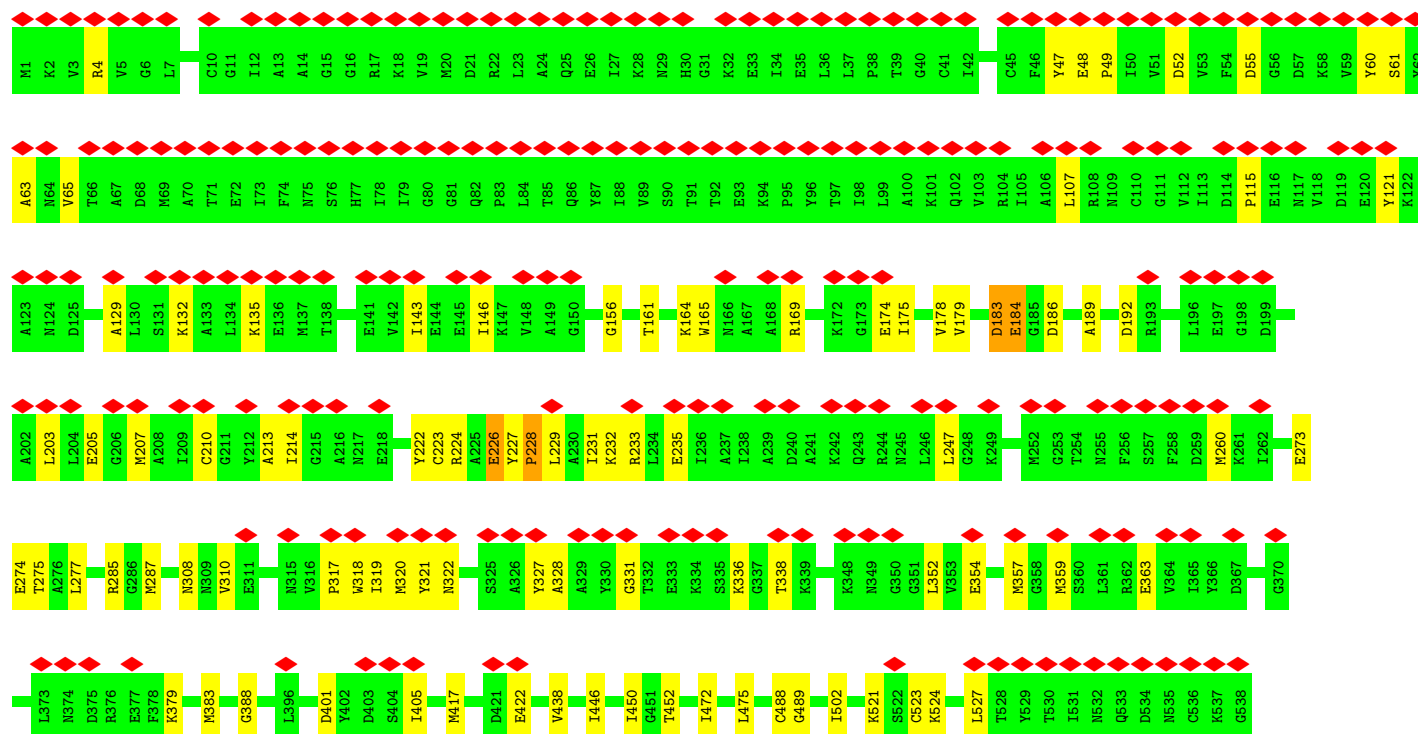
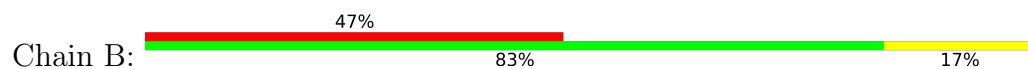




• Molecule 1: NAD-dependent formate dehydrogenase gamma subunit

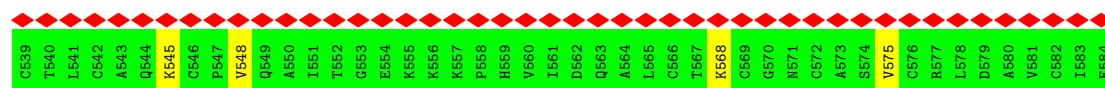
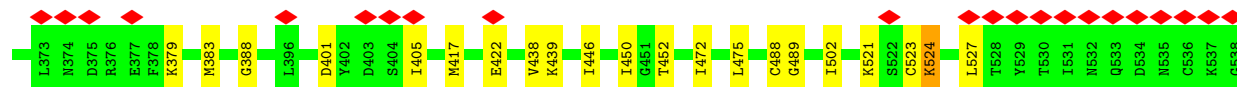
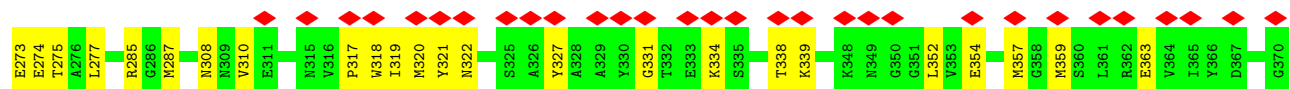
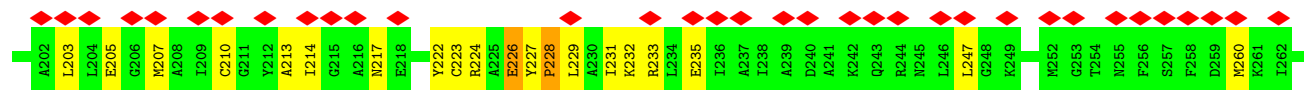
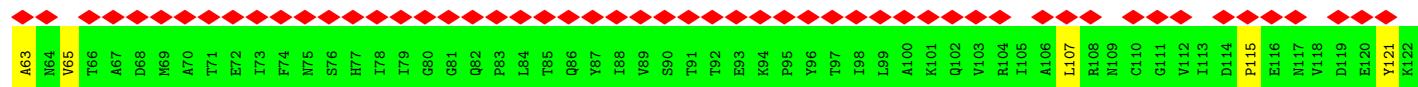
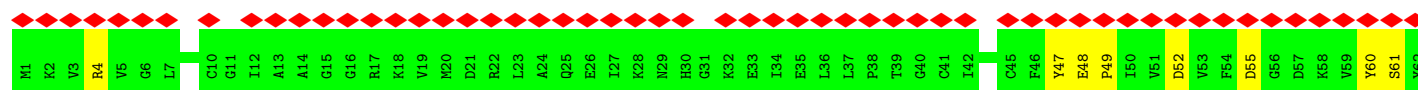
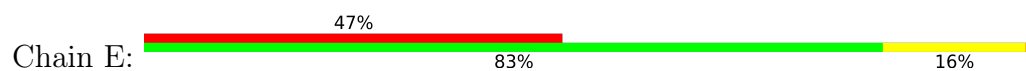


• Molecule 2: NAD-reducing hydrogenase subunit HoxF

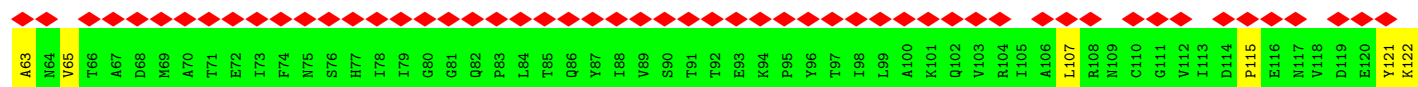
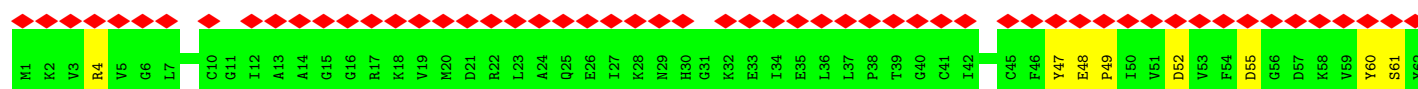
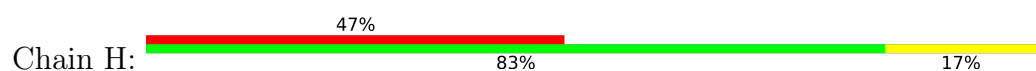


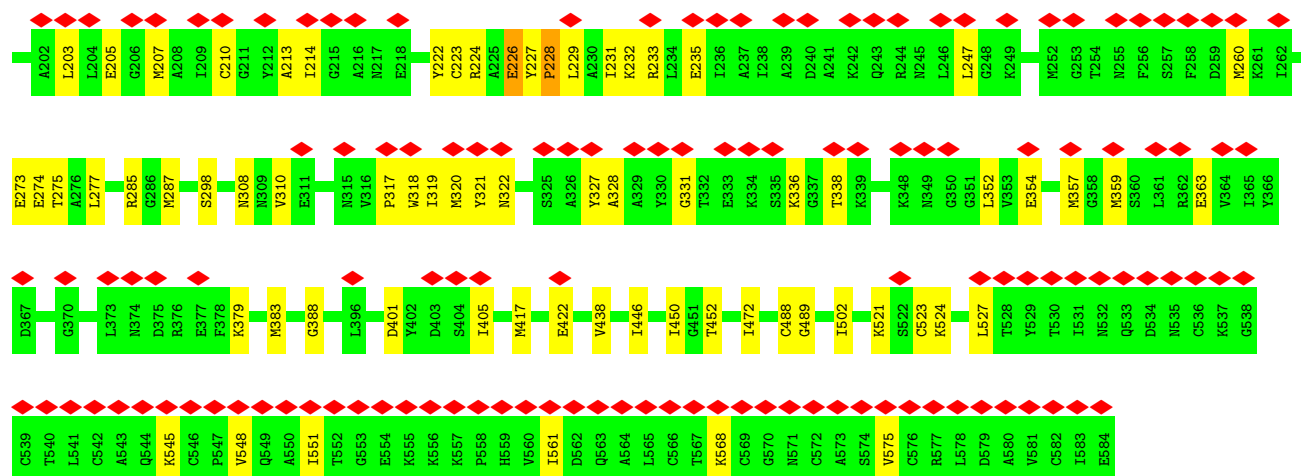


• Molecule 2: NAD-reducing hydrogenase subunit HoxF

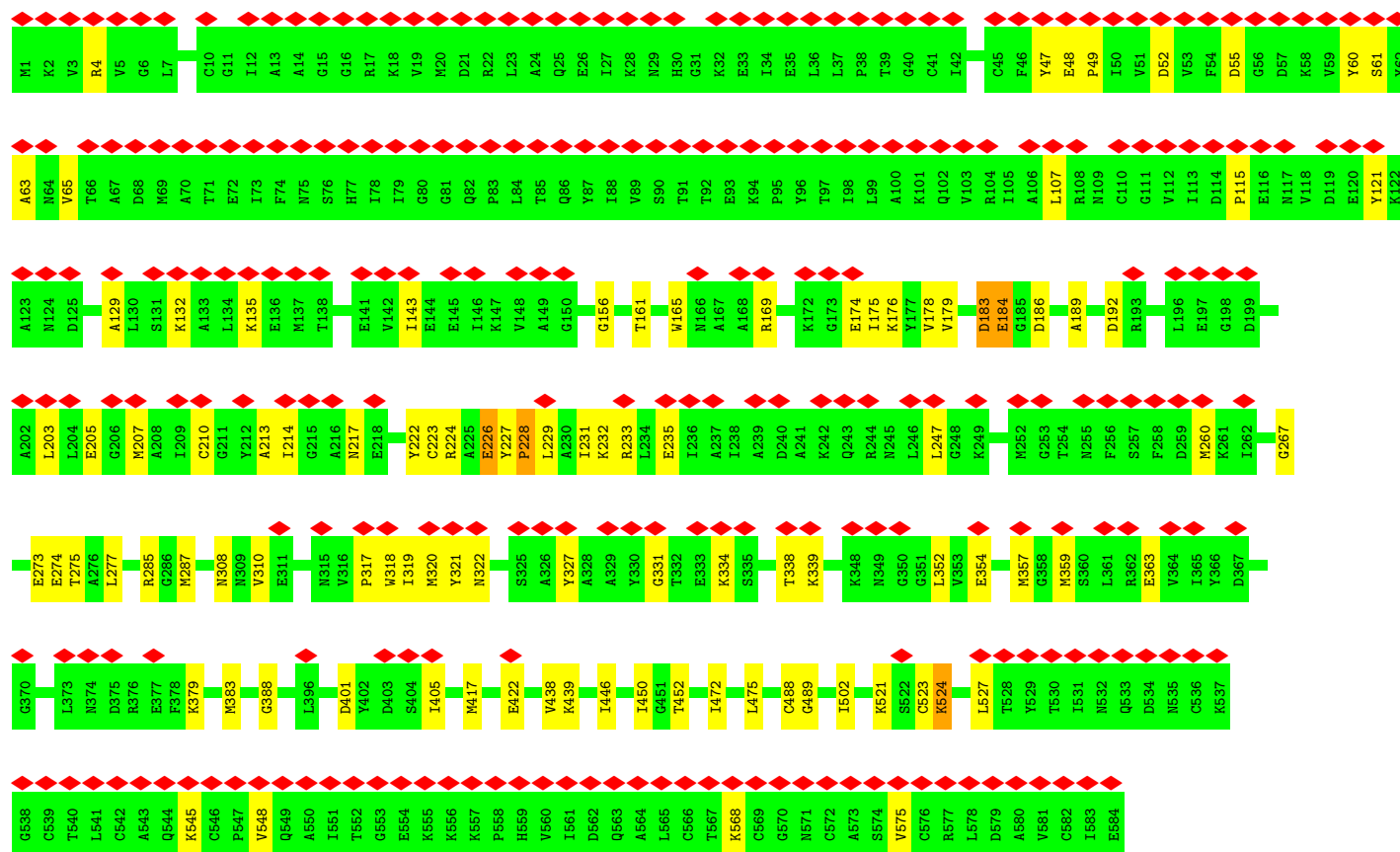
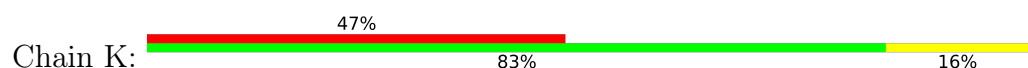


• Molecule 2: NAD-reducing hydrogenase subunit HoxF

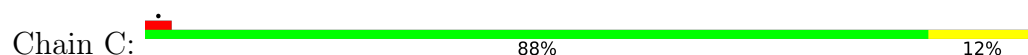


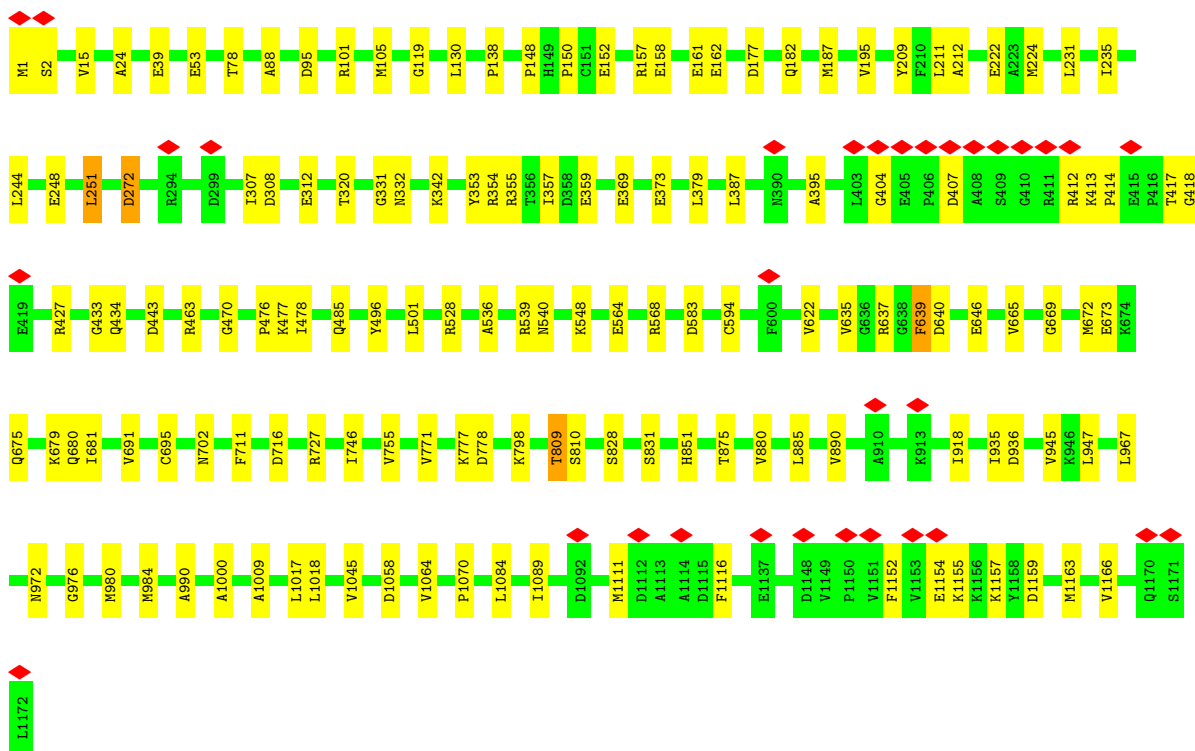


• Molecule 2: NAD-reducing hydrogenase subunit HoxF

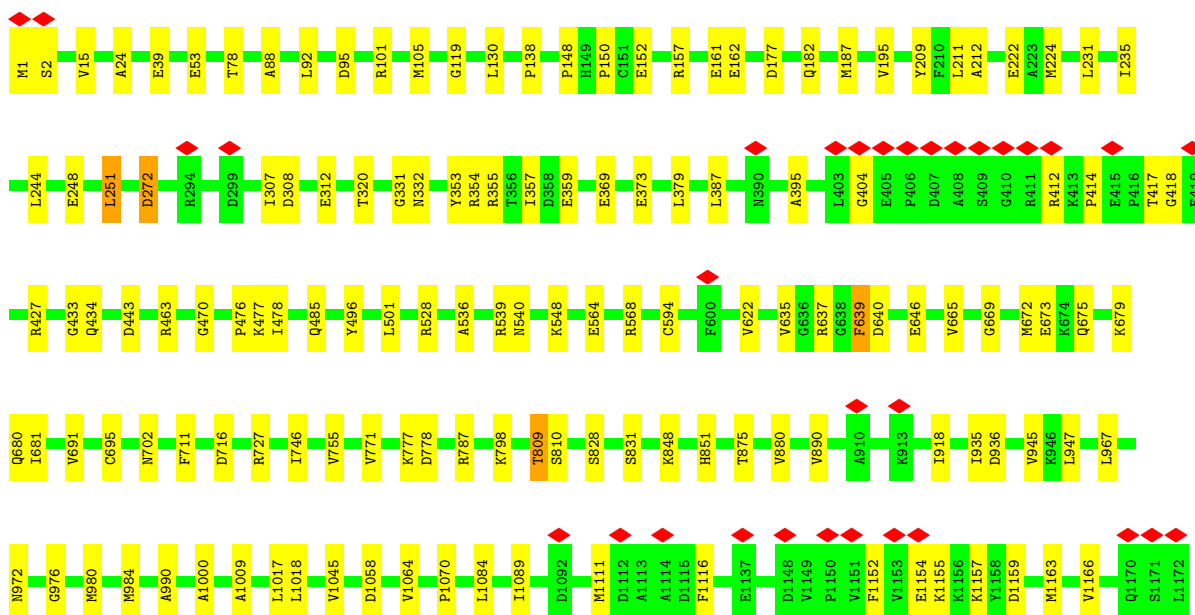
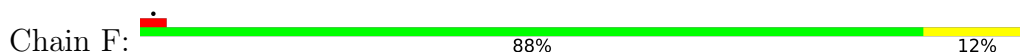


• Molecule 3: Formate dehydrogenase-O, major subunit

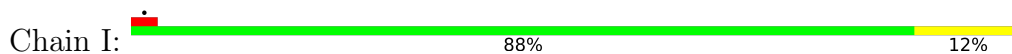


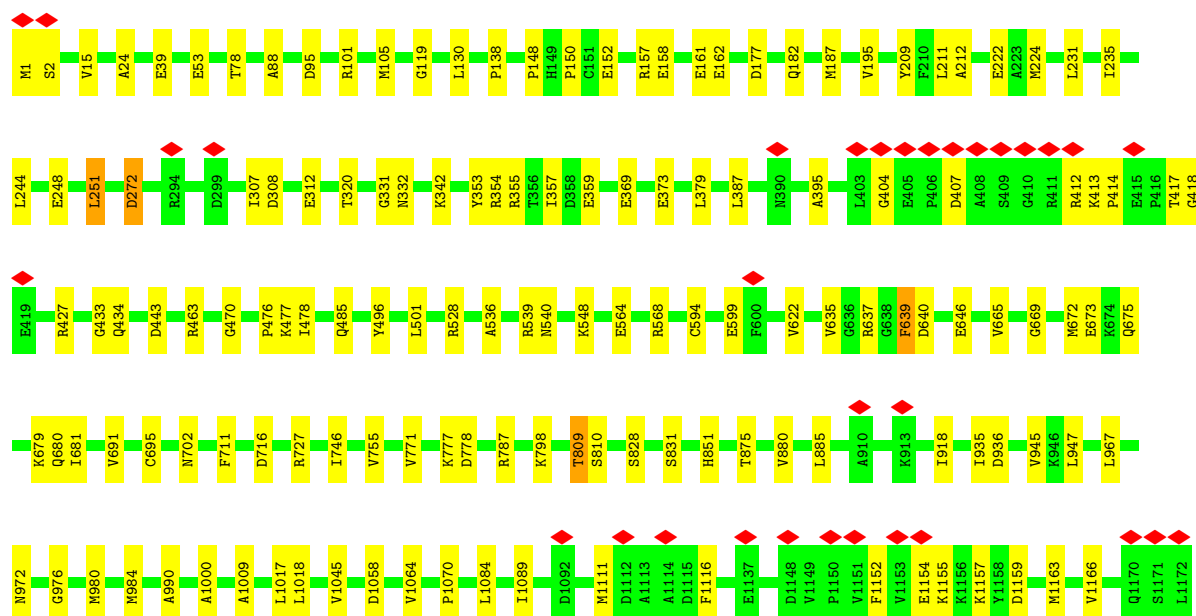


• Molecule 3: Formate dehydrogenase-O, major subunit



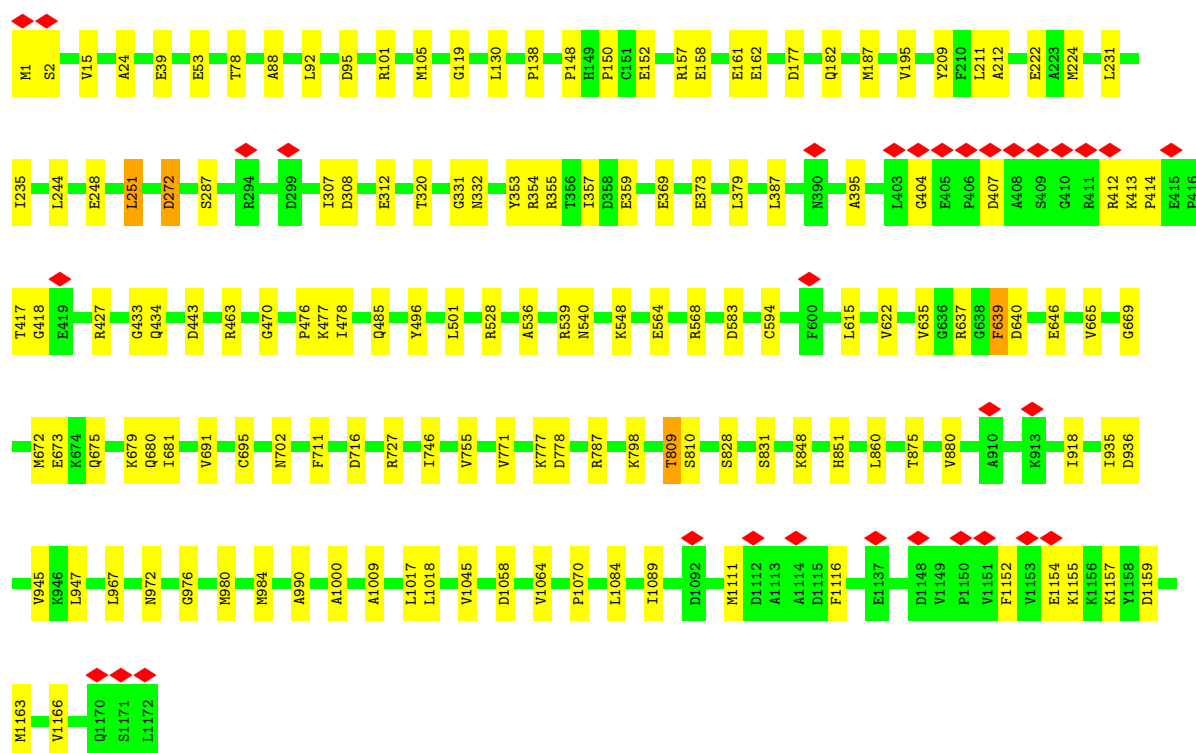
• Molecule 3: Formate dehydrogenase-O, major subunit





• Molecule 3: Formate dehydrogenase-O, major subunit

Chain L: 87% 12%



## 4 Experimental information

| Property                             | Value                                   | Source    |
|--------------------------------------|-----------------------------------------|-----------|
| EM reconstruction method             | SINGLE PARTICLE                         | Depositor |
| Imposed symmetry                     | POINT, Not provided                     |           |
| Number of particles used             | 54596                                   | Depositor |
| Resolution determination method      | FSC 0.143 CUT-OFF                       | Depositor |
| CTF correction method                | PHASE FLIPPING AND AMPLITUDE CORRECTION | Depositor |
| Microscope                           | FEI TITAN KRIOS                         | Depositor |
| Voltage (kV)                         | 300                                     | Depositor |
| Electron dose ( $e^-/\text{\AA}^2$ ) | 50                                      | Depositor |
| Minimum defocus (nm)                 | 800                                     | Depositor |
| Maximum defocus (nm)                 | 2000                                    | Depositor |
| Magnification                        | Not provided                            |           |
| Image detector                       | GATAN K2 SUMMIT (4k x 4k)               | Depositor |
| Maximum map value                    | 1.749                                   | Depositor |
| Minimum map value                    | -1.096                                  | Depositor |
| Average map value                    | 0.001                                   | Depositor |
| Map value standard deviation         | 0.054                                   | Depositor |
| Recommended contour level            | 0.164                                   | Depositor |
| Map size ( $\text{\AA}$ )            | 340.0, 340.0, 340.0                     | wwPDB     |
| Map dimensions                       | 400, 400, 400                           | wwPDB     |
| Map angles ( $^\circ$ )              | 90.0, 90.0, 90.0                        | wwPDB     |
| Pixel spacing ( $\text{\AA}$ )       | 0.85, 0.85, 0.85                        | Depositor |

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FMN, FAD, FES, NAD, SF4, ZN, NDP

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).

| Mol | Chain | Bond lengths |             | Bond angles |                 |
|-----|-------|--------------|-------------|-------------|-----------------|
|     |       | RMSZ         | $\# Z  > 5$ | RMSZ        | $\# Z  > 5$     |
| 1   | A     | 0.18         | 0/1135      | 0.49        | 2/1540 (0.1%)   |
| 1   | D     | 0.18         | 0/1135      | 0.50        | 2/1540 (0.1%)   |
| 1   | G     | 0.18         | 0/1135      | 0.50        | 2/1540 (0.1%)   |
| 1   | J     | 0.18         | 0/1135      | 0.50        | 2/1540 (0.1%)   |
| 2   | B     | 0.23         | 0/4508      | 0.49        | 3/6074 (0.0%)   |
| 2   | E     | 0.23         | 0/4508      | 0.49        | 3/6074 (0.0%)   |
| 2   | H     | 0.23         | 0/4508      | 0.49        | 3/6074 (0.0%)   |
| 2   | K     | 0.23         | 0/4508      | 0.49        | 3/6074 (0.0%)   |
| 3   | C     | 0.23         | 0/8981      | 0.39        | 0/12161         |
| 3   | F     | 0.23         | 0/8981      | 0.39        | 0/12161         |
| 3   | I     | 0.23         | 0/8981      | 0.39        | 0/12161         |
| 3   | L     | 0.23         | 0/8981      | 0.39        | 0/12161         |
| All | All   | 0.23         | 0/58496     | 0.43        | 20/79100 (0.0%) |

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

| Mol | Chain | #Chirality outliers | #Planarity outliers |
|-----|-------|---------------------|---------------------|
| 2   | B     | 0                   | 1                   |
| 2   | E     | 0                   | 1                   |
| 2   | H     | 0                   | 1                   |
| 2   | K     | 0                   | 1                   |
| All | All   | 0                   | 4                   |

There are no bond length outliers.

All (20) bond angle outliers are listed below:

| Mol | Chain | Res | Type | Atoms  | Z     | Observed(°) | Ideal(°) |
|-----|-------|-----|------|--------|-------|-------------|----------|
| 2   | K     | 226 | GLU  | N-CA-C | -7.12 | 104.96      | 112.93   |
| 2   | B     | 226 | GLU  | N-CA-C | -7.11 | 104.97      | 112.93   |
| 2   | E     | 226 | GLU  | N-CA-C | -7.08 | 105.00      | 112.93   |
| 2   | H     | 226 | GLU  | N-CA-C | -7.06 | 105.02      | 112.93   |
| 1   | D     | 76  | PHE  | CA-C-N | 5.70  | 132.42      | 121.54   |
| 1   | D     | 76  | PHE  | C-N-CA | 5.70  | 132.42      | 121.54   |
| 1   | A     | 76  | PHE  | CA-C-N | 5.69  | 132.41      | 121.54   |
| 1   | A     | 76  | PHE  | C-N-CA | 5.69  | 132.41      | 121.54   |
| 1   | G     | 76  | PHE  | CA-C-N | 5.69  | 132.41      | 121.54   |
| 1   | G     | 76  | PHE  | C-N-CA | 5.69  | 132.41      | 121.54   |
| 1   | J     | 76  | PHE  | CA-C-N | 5.69  | 132.41      | 121.54   |
| 1   | J     | 76  | PHE  | C-N-CA | 5.69  | 132.41      | 121.54   |
| 2   | E     | 523 | CYS  | CA-C-N | 5.18  | 134.44      | 121.80   |
| 2   | E     | 523 | CYS  | C-N-CA | 5.18  | 134.44      | 121.80   |
| 2   | B     | 523 | CYS  | CA-C-N | 5.17  | 134.41      | 121.80   |
| 2   | B     | 523 | CYS  | C-N-CA | 5.17  | 134.41      | 121.80   |
| 2   | H     | 523 | CYS  | CA-C-N | 5.16  | 134.40      | 121.80   |
| 2   | H     | 523 | CYS  | C-N-CA | 5.16  | 134.40      | 121.80   |
| 2   | K     | 523 | CYS  | CA-C-N | 5.15  | 134.37      | 121.80   |
| 2   | K     | 523 | CYS  | C-N-CA | 5.15  | 134.37      | 121.80   |

There are no chirality outliers.

All (4) planarity outliers are listed below:

| Mol | Chain | Res | Type | Group     |
|-----|-------|-----|------|-----------|
| 2   | B     | 224 | ARG  | Sidechain |
| 2   | E     | 224 | ARG  | Sidechain |
| 2   | H     | 224 | ARG  | Sidechain |
| 2   | K     | 224 | ARG  | Sidechain |

## 5.2 Too-close contacts [i](#)

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     | 1118  | 0        | 1148     | 20      | 0            |
| 1   | D     | 1118  | 0        | 1148     | 20      | 0            |
| 1   | G     | 1118  | 0        | 1148     | 21      | 0            |
| 1   | J     | 1118  | 0        | 1148     | 21      | 0            |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 2   | B     | 4431  | 0        | 4443     | 65      | 0            |
| 2   | E     | 4431  | 0        | 4443     | 68      | 0            |
| 2   | H     | 4431  | 0        | 4443     | 65      | 0            |
| 2   | K     | 4431  | 0        | 4443     | 68      | 0            |
| 3   | C     | 8846  | 0        | 8905     | 94      | 0            |
| 3   | F     | 8846  | 0        | 8905     | 93      | 0            |
| 3   | I     | 8846  | 0        | 8905     | 96      | 0            |
| 3   | L     | 8846  | 0        | 8905     | 97      | 0            |
| 4   | A     | 4     | 0        | 0        | 0       | 0            |
| 4   | B     | 4     | 0        | 0        | 0       | 0            |
| 4   | C     | 4     | 0        | 0        | 0       | 0            |
| 4   | D     | 4     | 0        | 0        | 0       | 0            |
| 4   | E     | 4     | 0        | 0        | 0       | 0            |
| 4   | F     | 4     | 0        | 0        | 0       | 0            |
| 4   | G     | 4     | 0        | 0        | 0       | 0            |
| 4   | H     | 4     | 0        | 0        | 0       | 0            |
| 4   | I     | 4     | 0        | 0        | 0       | 0            |
| 4   | J     | 4     | 0        | 0        | 0       | 0            |
| 4   | K     | 4     | 0        | 0        | 0       | 0            |
| 4   | L     | 4     | 0        | 0        | 0       | 0            |
| 5   | B     | 1     | 0        | 0        | 0       | 0            |
| 5   | E     | 1     | 0        | 0        | 0       | 0            |
| 5   | H     | 1     | 0        | 0        | 0       | 0            |
| 5   | K     | 1     | 0        | 0        | 0       | 0            |
| 6   | B     | 31    | 0        | 19       | 3       | 0            |
| 6   | E     | 31    | 0        | 19       | 4       | 0            |
| 6   | H     | 31    | 0        | 19       | 3       | 0            |
| 6   | K     | 31    | 0        | 19       | 5       | 0            |
| 7   | B     | 24    | 0        | 0        | 2       | 0            |
| 7   | C     | 48    | 0        | 0        | 1       | 0            |
| 7   | E     | 24    | 0        | 0        | 2       | 0            |
| 7   | F     | 48    | 0        | 0        | 1       | 0            |
| 7   | H     | 24    | 0        | 0        | 2       | 0            |
| 7   | I     | 48    | 0        | 0        | 1       | 0            |
| 7   | K     | 24    | 0        | 0        | 2       | 0            |
| 7   | L     | 48    | 0        | 0        | 1       | 0            |
| 8   | B     | 44    | 0        | 26       | 3       | 0            |
| 8   | E     | 44    | 0        | 26       | 3       | 0            |
| 8   | H     | 44    | 0        | 26       | 3       | 0            |
| 8   | K     | 44    | 0        | 26       | 3       | 0            |
| 9   | C     | 53    | 0        | 31       | 0       | 0            |
| 9   | F     | 53    | 0        | 31       | 1       | 0            |

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| Mol | Chain | Non-H | H(model) | H(added) | Clashes | Symm-Clashes |
|-----|-------|-------|----------|----------|---------|--------------|
| 9   | I     | 53    | 0        | 31       | 0       | 0            |
| 9   | L     | 53    | 0        | 31       | 1       | 0            |
| 10  | C     | 48    | 0        | 26       | 6       | 0            |
| 10  | F     | 48    | 0        | 26       | 6       | 0            |
| 10  | I     | 48    | 0        | 26       | 6       | 0            |
| 10  | L     | 48    | 0        | 26       | 6       | 0            |
| All | All   | 58624 | 0        | 58392    | 714     | 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 6.

All (714) 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) |
|------------------|-------------------|--------------------------|-------------------|
| 2:B:184:GLU:HG3  | 2:B:192:ASP:HB2   | 1.45                     | 0.97              |
| 2:K:184:GLU:HG3  | 2:K:192:ASP:HB2   | 1.45                     | 0.97              |
| 2:E:184:GLU:HG3  | 2:E:192:ASP:HB2   | 1.45                     | 0.97              |
| 2:H:184:GLU:HG3  | 2:H:192:ASP:HB2   | 1.45                     | 0.97              |
| 1:J:154:LEU:HD21 | 1:J:159:VAL:HB    | 1.67                     | 0.76              |
| 1:D:154:LEU:HD21 | 1:D:159:VAL:HB    | 1.67                     | 0.75              |
| 1:G:154:LEU:HD21 | 1:G:159:VAL:HB    | 1.67                     | 0.74              |
| 1:A:154:LEU:HD21 | 1:A:159:VAL:HB    | 1.67                     | 0.73              |
| 2:B:156:GLY:HA3  | 8:B:606:NAD:H2N   | 1.73                     | 0.71              |
| 2:H:156:GLY:HA3  | 8:H:606:NAD:H2N   | 1.73                     | 0.71              |
| 2:B:285:ARG:HE   | 2:B:287:MET:HE3   | 1.56                     | 0.71              |
| 2:H:285:ARG:HE   | 2:H:287:MET:HE3   | 1.56                     | 0.71              |
| 3:F:332:ASN:ND2  | 10:F:1203:NDP:O7N | 2.22                     | 0.71              |
| 3:L:332:ASN:ND2  | 10:L:1203:NDP:O7N | 2.22                     | 0.71              |
| 2:K:156:GLY:HA3  | 8:K:606:NAD:H2N   | 1.73                     | 0.71              |
| 2:E:156:GLY:HA3  | 8:E:606:NAD:H2N   | 1.73                     | 0.71              |
| 2:E:285:ARG:HE   | 2:E:287:MET:HE3   | 1.56                     | 0.69              |
| 2:K:285:ARG:HE   | 2:K:287:MET:HE3   | 1.56                     | 0.69              |
| 2:B:227:TYR:O    | 2:B:231:ILE:HG12  | 1.93                     | 0.69              |
| 2:H:227:TYR:O    | 2:H:231:ILE:HG12  | 1.93                     | 0.69              |
| 2:E:227:TYR:O    | 2:E:231:ILE:HG12  | 1.93                     | 0.68              |
| 2:K:227:TYR:O    | 2:K:231:ILE:HG12  | 1.93                     | 0.68              |
| 2:B:174:GLU:HG2  | 2:B:175:ILE:HG13  | 1.74                     | 0.68              |
| 2:H:174:GLU:HG2  | 2:H:175:ILE:HG13  | 1.74                     | 0.68              |
| 3:L:331:GLY:HA3  | 10:L:1203:NDP:H1D | 1.77                     | 0.67              |
| 3:F:331:GLY:HA3  | 10:F:1203:NDP:H1D | 1.77                     | 0.67              |
| 3:L:244:LEU:O    | 3:L:248:GLU:HG3   | 1.94                     | 0.67              |

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| Atom-1          | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-------------------|--------------------------|-------------------|
| 2:E:174:GLU:HG2 | 2:E:175:ILE:HG13  | 1.74                     | 0.67              |
| 3:F:244:LEU:O   | 3:F:248:GLU:HG3   | 1.94                     | 0.67              |
| 3:C:369:GLU:HG2 | 3:C:539:ARG:HH12  | 1.60                     | 0.67              |
| 3:I:332:ASN:ND2 | 10:I:1203:NDP:O7N | 2.22                     | 0.67              |
| 2:K:174:GLU:HG2 | 2:K:175:ILE:HG13  | 1.74                     | 0.67              |
| 2:B:260:MET:HA  | 2:B:260:MET:HE3   | 1.76                     | 0.67              |
| 3:I:369:GLU:HG2 | 3:I:539:ARG:HH12  | 1.60                     | 0.67              |
| 2:H:260:MET:HE3 | 2:H:260:MET:HA    | 1.76                     | 0.66              |
| 3:I:331:GLY:HA3 | 10:I:1203:NDP:H1D | 1.77                     | 0.66              |
| 3:C:331:GLY:HA3 | 10:C:1203:NDP:H1D | 1.77                     | 0.66              |
| 3:C:332:ASN:ND2 | 10:C:1203:NDP:O7N | 2.22                     | 0.66              |
| 2:E:260:MET:HE3 | 2:E:260:MET:HA    | 1.76                     | 0.66              |
| 3:C:244:LEU:O   | 3:C:248:GLU:HG3   | 1.94                     | 0.66              |
| 2:K:260:MET:HE3 | 2:K:260:MET:HA    | 1.76                     | 0.66              |
| 3:I:244:LEU:O   | 3:I:248:GLU:HG3   | 1.94                     | 0.66              |
| 2:E:226:GLU:C   | 2:E:228:PRO:HD3   | 2.21                     | 0.65              |
| 2:K:226:GLU:C   | 2:K:228:PRO:HD3   | 2.22                     | 0.65              |
| 3:F:369:GLU:HG2 | 3:F:539:ARG:HH12  | 1.60                     | 0.65              |
| 3:L:369:GLU:HG2 | 3:L:539:ARG:HH12  | 1.60                     | 0.65              |
| 1:A:68:ALA:HB2  | 3:C:646:GLU:HG2   | 1.79                     | 0.65              |
| 3:C:187:MET:HE3 | 3:C:212:ALA:O     | 1.97                     | 0.65              |
| 3:I:187:MET:HE3 | 3:I:212:ALA:O     | 1.97                     | 0.65              |
| 3:C:354:ARG:NH1 | 10:C:1203:NDP:O3X | 2.30                     | 0.65              |
| 3:F:152:GLU:OE1 | 3:F:528:ARG:NH2   | 2.30                     | 0.65              |
| 1:G:68:ALA:HB2  | 3:I:646:GLU:HG2   | 1.79                     | 0.65              |
| 3:L:152:GLU:OE1 | 3:L:528:ARG:NH2   | 2.30                     | 0.65              |
| 1:D:68:ALA:HB2  | 3:F:646:GLU:HG2   | 1.79                     | 0.65              |
| 3:I:354:ARG:NH1 | 10:I:1203:NDP:O3X | 2.30                     | 0.65              |
| 1:J:68:ALA:HB2  | 3:L:646:GLU:HG2   | 1.79                     | 0.65              |
| 3:F:354:ARG:NH1 | 10:F:1203:NDP:O3X | 2.30                     | 0.64              |
| 3:L:354:ARG:NH1 | 10:L:1203:NDP:O3X | 2.30                     | 0.64              |
| 2:B:285:ARG:HE  | 2:B:287:MET:CE    | 2.10                     | 0.64              |
| 2:H:226:GLU:C   | 2:H:228:PRO:HD3   | 2.21                     | 0.64              |
| 2:H:285:ARG:HE  | 2:H:287:MET:CE    | 2.10                     | 0.64              |
| 3:C:152:GLU:OE1 | 3:C:528:ARG:NH2   | 2.30                     | 0.64              |
| 3:F:695:CYS:SG  | 3:F:727:ARG:NH2   | 2.71                     | 0.64              |
| 3:I:152:GLU:OE1 | 3:I:528:ARG:NH2   | 2.30                     | 0.64              |
| 2:K:285:ARG:HE  | 2:K:287:MET:CE    | 2.10                     | 0.64              |
| 3:L:695:CYS:SG  | 3:L:727:ARG:NH2   | 2.71                     | 0.64              |
| 2:B:226:GLU:C   | 2:B:228:PRO:HD3   | 2.22                     | 0.64              |
| 2:E:285:ARG:HE  | 2:E:287:MET:CE    | 2.10                     | 0.64              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 3:C:355:ARG:HD3  | 3:C:359:GLU:HG2   | 1.81                     | 0.63              |
| 3:I:355:ARG:HD3  | 3:I:359:GLU:HG2   | 1.81                     | 0.63              |
| 3:L:187:MET:HE3  | 3:L:212:ALA:O     | 1.97                     | 0.63              |
| 3:L:355:ARG:HD3  | 3:L:359:GLU:HG2   | 1.80                     | 0.63              |
| 3:F:187:MET:HE3  | 3:F:212:ALA:O     | 1.97                     | 0.63              |
| 3:F:355:ARG:HD3  | 3:F:359:GLU:HG2   | 1.81                     | 0.63              |
| 2:B:107:LEU:HD11 | 2:B:352:LEU:HD22  | 1.81                     | 0.62              |
| 3:C:695:CYS:SG   | 3:C:727:ARG:NH2   | 2.71                     | 0.62              |
| 2:H:107:LEU:HD11 | 2:H:352:LEU:HD22  | 1.81                     | 0.62              |
| 2:K:107:LEU:HD11 | 2:K:352:LEU:HD22  | 1.81                     | 0.62              |
| 2:E:107:LEU:HD11 | 2:E:352:LEU:HD22  | 1.81                     | 0.62              |
| 3:I:695:CYS:SG   | 3:I:727:ARG:NH2   | 2.71                     | 0.62              |
| 2:B:357:MET:N    | 2:B:357:MET:SD    | 2.67                     | 0.62              |
| 2:H:357:MET:SD   | 2:H:357:MET:N     | 2.67                     | 0.61              |
| 3:F:477:LYS:O    | 10:F:1203:NDP:N7N | 2.34                     | 0.61              |
| 3:L:477:LYS:O    | 10:L:1203:NDP:N7N | 2.34                     | 0.61              |
| 1:A:77:TYR:O     | 1:A:79:GLN:N      | 2.34                     | 0.60              |
| 1:G:77:TYR:O     | 1:G:79:GLN:N      | 2.34                     | 0.60              |
| 3:C:477:LYS:O    | 10:C:1203:NDP:N7N | 2.34                     | 0.60              |
| 1:J:77:TYR:O     | 1:J:79:GLN:N      | 2.34                     | 0.60              |
| 1:D:77:TYR:O     | 1:D:79:GLN:N      | 2.34                     | 0.60              |
| 3:F:470:GLY:N    | 3:F:485:GLN:OE1   | 2.33                     | 0.60              |
| 3:I:477:LYS:O    | 10:I:1203:NDP:N7N | 2.34                     | 0.60              |
| 3:L:470:GLY:N    | 3:L:485:GLN:OE1   | 2.33                     | 0.60              |
| 3:C:496:TYR:HB2  | 3:C:501:LEU:HD13  | 1.84                     | 0.59              |
| 3:I:496:TYR:HB2  | 3:I:501:LEU:HD13  | 1.84                     | 0.59              |
| 3:F:880:VAL:HG12 | 3:F:918:ILE:HG21  | 1.83                     | 0.59              |
| 3:I:880:VAL:HG12 | 3:I:918:ILE:HG21  | 1.83                     | 0.59              |
| 2:K:331:GLY:HA3  | 2:K:357:MET:SD    | 2.43                     | 0.59              |
| 3:L:880:VAL:HG12 | 3:L:918:ILE:HG21  | 1.83                     | 0.59              |
| 3:C:880:VAL:HG12 | 3:C:918:ILE:HG21  | 1.83                     | 0.59              |
| 2:E:331:GLY:HA3  | 2:E:357:MET:SD    | 2.43                     | 0.59              |
| 3:F:222:GLU:HG3  | 3:F:224:MET:H     | 1.66                     | 0.59              |
| 3:L:222:GLU:HG3  | 3:L:224:MET:H     | 1.66                     | 0.59              |
| 2:B:331:GLY:HA3  | 2:B:357:MET:SD    | 2.43                     | 0.59              |
| 2:H:331:GLY:HA3  | 2:H:357:MET:SD    | 2.43                     | 0.59              |
| 3:C:222:GLU:HG3  | 3:C:224:MET:H     | 1.66                     | 0.59              |
| 2:E:228:PRO:O    | 2:E:229:LEU:C     | 2.46                     | 0.59              |
| 1:D:38:ILE:O     | 1:D:42:GLN:HG3    | 2.03                     | 0.58              |
| 1:J:38:ILE:O     | 1:J:42:GLN:HG3    | 2.03                     | 0.58              |
| 2:K:228:PRO:O    | 2:K:229:LEU:C     | 2.46                     | 0.58              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 3:I:222:GLU:HG3  | 3:I:224:MET:H    | 1.66                     | 0.58              |
| 3:F:496:TYR:HB2  | 3:F:501:LEU:HD13 | 1.84                     | 0.58              |
| 3:L:496:TYR:HB2  | 3:L:501:LEU:HD13 | 1.84                     | 0.58              |
| 1:A:38:ILE:O     | 1:A:42:GLN:HG3   | 2.03                     | 0.58              |
| 1:G:38:ILE:O     | 1:G:42:GLN:HG3   | 2.03                     | 0.58              |
| 2:H:132:LYS:NZ   | 2:H:321:TYR:O    | 2.34                     | 0.58              |
| 2:B:132:LYS:NZ   | 2:B:321:TYR:O    | 2.34                     | 0.58              |
| 2:E:228:PRO:O    | 2:E:231:ILE:N    | 2.37                     | 0.58              |
| 2:E:357:MET:SD   | 2:E:357:MET:N    | 2.67                     | 0.58              |
| 2:K:228:PRO:O    | 2:K:231:ILE:N    | 2.37                     | 0.58              |
| 2:B:450:ILE:HA   | 3:C:639:PHE:HE2  | 1.68                     | 0.58              |
| 2:H:450:ILE:HA   | 3:I:639:PHE:HE2  | 1.69                     | 0.58              |
| 3:C:470:GLY:N    | 3:C:485:GLN:OE1  | 2.33                     | 0.57              |
| 3:I:777:LYS:NZ   | 3:I:778:ASP:OD2  | 2.37                     | 0.57              |
| 3:C:777:LYS:NZ   | 3:C:778:ASP:OD2  | 2.37                     | 0.57              |
| 2:E:472:ILE:HG23 | 2:E:502:ILE:HD11 | 1.85                     | 0.57              |
| 2:H:472:ILE:HG23 | 2:H:502:ILE:HD11 | 1.85                     | 0.57              |
| 3:I:470:GLY:N    | 3:I:485:GLN:OE1  | 2.33                     | 0.57              |
| 2:K:203:LEU:HD13 | 2:K:310:VAL:HG13 | 1.85                     | 0.57              |
| 2:K:357:MET:SD   | 2:K:357:MET:N    | 2.67                     | 0.57              |
| 2:K:472:ILE:HG23 | 2:K:502:ILE:HD11 | 1.85                     | 0.57              |
| 2:B:472:ILE:HG23 | 2:B:502:ILE:HD11 | 1.85                     | 0.57              |
| 2:E:203:LEU:HD13 | 2:E:310:VAL:HG13 | 1.85                     | 0.57              |
| 3:F:777:LYS:NZ   | 3:F:778:ASP:OD2  | 2.37                     | 0.57              |
| 2:H:203:LEU:HD13 | 2:H:310:VAL:HG13 | 1.85                     | 0.57              |
| 2:B:228:PRO:O    | 2:B:229:LEU:C    | 2.46                     | 0.57              |
| 3:L:777:LYS:NZ   | 3:L:778:ASP:OD2  | 2.37                     | 0.57              |
| 2:B:183:ASP:OD2  | 2:B:183:ASP:N    | 2.37                     | 0.57              |
| 2:B:203:LEU:HD13 | 2:B:310:VAL:HG13 | 1.85                     | 0.57              |
| 2:H:228:PRO:O    | 2:H:231:ILE:N    | 2.37                     | 0.57              |
| 2:H:183:ASP:OD2  | 2:H:183:ASP:N    | 2.37                     | 0.57              |
| 2:B:228:PRO:O    | 2:B:231:ILE:N    | 2.37                     | 0.57              |
| 2:E:48:GLU:HG3   | 2:E:49:PRO:HA    | 1.87                     | 0.57              |
| 2:H:228:PRO:O    | 2:H:229:LEU:C    | 2.46                     | 0.57              |
| 2:K:48:GLU:HG3   | 2:K:49:PRO:HA    | 1.87                     | 0.57              |
| 2:K:132:LYS:NZ   | 2:K:321:TYR:O    | 2.34                     | 0.56              |
| 2:K:273:GLU:OE1  | 2:K:275:THR:OG1  | 2.23                     | 0.56              |
| 2:B:273:GLU:OE1  | 2:B:275:THR:OG1  | 2.23                     | 0.56              |
| 2:E:132:LYS:NZ   | 2:E:321:TYR:O    | 2.34                     | 0.56              |
| 2:E:161:THR:O    | 2:E:165:TRP:N    | 2.32                     | 0.56              |
| 2:E:183:ASP:OD2  | 2:E:183:ASP:N    | 2.37                     | 0.56              |

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| Atom-1            | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|------------------|--------------------------|-------------------|
| 2:E:273:GLU:OE1   | 2:E:275:THR:OG1  | 2.23                     | 0.56              |
| 2:H:273:GLU:OE1   | 2:H:275:THR:OG1  | 2.23                     | 0.56              |
| 3:F:308:ASP:O     | 3:F:312:GLU:HG3  | 2.06                     | 0.56              |
| 2:K:161:THR:O     | 2:K:165:TRP:N    | 2.32                     | 0.56              |
| 2:K:183:ASP:N     | 2:K:183:ASP:OD2  | 2.37                     | 0.56              |
| 3:L:308:ASP:O     | 3:L:312:GLU:HG3  | 2.06                     | 0.56              |
| 3:F:1045:VAL:HG11 | 3:F:1070:PRO:HB3 | 1.88                     | 0.56              |
| 3:C:404:GLY:O     | 3:C:412:ARG:NE   | 2.38                     | 0.56              |
| 2:E:450:ILE:HA    | 3:F:639:PHE:HE2  | 1.68                     | 0.56              |
| 2:K:450:ILE:HA    | 3:L:639:PHE:HE2  | 1.68                     | 0.56              |
| 3:L:1045:VAL:HG11 | 3:L:1070:PRO:HB3 | 1.88                     | 0.56              |
| 3:I:404:GLY:O     | 3:I:412:ARG:NE   | 2.38                     | 0.56              |
| 2:K:183:ASP:OD2   | 2:K:222:TYR:HD1  | 1.88                     | 0.56              |
| 2:B:183:ASP:OD2   | 2:B:222:TYR:HD1  | 1.88                     | 0.56              |
| 2:E:183:ASP:OD2   | 2:E:222:TYR:HD1  | 1.88                     | 0.56              |
| 3:C:1045:VAL:HG11 | 3:C:1070:PRO:HB3 | 1.88                     | 0.55              |
| 2:H:183:ASP:OD2   | 2:H:222:TYR:HD1  | 1.88                     | 0.55              |
| 3:L:976:GLY:O     | 3:L:980:MET:HG2  | 2.06                     | 0.55              |
| 3:C:308:ASP:O     | 3:C:312:GLU:HG3  | 2.06                     | 0.55              |
| 3:F:976:GLY:O     | 3:F:980:MET:HG2  | 2.06                     | 0.55              |
| 3:I:308:ASP:O     | 3:I:312:GLU:HG3  | 2.06                     | 0.55              |
| 3:I:1045:VAL:HG11 | 3:I:1070:PRO:HB3 | 1.88                     | 0.55              |
| 3:C:976:GLY:O     | 3:C:980:MET:HG2  | 2.06                     | 0.55              |
| 3:I:976:GLY:O     | 3:I:980:MET:HG2  | 2.06                     | 0.55              |
| 3:F:404:GLY:O     | 3:F:412:ARG:NE   | 2.38                     | 0.55              |
| 2:H:48:GLU:HG3    | 2:H:49:PRO:HA    | 1.87                     | 0.55              |
| 1:D:59:ILE:O      | 1:D:63:THR:OG1   | 2.25                     | 0.55              |
| 3:L:404:GLY:O     | 3:L:412:ARG:NE   | 2.38                     | 0.55              |
| 2:B:48:GLU:HG3    | 2:B:49:PRO:HA    | 1.87                     | 0.55              |
| 1:J:59:ILE:O      | 1:J:63:THR:OG1   | 2.25                     | 0.55              |
| 2:K:320:MET:HA    | 2:K:320:MET:HE2  | 1.90                     | 0.55              |
| 2:B:161:THR:O     | 2:B:165:TRP:N    | 2.32                     | 0.54              |
| 3:C:568:ARG:NH2   | 3:C:673:GLU:O    | 2.40                     | 0.54              |
| 2:E:320:MET:HE2   | 2:E:320:MET:HA   | 1.90                     | 0.54              |
| 1:G:59:ILE:O      | 1:G:63:THR:OG1   | 2.25                     | 0.54              |
| 2:H:161:THR:O     | 2:H:165:TRP:N    | 2.32                     | 0.54              |
| 1:A:59:ILE:O      | 1:A:63:THR:OG1   | 2.25                     | 0.54              |
| 3:I:568:ARG:NH2   | 3:I:673:GLU:O    | 2.40                     | 0.54              |
| 3:C:809:THR:OG1   | 3:C:810:SER:N    | 2.40                     | 0.54              |
| 3:I:809:THR:OG1   | 3:I:810:SER:N    | 2.40                     | 0.54              |
| 2:K:308:ASN:ND2   | 6:K:603:FMN:O1P  | 2.41                     | 0.54              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 3:L:434:GLN:HB2  | 3:L:476:PRO:HG3   | 1.90                     | 0.54              |
| 2:B:179:VAL:HG11 | 2:B:277:LEU:HD21  | 1.90                     | 0.54              |
| 2:E:308:ASN:ND2  | 6:E:603:FMN:O1P   | 2.41                     | 0.54              |
| 3:F:434:GLN:HB2  | 3:F:476:PRO:HG3   | 1.90                     | 0.54              |
| 3:F:809:THR:OG1  | 3:F:810:SER:N     | 2.40                     | 0.54              |
| 2:B:320:MET:HE2  | 2:B:320:MET:HA    | 1.90                     | 0.53              |
| 2:H:179:VAL:HG11 | 2:H:277:LEU:HD21  | 1.90                     | 0.53              |
| 2:H:320:MET:HE2  | 2:H:320:MET:HA    | 1.90                     | 0.53              |
| 3:L:809:THR:OG1  | 3:L:810:SER:N     | 2.40                     | 0.53              |
| 3:L:568:ARG:NH2  | 3:L:673:GLU:O     | 2.40                     | 0.53              |
| 3:C:434:GLN:HB2  | 3:C:476:PRO:HG3   | 1.90                     | 0.53              |
| 2:E:274:GLU:OE2  | 8:E:606:NAD:O2B   | 2.23                     | 0.53              |
| 3:F:568:ARG:NH2  | 3:F:673:GLU:O     | 2.40                     | 0.53              |
| 2:H:308:ASN:ND2  | 6:H:603:FMN:O1P   | 2.41                     | 0.53              |
| 3:I:434:GLN:HB2  | 3:I:476:PRO:HG3   | 1.90                     | 0.53              |
| 2:K:274:GLU:OE2  | 8:K:606:NAD:O2B   | 2.23                     | 0.53              |
| 2:B:308:ASN:ND2  | 6:B:603:FMN:O1P   | 2.41                     | 0.53              |
| 2:K:383:MET:O    | 2:K:388:GLY:HA3   | 2.09                     | 0.53              |
| 2:E:383:MET:O    | 2:E:388:GLY:HA3   | 2.09                     | 0.53              |
| 1:A:78:SER:HB3   | 3:C:637:ARG:HH12  | 1.74                     | 0.52              |
| 2:K:179:VAL:HG11 | 2:K:277:LEU:HD21  | 1.90                     | 0.52              |
| 1:D:78:SER:HB3   | 3:F:637:ARG:HH12  | 1.74                     | 0.52              |
| 2:E:179:VAL:HG11 | 2:E:277:LEU:HD21  | 1.90                     | 0.52              |
| 1:G:78:SER:HB3   | 3:I:637:ARG:HH12  | 1.74                     | 0.52              |
| 3:I:1:MET:HG2    | 3:I:2:SER:H       | 1.75                     | 0.52              |
| 3:C:1:MET:HG2    | 3:C:2:SER:H       | 1.75                     | 0.52              |
| 1:J:78:SER:HB3   | 3:L:637:ARG:HH12  | 1.74                     | 0.52              |
| 2:B:383:MET:O    | 2:B:388:GLY:HA3   | 2.09                     | 0.52              |
| 2:E:169:ARG:NH1  | 2:E:213:ALA:O     | 2.43                     | 0.52              |
| 2:H:383:MET:O    | 2:H:388:GLY:HA3   | 2.09                     | 0.52              |
| 2:K:169:ARG:NH1  | 2:K:213:ALA:O     | 2.43                     | 0.52              |
| 6:H:603:FMN:O2'  | 8:H:606:NAD:O2N   | 2.27                     | 0.52              |
| 6:B:603:FMN:O2'  | 8:B:606:NAD:O2N   | 2.27                     | 0.52              |
| 3:F:990:ALA:HA   | 3:F:1017:LEU:HD21 | 1.92                     | 0.52              |
| 3:L:990:ALA:HA   | 3:L:1017:LEU:HD21 | 1.92                     | 0.52              |
| 2:B:169:ARG:NH1  | 2:B:213:ALA:O     | 2.43                     | 0.52              |
| 2:H:169:ARG:NH1  | 2:H:213:ALA:O     | 2.43                     | 0.51              |
| 2:B:52:ASP:OD1   | 2:B:61:SER:OG     | 2.23                     | 0.51              |
| 3:L:702:ASN:ND2  | 3:L:716:ASP:OD1   | 2.42                     | 0.51              |
| 3:L:972:ASN:N    | 3:L:972:ASN:OD1   | 2.42                     | 0.51              |
| 3:F:669:GLY:O    | 3:F:672:MET:HE2   | 2.10                     | 0.51              |

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| Atom-1          | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-----------------|-------------------|--------------------------|-------------------|
| 3:F:702:ASN:ND2 | 3:F:716:ASP:OD1   | 2.42                     | 0.51              |
| 3:F:972:ASN:OD1 | 3:F:972:ASN:N     | 2.42                     | 0.51              |
| 3:L:669:GLY:O   | 3:L:672:MET:HE2   | 2.10                     | 0.51              |
| 2:H:52:ASP:OD1  | 2:H:61:SER:OG     | 2.23                     | 0.51              |
| 3:C:990:ALA:HA  | 3:C:1017:LEU:HD21 | 1.92                     | 0.51              |
| 3:I:990:ALA:HA  | 3:I:1017:LEU:HD21 | 1.92                     | 0.51              |
| 3:L:1:MET:HG2   | 3:L:2:SER:H       | 1.75                     | 0.51              |
| 6:E:603:FMN:O2' | 8:E:606:NAD:O2N   | 2.27                     | 0.51              |
| 3:F:1:MET:HG2   | 3:F:2:SER:H       | 1.75                     | 0.50              |
| 3:C:669:GLY:O   | 3:C:672:MET:HE2   | 2.11                     | 0.50              |
| 1:G:124:ASP:OD1 | 1:G:124:ASP:N     | 2.44                     | 0.50              |
| 1:A:124:ASP:OD1 | 1:A:124:ASP:N     | 2.44                     | 0.50              |
| 2:B:318:TRP:O   | 2:B:327:TYR:OH    | 2.19                     | 0.50              |
| 3:C:702:ASN:ND2 | 3:C:716:ASP:OD1   | 2.42                     | 0.50              |
| 3:I:669:GLY:O   | 3:I:672:MET:HE2   | 2.11                     | 0.50              |
| 3:I:702:ASN:ND2 | 3:I:716:ASP:OD1   | 2.42                     | 0.50              |
| 6:K:603:FMN:O2' | 8:K:606:NAD:O2N   | 2.27                     | 0.50              |
| 3:C:564:GLU:OE2 | 3:C:679:LYS:NZ    | 2.35                     | 0.50              |
| 3:C:828:SER:HB3 | 3:C:967:LEU:H     | 1.77                     | 0.50              |
| 3:L:828:SER:HB3 | 3:L:967:LEU:H     | 1.77                     | 0.50              |
| 2:E:568:LYS:N   | 7:E:604:SF4:S2    | 2.85                     | 0.50              |
| 3:F:828:SER:HB3 | 3:F:967:LEU:H     | 1.77                     | 0.50              |
| 3:I:828:SER:HB3 | 3:I:967:LEU:H     | 1.77                     | 0.50              |
| 2:K:568:LYS:N   | 7:K:604:SF4:S2    | 2.85                     | 0.50              |
| 2:B:568:LYS:N   | 7:B:604:SF4:S2    | 2.85                     | 0.50              |
| 2:H:318:TRP:O   | 2:H:327:TYR:OH    | 2.19                     | 0.50              |
| 2:H:568:LYS:N   | 7:H:604:SF4:S2    | 2.85                     | 0.50              |
| 3:I:138:PRO:HB3 | 3:I:209:TYR:CG    | 2.47                     | 0.50              |
| 3:C:138:PRO:HB3 | 3:C:209:TYR:CG    | 2.47                     | 0.49              |
| 2:E:318:TRP:O   | 2:E:327:TYR:OH    | 2.19                     | 0.49              |
| 2:E:338:THR:OG1 | 2:E:354:GLU:OE2   | 2.26                     | 0.49              |
| 2:E:359:MET:HE3 | 2:E:363:GLU:HB3   | 1.93                     | 0.49              |
| 2:H:338:THR:OG1 | 2:H:354:GLU:OE2   | 2.26                     | 0.49              |
| 2:K:318:TRP:O   | 2:K:327:TYR:OH    | 2.19                     | 0.49              |
| 2:K:338:THR:OG1 | 2:K:354:GLU:OE2   | 2.26                     | 0.49              |
| 2:K:359:MET:HE3 | 2:K:363:GLU:HB3   | 1.93                     | 0.49              |
| 1:A:76:PHE:O    | 1:A:78:SER:N      | 2.40                     | 0.49              |
| 3:C:972:ASN:OD1 | 3:C:972:ASN:N     | 2.42                     | 0.49              |
| 3:I:231:LEU:HA  | 3:I:235:ILE:HG13  | 1.94                     | 0.49              |
| 3:L:138:PRO:HB3 | 3:L:209:TYR:CG    | 2.47                     | 0.49              |
| 3:L:1152:PHE:HZ | 3:L:1155:LYS:HG3  | 1.78                     | 0.49              |

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| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 3:C:150:PRO:HD2   | 7:C:1206:SF4:S4   | 2.53                     | 0.49              |
| 3:C:231:LEU:HA    | 3:C:235:ILE:HG13  | 1.94                     | 0.49              |
| 3:F:138:PRO:HB3   | 3:F:209:TYR:CG    | 2.47                     | 0.49              |
| 3:F:1152:PHE:HZ   | 3:F:1155:LYS:HG3  | 1.78                     | 0.49              |
| 3:I:150:PRO:HD2   | 7:I:1206:SF4:S4   | 2.53                     | 0.49              |
| 2:K:178:VAL:HG22  | 2:K:214:ILE:HD11  | 1.94                     | 0.49              |
| 1:G:76:PHE:O      | 1:G:78:SER:N      | 2.40                     | 0.49              |
| 3:I:972:ASN:OD1   | 3:I:972:ASN:N     | 2.42                     | 0.49              |
| 1:A:140:LEU:HB3   | 1:A:152:GLY:HA3   | 1.95                     | 0.49              |
| 2:B:359:MET:HE3   | 2:B:363:GLU:HB3   | 1.93                     | 0.49              |
| 2:E:178:VAL:HG22  | 2:E:214:ILE:HD11  | 1.94                     | 0.49              |
| 2:H:359:MET:HE3   | 2:H:363:GLU:HB3   | 1.93                     | 0.49              |
| 3:F:691:VAL:HG22  | 3:F:1064:VAL:HG22 | 1.95                     | 0.49              |
| 1:G:140:LEU:HB3   | 1:G:152:GLY:HA3   | 1.95                     | 0.49              |
| 3:L:691:VAL:HG22  | 3:L:1064:VAL:HG22 | 1.95                     | 0.49              |
| 3:F:357:ILE:HG13  | 3:F:379:LEU:HD11  | 1.94                     | 0.49              |
| 2:K:63:ALA:HA     | 2:K:65:VAL:HG23   | 1.94                     | 0.48              |
| 3:L:231:LEU:HA    | 3:L:235:ILE:HG13  | 1.94                     | 0.48              |
| 2:B:446:ILE:HD11  | 3:C:88:ALA:HB1    | 1.96                     | 0.48              |
| 3:F:231:LEU:HA    | 3:F:235:ILE:HG13  | 1.94                     | 0.48              |
| 2:H:446:ILE:HD11  | 3:I:88:ALA:HB1    | 1.96                     | 0.48              |
| 3:L:150:PRO:HD2   | 7:L:1206:SF4:S4   | 2.53                     | 0.48              |
| 3:L:357:ILE:HG13  | 3:L:379:LEU:HD11  | 1.94                     | 0.48              |
| 2:E:63:ALA:HA     | 2:E:65:VAL:HG23   | 1.95                     | 0.48              |
| 3:F:150:PRO:HD2   | 7:F:1206:SF4:S4   | 2.53                     | 0.48              |
| 3:I:564:GLU:OE2   | 3:I:679:LYS:NZ    | 2.35                     | 0.48              |
| 3:C:357:ILE:HG13  | 3:C:379:LEU:HD11  | 1.94                     | 0.48              |
| 3:I:357:ILE:HG13  | 3:I:379:LEU:HD11  | 1.94                     | 0.48              |
| 2:B:178:VAL:HG22  | 2:B:214:ILE:HD11  | 1.94                     | 0.48              |
| 3:C:622:VAL:HG21  | 3:C:665:VAL:HG11  | 1.95                     | 0.48              |
| 3:C:1084:LEU:HD22 | 3:C:1089:ILE:HD12 | 1.95                     | 0.48              |
| 2:E:164:LYS:HE3   | 2:E:164:LYS:HB3   | 1.72                     | 0.48              |
| 3:F:622:VAL:HG21  | 3:F:665:VAL:HG11  | 1.95                     | 0.48              |
| 2:H:178:VAL:HG22  | 2:H:214:ILE:HD11  | 1.94                     | 0.48              |
| 3:L:622:VAL:HG21  | 3:L:665:VAL:HG11  | 1.95                     | 0.48              |
| 3:L:1084:LEU:HD22 | 3:L:1089:ILE:HD12 | 1.95                     | 0.48              |
| 2:B:274:GLU:OE2   | 8:B:606:NAD:O2B   | 2.23                     | 0.48              |
| 3:C:433:GLY:HA2   | 10:C:1203:NDP:H4D | 1.96                     | 0.48              |
| 2:E:446:ILE:HD11  | 3:F:88:ALA:HB1    | 1.96                     | 0.48              |
| 3:F:1084:LEU:HD22 | 3:F:1089:ILE:HD12 | 1.95                     | 0.48              |
| 2:H:274:GLU:OE2   | 8:H:606:NAD:O2B   | 2.23                     | 0.48              |

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| Atom-1            | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|-------------------|-------------------|--------------------------|-------------------|
| 2:H:322:ASN:ND2   | 2:H:327:TYR:OH    | 2.31                     | 0.48              |
| 3:I:622:VAL:HG21  | 3:I:665:VAL:HG11  | 1.95                     | 0.48              |
| 2:K:446:ILE:HD11  | 3:L:88:ALA:HB1    | 1.96                     | 0.48              |
| 2:B:63:ALA:HA     | 2:B:65:VAL:HG23   | 1.95                     | 0.48              |
| 3:C:320:THR:HG23  | 3:C:427:ARG:CZ    | 2.44                     | 0.48              |
| 2:H:63:ALA:HA     | 2:H:65:VAL:HG23   | 1.95                     | 0.48              |
| 3:I:320:THR:HG23  | 3:I:427:ARG:CZ    | 2.44                     | 0.48              |
| 3:I:433:GLY:HA2   | 10:I:1203:NDP:H4D | 1.96                     | 0.48              |
| 3:I:1152:PHE:HZ   | 3:I:1155:LYS:HG3  | 1.78                     | 0.48              |
| 3:C:1152:PHE:HZ   | 3:C:1155:LYS:HG3  | 1.78                     | 0.47              |
| 3:I:1084:LEU:HD22 | 3:I:1089:ILE:HD12 | 1.95                     | 0.47              |
| 3:L:1157:LYS:HE3  | 3:L:1166:VAL:HG21 | 1.96                     | 0.47              |
| 2:B:322:ASN:ND2   | 2:B:327:TYR:OH    | 2.31                     | 0.47              |
| 3:F:1157:LYS:HE3  | 3:F:1166:VAL:HG21 | 1.96                     | 0.47              |
| 3:I:691:VAL:HG22  | 3:I:1064:VAL:HG22 | 1.95                     | 0.47              |
| 3:C:691:VAL:HG22  | 3:C:1064:VAL:HG22 | 1.95                     | 0.47              |
| 3:L:320:THR:HG23  | 3:L:427:ARG:CZ    | 2.44                     | 0.47              |
| 3:F:320:THR:HG23  | 3:F:427:ARG:CZ    | 2.44                     | 0.47              |
| 3:F:851:HIS:NE2   | 3:F:936:ASP:OD1   | 2.46                     | 0.47              |
| 1:J:140:LEU:HB3   | 1:J:152:GLY:HA3   | 1.95                     | 0.47              |
| 3:L:851:HIS:NE2   | 3:L:936:ASP:OD1   | 2.46                     | 0.47              |
| 3:L:355:ARG:HE    | 3:L:414:PRO:HD3   | 1.78                     | 0.47              |
| 3:F:355:ARG:HE    | 3:F:414:PRO:HD3   | 1.78                     | 0.47              |
| 3:C:272:ASP:OD2   | 3:C:272:ASP:N     | 2.48                     | 0.47              |
| 1:D:140:LEU:HB3   | 1:D:152:GLY:HA3   | 1.95                     | 0.47              |
| 2:E:379:LYS:HD2   | 2:E:422:GLU:HA    | 1.97                     | 0.47              |
| 3:F:130:LEU:HD22  | 3:F:177:ASP:HB2   | 1.97                     | 0.47              |
| 3:I:272:ASP:OD2   | 3:I:272:ASP:N     | 2.48                     | 0.47              |
| 2:K:379:LYS:HD2   | 2:K:422:GLU:HA    | 1.97                     | 0.47              |
| 1:A:85:VAL:HG12   | 1:A:128:THR:HG21  | 1.97                     | 0.47              |
| 2:B:338:THR:OG1   | 2:B:354:GLU:OE2   | 2.26                     | 0.47              |
| 1:J:85:VAL:HG12   | 1:J:128:THR:HG21  | 1.97                     | 0.47              |
| 3:L:130:LEU:HD22  | 3:L:177:ASP:HB2   | 1.97                     | 0.47              |
| 1:D:85:VAL:HG12   | 1:D:128:THR:HG21  | 1.97                     | 0.46              |
| 2:E:52:ASP:OD1    | 2:E:61:SER:OG     | 2.23                     | 0.46              |
| 3:F:162:GLU:HG3   | 3:F:528:ARG:HB2   | 1.97                     | 0.46              |
| 1:G:85:VAL:HG12   | 1:G:128:THR:HG21  | 1.97                     | 0.46              |
| 3:I:1:MET:HG2     | 3:I:2:SER:N       | 2.30                     | 0.46              |
| 3:I:1157:LYS:HE3  | 3:I:1166:VAL:HG21 | 1.96                     | 0.46              |
| 3:C:355:ARG:HE    | 3:C:414:PRO:HD3   | 1.78                     | 0.46              |
| 3:L:162:GLU:HG3   | 3:L:528:ARG:HB2   | 1.97                     | 0.46              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 3:C:1:MET:HG2    | 3:C:2:SER:N       | 2.30                     | 0.46              |
| 3:C:1157:LYS:HE3 | 3:C:1166:VAL:HG21 | 1.96                     | 0.46              |
| 2:E:401:ASP:O    | 2:E:405:ILE:HG12  | 2.16                     | 0.46              |
| 3:I:119:GLY:HA3  | 3:I:681:ILE:HG21  | 1.97                     | 0.46              |
| 3:I:417:THR:OG1  | 3:I:418:GLY:N     | 2.48                     | 0.46              |
| 2:K:52:ASP:OD1   | 2:K:61:SER:OG     | 2.23                     | 0.46              |
| 2:K:401:ASP:O    | 2:K:405:ILE:HG12  | 2.16                     | 0.46              |
| 3:C:119:GLY:HA3  | 3:C:681:ILE:HG21  | 1.97                     | 0.46              |
| 3:C:417:THR:OG1  | 3:C:418:GLY:N     | 2.48                     | 0.46              |
| 6:B:603:FMN:O2'  | 6:B:603:FMN:O4'   | 2.32                     | 0.46              |
| 6:H:603:FMN:O2'  | 6:H:603:FMN:O4'   | 2.32                     | 0.46              |
| 3:L:417:THR:OG1  | 3:L:418:GLY:N     | 2.48                     | 0.46              |
| 3:C:162:GLU:HG3  | 3:C:528:ARG:HB2   | 1.97                     | 0.46              |
| 3:C:1009:ALA:HB2 | 3:C:1018:LEU:HD12 | 1.97                     | 0.46              |
| 3:F:119:GLY:HA3  | 3:F:681:ILE:HG21  | 1.97                     | 0.46              |
| 3:F:417:THR:OG1  | 3:F:418:GLY:N     | 2.48                     | 0.46              |
| 2:H:488:CYS:SG   | 2:H:489:GLY:N     | 2.89                     | 0.46              |
| 3:I:162:GLU:HG3  | 3:I:528:ARG:HB2   | 1.97                     | 0.46              |
| 3:I:355:ARG:HE   | 3:I:414:PRO:HD3   | 1.78                     | 0.46              |
| 2:K:169:ARG:O    | 2:K:176:LYS:NZ    | 2.40                     | 0.46              |
| 3:L:119:GLY:HA3  | 3:L:681:ILE:HG21  | 1.97                     | 0.46              |
| 2:E:169:ARG:O    | 2:E:176:LYS:NZ    | 2.40                     | 0.46              |
| 3:F:433:GLY:HA2  | 10:F:1203:NDP:H4D | 1.96                     | 0.46              |
| 3:I:1009:ALA:HB2 | 3:I:1018:LEU:HD12 | 1.97                     | 0.46              |
| 3:I:809:THR:HB   | 3:I:984:MET:HB3   | 1.98                     | 0.46              |
| 3:C:771:VAL:HG21 | 3:C:1000:ALA:HB2  | 1.98                     | 0.46              |
| 3:C:809:THR:HB   | 3:C:984:MET:HB3   | 1.98                     | 0.46              |
| 3:C:1111:MET:HG3 | 3:C:1116:PHE:HZ   | 1.81                     | 0.46              |
| 2:E:488:CYS:SG   | 2:E:489:GLY:N     | 2.88                     | 0.46              |
| 3:I:1111:MET:HG3 | 3:I:1116:PHE:HZ   | 1.81                     | 0.46              |
| 3:L:433:GLY:HA2  | 10:L:1203:NDP:H4D | 1.96                     | 0.46              |
| 2:B:401:ASP:O    | 2:B:405:ILE:HG12  | 2.16                     | 0.46              |
| 2:B:488:CYS:SG   | 2:B:489:GLY:N     | 2.89                     | 0.46              |
| 3:I:771:VAL:HG21 | 3:I:1000:ALA:HB2  | 1.98                     | 0.46              |
| 2:K:488:CYS:SG   | 2:K:489:GLY:N     | 2.88                     | 0.46              |
| 3:F:1:MET:HG2    | 3:F:2:SER:N       | 2.30                     | 0.45              |
| 3:F:548:LYS:HE2  | 3:F:548:LYS:HB3   | 1.84                     | 0.45              |
| 2:H:401:ASP:O    | 2:H:405:ILE:HG12  | 2.16                     | 0.45              |
| 3:L:1:MET:HG2    | 3:L:2:SER:N       | 2.30                     | 0.45              |
| 3:F:272:ASP:OD2  | 3:F:272:ASP:N     | 2.48                     | 0.45              |
| 3:F:809:THR:HB   | 3:F:984:MET:HB3   | 1.98                     | 0.45              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 2:K:135:LYS:HD3  | 2:K:135:LYS:HA    | 1.80                     | 0.45              |
| 3:L:809:THR:HB   | 3:L:984:MET:HB3   | 1.98                     | 0.45              |
| 2:B:207:MET:HA   | 2:B:210:CYS:SG    | 2.57                     | 0.45              |
| 3:C:130:LEU:HD22 | 3:C:177:ASP:HB2   | 1.97                     | 0.45              |
| 3:F:771:VAL:HG21 | 3:F:1000:ALA:HB2  | 1.98                     | 0.45              |
| 1:G:24:GLU:O     | 1:G:28:LYS:HB3    | 2.17                     | 0.45              |
| 2:H:247:LEU:HD11 | 2:H:260:MET:HG2   | 1.99                     | 0.45              |
| 2:H:379:LYS:HD2  | 2:H:422:GLU:HA    | 1.97                     | 0.45              |
| 3:I:599:GLU:H    | 3:I:599:GLU:HG3   | 1.60                     | 0.45              |
| 3:L:272:ASP:N    | 3:L:272:ASP:OD2   | 2.48                     | 0.45              |
| 1:A:24:GLU:O     | 1:A:28:LYS:HB3    | 2.17                     | 0.45              |
| 2:B:247:LEU:HD11 | 2:B:260:MET:HG2   | 1.99                     | 0.45              |
| 2:B:379:LYS:HD2  | 2:B:422:GLU:HA    | 1.97                     | 0.45              |
| 2:B:450:ILE:HA   | 3:C:639:PHE:CE2   | 2.50                     | 0.45              |
| 3:F:1111:MET:HG3 | 3:F:1116:PHE:HZ   | 1.81                     | 0.45              |
| 2:H:207:MET:HA   | 2:H:210:CYS:SG    | 2.57                     | 0.45              |
| 2:H:450:ILE:HA   | 3:I:639:PHE:CE2   | 2.50                     | 0.45              |
| 2:K:322:ASN:ND2  | 2:K:327:TYR:OH    | 2.31                     | 0.45              |
| 2:K:334:LYS:HA   | 2:K:334:LYS:HD3   | 1.78                     | 0.45              |
| 3:L:548:LYS:HE2  | 3:L:548:LYS:HB3   | 1.84                     | 0.45              |
| 3:L:771:VAL:HG21 | 3:L:1000:ALA:HB2  | 1.98                     | 0.45              |
| 2:B:383:MET:CE   | 2:B:417:MET:HE1   | 2.46                     | 0.45              |
| 2:H:383:MET:CE   | 2:H:417:MET:HE1   | 2.46                     | 0.45              |
| 2:E:317:PRO:HA   | 2:E:320:MET:HB2   | 1.99                     | 0.45              |
| 3:F:1009:ALA:HB2 | 3:F:1018:LEU:HD12 | 1.97                     | 0.45              |
| 3:I:130:LEU:HD22 | 3:I:177:ASP:HB2   | 1.98                     | 0.45              |
| 2:K:317:PRO:HA   | 2:K:320:MET:HB2   | 1.99                     | 0.45              |
| 6:K:603:FMN:O2'  | 6:K:603:FMN:O4'   | 2.32                     | 0.45              |
| 3:L:1111:MET:HG3 | 3:L:1116:PHE:HZ   | 1.81                     | 0.45              |
| 3:L:15:VAL:HG11  | 3:L:24:ALA:HB1    | 1.98                     | 0.45              |
| 3:F:148:PRO:HG2  | 3:F:478:ILE:HG21  | 1.99                     | 0.45              |
| 2:H:186:ASP:HB3  | 2:H:189:ALA:HB3   | 1.99                     | 0.45              |
| 3:L:148:PRO:HG2  | 3:L:478:ILE:HG21  | 1.99                     | 0.45              |
| 3:L:1009:ALA:HB2 | 3:L:1018:LEU:HD12 | 1.97                     | 0.45              |
| 2:B:186:ASP:HB3  | 2:B:189:ALA:HB3   | 1.99                     | 0.45              |
| 2:E:135:LYS:HD3  | 2:E:135:LYS:HA    | 1.80                     | 0.45              |
| 2:E:322:ASN:ND2  | 2:E:327:TYR:OH    | 2.31                     | 0.45              |
| 6:E:603:FMN:O2'  | 6:E:603:FMN:O4'   | 2.32                     | 0.45              |
| 3:F:15:VAL:HG11  | 3:F:24:ALA:HB1    | 1.98                     | 0.45              |
| 3:F:443:ASP:HB3  | 3:F:463:ARG:HD2   | 1.99                     | 0.45              |
| 1:J:24:GLU:O     | 1:J:28:LYS:HB3    | 2.17                     | 0.45              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 3:L:443:ASP:HB3  | 3:L:463:ARG:HD2  | 1.99                     | 0.45              |
| 1:D:24:GLU:O     | 1:D:28:LYS:HB3   | 2.17                     | 0.45              |
| 3:C:15:VAL:HG11  | 3:C:24:ALA:HB1   | 1.98                     | 0.44              |
| 2:E:383:MET:CE   | 2:E:417:MET:HE1  | 2.46                     | 0.44              |
| 1:A:135:LEU:HD22 | 1:A:145:MET:HE2  | 1.99                     | 0.44              |
| 2:K:383:MET:CE   | 2:K:417:MET:HE1  | 2.46                     | 0.44              |
| 2:B:121:TYR:OH   | 2:B:205:GLU:OE1  | 2.23                     | 0.44              |
| 3:C:640:ASP:OD1  | 3:C:640:ASP:N    | 2.51                     | 0.44              |
| 2:E:247:LEU:HD11 | 2:E:260:MET:HG2  | 1.99                     | 0.44              |
| 1:G:135:LEU:HD22 | 1:G:145:MET:HE2  | 1.99                     | 0.44              |
| 2:H:121:TYR:OH   | 2:H:205:GLU:OE1  | 2.23                     | 0.44              |
| 3:I:15:VAL:HG11  | 3:I:24:ALA:HB1   | 1.98                     | 0.44              |
| 3:I:640:ASP:OD1  | 3:I:640:ASP:N    | 2.51                     | 0.44              |
| 2:K:450:ILE:HA   | 3:L:639:PHE:CE2  | 2.50                     | 0.44              |
| 6:E:603:FMN:H1'1 | 6:E:603:FMN:H9   | 1.65                     | 0.44              |
| 2:H:545:LYS:HD2  | 2:H:575:VAL:HG21 | 1.99                     | 0.44              |
| 2:B:545:LYS:HD2  | 2:B:575:VAL:HG21 | 1.99                     | 0.44              |
| 2:E:450:ILE:HA   | 3:F:639:PHE:CE2  | 2.50                     | 0.44              |
| 3:I:182:GLN:HB3  | 3:I:251:LEU:HD21 | 1.99                     | 0.44              |
| 3:I:443:ASP:HB3  | 3:I:463:ARG:HD2  | 1.99                     | 0.44              |
| 2:K:247:LEU:HD11 | 2:K:260:MET:HG2  | 1.99                     | 0.44              |
| 3:C:182:GLN:HB3  | 3:C:251:LEU:HD21 | 1.99                     | 0.44              |
| 3:C:443:ASP:HB3  | 3:C:463:ARG:HD2  | 1.99                     | 0.44              |
| 1:D:135:LEU:HD22 | 1:D:145:MET:HE2  | 1.99                     | 0.44              |
| 3:F:307:ILE:HD11 | 3:F:434:GLN:HE22 | 1.83                     | 0.44              |
| 1:J:135:LEU:HD22 | 1:J:145:MET:HE2  | 1.99                     | 0.44              |
| 3:L:640:ASP:OD1  | 3:L:640:ASP:N    | 2.51                     | 0.44              |
| 2:E:207:MET:HA   | 2:E:210:CYS:SG   | 2.57                     | 0.44              |
| 3:F:182:GLN:HB3  | 3:F:251:LEU:HD21 | 1.99                     | 0.44              |
| 2:K:4:ARG:HB2    | 2:K:52:ASP:HB2   | 2.00                     | 0.44              |
| 6:K:603:FMN:H1'1 | 6:K:603:FMN:H9   | 1.65                     | 0.44              |
| 3:L:182:GLN:HB3  | 3:L:251:LEU:HD21 | 1.99                     | 0.44              |
| 3:L:307:ILE:HD11 | 3:L:434:GLN:HE22 | 1.83                     | 0.44              |
| 3:C:53:GLU:OE1   | 3:C:78:THR:HG21  | 2.18                     | 0.44              |
| 3:C:851:HIS:NE2  | 3:C:936:ASP:OD1  | 2.46                     | 0.44              |
| 2:E:4:ARG:HB2    | 2:E:52:ASP:HB2   | 2.00                     | 0.44              |
| 3:F:640:ASP:N    | 3:F:640:ASP:OD1  | 2.51                     | 0.44              |
| 3:I:53:GLU:OE1   | 3:I:78:THR:HG21  | 2.18                     | 0.44              |
| 3:I:680:GLN:HG2  | 3:I:711:PHE:HD2  | 1.83                     | 0.44              |
| 3:C:680:GLN:HG2  | 3:C:711:PHE:HD2  | 1.83                     | 0.44              |
| 1:D:23:LEU:HD13  | 1:D:48:TYR:HE1   | 1.83                     | 0.44              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 3:F:935:ILE:HG21 | 3:F:945:VAL:HG22  | 1.99                     | 0.44              |
| 2:K:186:ASP:HB3  | 2:K:189:ALA:HB3   | 1.99                     | 0.44              |
| 2:B:4:ARG:HB2    | 2:B:52:ASP:HB2    | 2.00                     | 0.43              |
| 2:E:186:ASP:HB3  | 2:E:189:ALA:HB3   | 1.99                     | 0.43              |
| 2:E:524:LYS:HA   | 2:E:524:LYS:HD3   | 1.86                     | 0.43              |
| 2:H:4:ARG:HB2    | 2:H:52:ASP:HB2    | 2.00                     | 0.43              |
| 1:J:23:LEU:HD13  | 1:J:48:TYR:HE1    | 1.83                     | 0.43              |
| 2:K:207:MET:HA   | 2:K:210:CYS:SG    | 2.57                     | 0.43              |
| 3:L:935:ILE:HG21 | 3:L:945:VAL:HG22  | 1.99                     | 0.43              |
| 2:E:115:PRO:HB2  | 2:E:233:ARG:HD3   | 2.00                     | 0.43              |
| 3:I:851:HIS:NE2  | 3:I:936:ASP:OD1   | 2.46                     | 0.43              |
| 1:J:75:THR:HG21  | 3:L:635:VAL:HG13  | 2.01                     | 0.43              |
| 2:K:115:PRO:HB2  | 2:K:233:ARG:HD3   | 2.00                     | 0.43              |
| 2:B:317:PRO:HA   | 2:B:320:MET:HB2   | 1.99                     | 0.43              |
| 3:I:307:ILE:HD11 | 3:I:434:GLN:HE22  | 1.83                     | 0.43              |
| 3:C:148:PRO:HG2  | 3:C:478:ILE:HG21  | 1.99                     | 0.43              |
| 1:D:75:THR:HG21  | 3:F:635:VAL:HG13  | 2.01                     | 0.43              |
| 3:F:53:GLU:OE1   | 3:F:78:THR:HG21   | 2.18                     | 0.43              |
| 3:I:187:MET:HE2  | 3:I:187:MET:HB3   | 1.81                     | 0.43              |
| 2:B:438:VAL:HG22 | 2:B:452:THR:HG23  | 2.01                     | 0.43              |
| 3:C:307:ILE:HD11 | 3:C:434:GLN:HE22  | 1.83                     | 0.43              |
| 2:E:545:LYS:HD2  | 2:E:575:VAL:HG21  | 1.99                     | 0.43              |
| 2:H:317:PRO:HA   | 2:H:320:MET:HB2   | 1.99                     | 0.43              |
| 3:I:675:GLN:CD   | 3:I:680:GLN:HB2   | 2.44                     | 0.43              |
| 3:I:935:ILE:HG21 | 3:I:945:VAL:HG22  | 1.99                     | 0.43              |
| 2:K:545:LYS:HD2  | 2:K:575:VAL:HG21  | 1.99                     | 0.43              |
| 3:L:53:GLU:OE1   | 3:L:78:THR:HG21   | 2.18                     | 0.43              |
| 1:A:23:LEU:HD13  | 1:A:48:TYR:HE1    | 1.83                     | 0.43              |
| 3:C:353:TYR:OH   | 10:C:1203:NDP:O2X | 2.37                     | 0.43              |
| 3:C:935:ILE:HG21 | 3:C:945:VAL:HG22  | 1.99                     | 0.43              |
| 3:F:222:GLU:OE2  | 9:F:1201:FAD:O3B  | 2.35                     | 0.43              |
| 2:H:438:VAL:HG22 | 2:H:452:THR:HG23  | 2.01                     | 0.43              |
| 3:I:148:PRO:HG2  | 3:I:478:ILE:HG21  | 1.99                     | 0.43              |
| 3:I:353:TYR:OH   | 10:I:1203:NDP:O2X | 2.37                     | 0.43              |
| 3:I:427:ARG:HE   | 3:I:427:ARG:HB2   | 1.64                     | 0.43              |
| 2:K:524:LYS:HD3  | 2:K:524:LYS:HA    | 1.86                     | 0.43              |
| 3:L:195:VAL:HG11 | 3:L:211:LEU:HD13  | 2.01                     | 0.43              |
| 1:A:156:PRO:HA   | 1:A:159:VAL:HG12  | 2.00                     | 0.43              |
| 3:C:162:GLU:CG   | 3:C:528:ARG:HB2   | 2.49                     | 0.43              |
| 3:C:675:GLN:CD   | 3:C:680:GLN:HB2   | 2.44                     | 0.43              |
| 3:C:1159:ASP:O   | 3:C:1163:MET:HG3  | 2.19                     | 0.43              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 1:D:143:VAL:HA   | 1:D:151:TYR:O    | 2.19                     | 0.43              |
| 3:F:195:VAL:HG11 | 3:F:211:LEU:HD13 | 2.00                     | 0.43              |
| 3:F:675:GLN:CD   | 3:F:680:GLN:HB2  | 2.44                     | 0.43              |
| 3:I:162:GLU:CG   | 3:I:528:ARG:HB2  | 2.49                     | 0.43              |
| 3:I:1159:ASP:O   | 3:I:1163:MET:HG3 | 2.19                     | 0.43              |
| 3:C:187:MET:HE2  | 3:C:187:MET:HB3  | 1.81                     | 0.43              |
| 3:C:195:VAL:HG11 | 3:C:211:LEU:HD13 | 2.00                     | 0.43              |
| 1:D:156:PRO:HA   | 1:D:159:VAL:HG12 | 2.00                     | 0.43              |
| 2:E:129:ALA:HB2  | 2:E:321:TYR:HB2  | 2.00                     | 0.43              |
| 3:F:162:GLU:CG   | 3:F:528:ARG:HB2  | 2.49                     | 0.43              |
| 3:F:564:GLU:OE2  | 3:F:679:LYS:NZ   | 2.35                     | 0.43              |
| 1:G:23:LEU:HD13  | 1:G:48:TYR:HE1   | 1.83                     | 0.43              |
| 3:I:195:VAL:HG11 | 3:I:211:LEU:HD13 | 2.00                     | 0.43              |
| 1:J:143:VAL:HA   | 1:J:151:TYR:O    | 2.19                     | 0.43              |
| 1:J:156:PRO:HA   | 1:J:159:VAL:HG12 | 2.00                     | 0.43              |
| 2:K:339:LYS:HA   | 2:K:339:LYS:HD3  | 1.83                     | 0.43              |
| 3:L:287:SER:O    | 3:L:287:SER:OG   | 2.36                     | 0.43              |
| 3:L:564:GLU:OE2  | 3:L:679:LYS:NZ   | 2.35                     | 0.43              |
| 3:L:675:GLN:CD   | 3:L:680:GLN:HB2  | 2.44                     | 0.43              |
| 2:E:334:LYS:HA   | 2:E:334:LYS:HD3  | 1.78                     | 0.43              |
| 1:G:156:PRO:HA   | 1:G:159:VAL:HG12 | 2.00                     | 0.43              |
| 2:K:143:ILE:HG12 | 2:K:165:TRP:HZ3  | 1.84                     | 0.43              |
| 3:L:162:GLU:CG   | 3:L:528:ARG:HB2  | 2.49                     | 0.43              |
| 3:C:427:ARG:HE   | 3:C:427:ARG:HB2  | 1.65                     | 0.43              |
| 2:E:143:ILE:HG12 | 2:E:165:TRP:HZ3  | 1.84                     | 0.43              |
| 3:F:320:THR:HG23 | 3:F:427:ARG:NH2  | 2.34                     | 0.43              |
| 3:I:320:THR:HG23 | 3:I:427:ARG:NH2  | 2.34                     | 0.43              |
| 2:K:129:ALA:HB2  | 2:K:321:TYR:HB2  | 2.01                     | 0.43              |
| 3:L:320:THR:HG23 | 3:L:427:ARG:NH2  | 2.34                     | 0.43              |
| 3:C:320:THR:HG23 | 3:C:427:ARG:NH2  | 2.34                     | 0.42              |
| 2:H:135:LYS:HA   | 2:H:135:LYS:HD3  | 1.80                     | 0.42              |
| 3:I:798:LYS:HD2  | 3:I:798:LYS:HA   | 1.83                     | 0.42              |
| 3:L:95:ASP:HA    | 3:L:594:CYS:SG   | 2.59                     | 0.42              |
| 3:L:222:GLU:OE2  | 9:L:1201:FAD:O3B | 2.35                     | 0.42              |
| 2:B:129:ALA:HB2  | 2:B:321:TYR:HB2  | 2.00                     | 0.42              |
| 3:I:746:ILE:HD12 | 3:I:755:VAL:HG11 | 2.01                     | 0.42              |
| 2:B:135:LYS:HD3  | 2:B:135:LYS:HA   | 1.80                     | 0.42              |
| 3:C:157:ARG:NH2  | 3:C:161:GLU:OE2  | 2.47                     | 0.42              |
| 3:C:746:ILE:HD12 | 3:C:755:VAL:HG11 | 2.01                     | 0.42              |
| 2:E:339:LYS:HA   | 2:E:339:LYS:HD3  | 1.83                     | 0.42              |
| 3:F:95:ASP:HA    | 3:F:594:CYS:SG   | 2.59                     | 0.42              |

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| Atom-1           | Atom-2            | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|-------------------|--------------------------|-------------------|
| 1:G:37:ILE:HD11  | 1:G:65:ASN:CG     | 2.45                     | 0.42              |
| 2:H:129:ALA:HB2  | 2:H:321:TYR:HB2   | 2.01                     | 0.42              |
| 3:I:157:ARG:NH2  | 3:I:161:GLU:OE2   | 2.47                     | 0.42              |
| 3:I:1152:PHE:CE2 | 3:I:1154:GLU:HA   | 2.54                     | 0.42              |
| 1:J:124:ASP:OD1  | 1:J:124:ASP:N     | 2.44                     | 0.42              |
| 1:A:37:ILE:HD11  | 1:A:65:ASN:CG     | 2.45                     | 0.42              |
| 1:A:75:THR:HG21  | 3:C:635:VAL:HG13  | 2.01                     | 0.42              |
| 1:A:101:LEU:HD12 | 1:A:141:ALA:HB3   | 2.00                     | 0.42              |
| 3:C:831:SER:HA   | 3:C:1058:ASP:HB2  | 2.02                     | 0.42              |
| 3:C:1152:PHE:CE2 | 3:C:1154:GLU:HA   | 2.55                     | 0.42              |
| 1:G:75:THR:HG21  | 3:I:635:VAL:HG13  | 2.01                     | 0.42              |
| 3:I:831:SER:HA   | 3:I:1058:ASP:HB2  | 2.02                     | 0.42              |
| 2:B:115:PRO:HB2  | 2:B:233:ARG:HD3   | 2.00                     | 0.42              |
| 3:C:342:LYS:HD2  | 3:C:342:LYS:HA    | 1.88                     | 0.42              |
| 3:C:798:LYS:HD2  | 3:C:798:LYS:HA    | 1.83                     | 0.42              |
| 2:E:438:VAL:HG22 | 2:E:452:THR:HG23  | 2.01                     | 0.42              |
| 3:F:157:ARG:NH2  | 3:F:161:GLU:OE2   | 2.47                     | 0.42              |
| 3:F:1159:ASP:O   | 3:F:1163:MET:HG3  | 2.19                     | 0.42              |
| 1:G:101:LEU:HD12 | 1:G:141:ALA:HB3   | 2.00                     | 0.42              |
| 2:K:438:VAL:HG22 | 2:K:452:THR:HG23  | 2.01                     | 0.42              |
| 3:L:680:GLN:HG2  | 3:L:711:PHE:HD2   | 1.83                     | 0.42              |
| 3:L:1159:ASP:O   | 3:L:1163:MET:HG3  | 2.19                     | 0.42              |
| 1:A:143:VAL:HA   | 1:A:151:TYR:O     | 2.19                     | 0.42              |
| 2:B:143:ILE:HG12 | 2:B:165:TRP:HZ3   | 1.84                     | 0.42              |
| 2:B:521:LYS:HA   | 2:B:527:LEU:HD21  | 2.02                     | 0.42              |
| 1:D:124:ASP:OD1  | 1:D:124:ASP:N     | 2.44                     | 0.42              |
| 2:H:115:PRO:HB2  | 2:H:233:ARG:HD3   | 2.00                     | 0.42              |
| 3:I:885:LEU:HD23 | 3:I:885:LEU:HA    | 1.88                     | 0.42              |
| 2:K:475:LEU:HD23 | 2:K:475:LEU:HA    | 1.86                     | 0.42              |
| 3:F:680:GLN:HG2  | 3:F:711:PHE:HD2   | 1.83                     | 0.42              |
| 2:H:521:LYS:HA   | 2:H:527:LEU:HD21  | 2.02                     | 0.42              |
| 3:I:95:ASP:HA    | 3:I:594:CYS:SG    | 2.59                     | 0.42              |
| 3:L:157:ARG:NH2  | 3:L:161:GLU:OE2   | 2.47                     | 0.42              |
| 3:L:353:TYR:OH   | 10:L:1203:NDP:O2X | 2.37                     | 0.42              |
| 1:D:101:LEU:HD12 | 1:D:141:ALA:HB3   | 2.00                     | 0.42              |
| 2:E:121:TYR:OH   | 2:E:205:GLU:OE1   | 2.23                     | 0.42              |
| 3:F:353:TYR:OH   | 10:F:1203:NDP:O2X | 2.37                     | 0.42              |
| 3:F:746:ILE:HD12 | 3:F:755:VAL:HG11  | 2.01                     | 0.42              |
| 3:F:831:SER:HA   | 3:F:1058:ASP:HB2  | 2.02                     | 0.42              |
| 3:F:1152:PHE:CE2 | 3:F:1154:GLU:HA   | 2.55                     | 0.42              |
| 1:G:143:VAL:HA   | 1:G:151:TYR:O     | 2.19                     | 0.42              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 2:H:143:ILE:HG12 | 2:H:165:TRP:HZ3  | 1.84                     | 0.42              |
| 1:J:101:LEU:HD12 | 1:J:141:ALA:HB3  | 2.00                     | 0.42              |
| 3:L:746:ILE:HD12 | 3:L:755:VAL:HG11 | 2.01                     | 0.42              |
| 3:L:798:LYS:HD2  | 3:L:798:LYS:HA   | 1.83                     | 0.42              |
| 3:L:831:SER:HA   | 3:L:1058:ASP:HB2 | 2.02                     | 0.42              |
| 3:L:1152:PHE:CE2 | 3:L:1154:GLU:HA  | 2.55                     | 0.42              |
| 3:C:95:ASP:HA    | 3:C:594:CYS:SG   | 2.59                     | 0.42              |
| 1:D:37:ILE:HD11  | 1:D:65:ASN:CG    | 2.45                     | 0.42              |
| 1:J:37:ILE:HD11  | 1:J:65:ASN:CG    | 2.45                     | 0.42              |
| 2:K:121:TYR:OH   | 2:K:205:GLU:OE1  | 2.23                     | 0.42              |
| 3:C:885:LEU:HD23 | 3:C:885:LEU:HA   | 1.88                     | 0.42              |
| 2:E:475:LEU:HD23 | 2:E:475:LEU:HA   | 1.86                     | 0.42              |
| 2:K:439:LYS:HB2  | 2:K:439:LYS:HE3  | 1.79                     | 0.42              |
| 2:H:55:ASP:HB3   | 2:H:60:TYR:OH    | 2.20                     | 0.41              |
| 2:H:122:LYS:O    | 2:H:128:LYS:NZ   | 2.50                     | 0.41              |
| 3:I:39:GLU:H     | 3:I:39:GLU:CD    | 2.28                     | 0.41              |
| 3:I:342:LYS:HD2  | 3:I:342:LYS:HA   | 1.88                     | 0.41              |
| 2:B:55:ASP:HB3   | 2:B:60:TYR:OH    | 2.20                     | 0.41              |
| 2:B:319:ILE:HA   | 2:B:327:TYR:CE1  | 2.55                     | 0.41              |
| 3:C:39:GLU:H     | 3:C:39:GLU:CD    | 2.28                     | 0.41              |
| 2:E:439:LYS:HB2  | 2:E:439:LYS:HE3  | 1.79                     | 0.41              |
| 3:F:798:LYS:HD2  | 3:F:798:LYS:HA   | 1.83                     | 0.41              |
| 2:E:55:ASP:HB3   | 2:E:60:TYR:OH    | 2.20                     | 0.41              |
| 2:H:319:ILE:HA   | 2:H:327:TYR:CE1  | 2.55                     | 0.41              |
| 3:I:387:LEU:HB2  | 3:I:395:ALA:HB3  | 2.01                     | 0.41              |
| 6:K:603:FMN:N1   | 6:K:603:FMN:O3'  | 2.39                     | 0.41              |
| 1:A:66:LYS:O     | 1:A:69:LYS:N     | 2.51                     | 0.41              |
| 3:F:92:LEU:HD23  | 3:F:92:LEU:HA    | 1.89                     | 0.41              |
| 3:F:848:LYS:HB3  | 3:F:848:LYS:HE3  | 1.95                     | 0.41              |
| 2:H:164:LYS:HE3  | 2:H:164:LYS:HB3  | 1.72                     | 0.41              |
| 2:K:55:ASP:HB3   | 2:K:60:TYR:OH    | 2.20                     | 0.41              |
| 2:B:328:ALA:O    | 2:B:336:LYS:NZ   | 2.50                     | 0.41              |
| 3:C:373:GLU:O    | 3:C:540:ASN:ND2  | 2.54                     | 0.41              |
| 3:C:387:LEU:HB2  | 3:C:395:ALA:HB3  | 2.01                     | 0.41              |
| 2:E:223:CYS:SG   | 2:E:231:ILE:HD11 | 2.61                     | 0.41              |
| 3:I:373:GLU:O    | 3:I:540:ASN:ND2  | 2.54                     | 0.41              |
| 2:K:223:CYS:SG   | 2:K:231:ILE:HD11 | 2.61                     | 0.41              |
| 2:B:223:CYS:SG   | 2:B:231:ILE:HD11 | 2.61                     | 0.41              |
| 2:E:232:LYS:HA   | 2:E:235:GLU:HG2  | 2.02                     | 0.41              |
| 3:F:101:ARG:HD3  | 3:F:105:MET:HE2  | 2.02                     | 0.41              |
| 1:G:66:LYS:O     | 1:G:69:LYS:N     | 2.51                     | 0.41              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 3:I:101:ARG:HD3  | 3:I:105:MET:HE2  | 2.02                     | 0.41              |
| 2:K:217:ASN:OD1  | 2:K:217:ASN:N    | 2.49                     | 0.41              |
| 3:L:101:ARG:HD3  | 3:L:105:MET:HE2  | 2.02                     | 0.41              |
| 3:F:387:LEU:HB2  | 3:F:395:ALA:HB3  | 2.01                     | 0.41              |
| 2:H:223:CYS:SG   | 2:H:231:ILE:HD11 | 2.61                     | 0.41              |
| 2:H:328:ALA:O    | 2:H:336:LYS:NZ   | 2.50                     | 0.41              |
| 3:L:848:LYS:HB3  | 3:L:848:LYS:HE3  | 1.95                     | 0.41              |
| 3:C:101:ARG:HD3  | 3:C:105:MET:HE2  | 2.02                     | 0.41              |
| 3:C:407:ASP:HB3  | 3:C:413:LYS:HE3  | 2.03                     | 0.41              |
| 3:C:536:ALA:HB2  | 3:C:539:ARG:HH21 | 1.86                     | 0.41              |
| 2:E:217:ASN:OD1  | 2:E:217:ASN:N    | 2.49                     | 0.41              |
| 2:E:319:ILE:HA   | 2:E:327:TYR:CE1  | 2.55                     | 0.41              |
| 2:E:521:LYS:HA   | 2:E:527:LEU:HD21 | 2.02                     | 0.41              |
| 3:F:251:LEU:HD12 | 3:F:251:LEU:HA   | 1.91                     | 0.41              |
| 3:F:536:ALA:HB2  | 3:F:539:ARG:HH21 | 1.86                     | 0.41              |
| 3:F:875:THR:HG23 | 3:F:947:LEU:CD1  | 2.51                     | 0.41              |
| 2:H:548:VAL:HB   | 7:H:604:SF4:S3   | 2.61                     | 0.41              |
| 3:I:407:ASP:HB3  | 3:I:413:LYS:HE3  | 2.03                     | 0.41              |
| 1:J:142:PRO:HD2  | 1:J:154:LEU:H    | 1.86                     | 0.41              |
| 2:K:232:LYS:HA   | 2:K:235:GLU:HG2  | 2.03                     | 0.41              |
| 2:K:319:ILE:HA   | 2:K:327:TYR:CE1  | 2.55                     | 0.41              |
| 2:K:521:LYS:HA   | 2:K:527:LEU:HD21 | 2.02                     | 0.41              |
| 3:L:39:GLU:H     | 3:L:39:GLU:CD    | 2.28                     | 0.41              |
| 3:L:92:LEU:HD23  | 3:L:92:LEU:HA    | 1.89                     | 0.41              |
| 3:L:251:LEU:HD12 | 3:L:251:LEU:HA   | 1.91                     | 0.41              |
| 3:L:387:LEU:HB2  | 3:L:395:ALA:HB3  | 2.01                     | 0.41              |
| 3:L:536:ALA:HB2  | 3:L:539:ARG:HH21 | 1.86                     | 0.41              |
| 3:L:875:THR:HG23 | 3:L:947:LEU:CD1  | 2.51                     | 0.41              |
| 2:B:548:VAL:HB   | 7:B:604:SF4:S3   | 2.61                     | 0.41              |
| 3:C:158:GLU:HA   | 3:C:161:GLU:O    | 2.21                     | 0.41              |
| 3:C:548:LYS:HE2  | 3:C:548:LYS:HB3  | 1.84                     | 0.41              |
| 3:F:39:GLU:H     | 3:F:39:GLU:CD    | 2.28                     | 0.41              |
| 3:F:787:ARG:HA   | 3:F:972:ASN:OD1  | 2.21                     | 0.41              |
| 3:I:158:GLU:HA   | 3:I:161:GLU:O    | 2.21                     | 0.41              |
| 3:I:536:ALA:HB2  | 3:I:539:ARG:HH21 | 1.86                     | 0.41              |
| 2:B:164:LYS:HE3  | 2:B:164:LYS:HB3  | 1.72                     | 0.40              |
| 2:B:475:LEU:HA   | 2:B:475:LEU:HD23 | 1.86                     | 0.40              |
| 3:C:875:THR:HG23 | 3:C:947:LEU:CD1  | 2.51                     | 0.40              |
| 2:H:298:SER:O    | 2:H:298:SER:OG   | 2.37                     | 0.40              |
| 3:I:307:ILE:HD13 | 3:I:307:ILE:HA   | 1.89                     | 0.40              |
| 3:L:373:GLU:O    | 3:L:540:ASN:ND2  | 2.54                     | 0.40              |

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| Atom-1           | Atom-2           | Interatomic distance (Å) | Clash overlap (Å) |
|------------------|------------------|--------------------------|-------------------|
| 3:L:787:ARG:HA   | 3:L:972:ASN:OD1  | 2.21                     | 0.40              |
| 2:B:551:ILE:HG12 | 2:B:561:ILE:HG12 | 2.04                     | 0.40              |
| 1:D:142:PRO:HD2  | 1:D:154:LEU:H    | 1.86                     | 0.40              |
| 3:F:373:GLU:O    | 3:F:540:ASN:ND2  | 2.54                     | 0.40              |
| 2:H:232:LYS:HA   | 2:H:235:GLU:HG2  | 2.03                     | 0.40              |
| 2:H:551:ILE:HG12 | 2:H:561:ILE:HG12 | 2.04                     | 0.40              |
| 3:I:875:THR:HG23 | 3:I:947:LEU:CD1  | 2.51                     | 0.40              |
| 1:J:66:LYS:O     | 1:J:69:LYS:N     | 2.51                     | 0.40              |
| 1:D:66:LYS:O     | 1:D:69:LYS:N     | 2.51                     | 0.40              |
| 2:E:548:VAL:HB   | 7:E:604:SF4:S3   | 2.61                     | 0.40              |
| 1:G:140:LEU:HG   | 1:G:153:LYS:HE3  | 2.03                     | 0.40              |
| 3:I:251:LEU:HD12 | 3:I:251:LEU:HA   | 1.91                     | 0.40              |
| 1:J:78:SER:OG    | 2:K:267:GLY:O    | 2.32                     | 0.40              |
| 3:L:860:LEU:HD23 | 3:L:860:LEU:HA   | 1.91                     | 0.40              |
| 1:A:140:LEU:HG   | 1:A:153:LYS:HE3  | 2.03                     | 0.40              |
| 2:B:232:LYS:HA   | 2:B:235:GLU:HG2  | 2.03                     | 0.40              |
| 3:C:251:LEU:HD12 | 3:C:251:LEU:HA   | 1.91                     | 0.40              |
| 3:C:307:ILE:HD13 | 3:C:307:ILE:HA   | 1.89                     | 0.40              |
| 3:F:947:LEU:HD23 | 3:F:947:LEU:HA   | 1.94                     | 0.40              |
| 2:K:548:VAL:HB   | 7:K:604:SF4:S3   | 2.61                     | 0.40              |
| 2:B:146:ILE:HD13 | 2:B:146:ILE:HA   | 1.91                     | 0.40              |
| 1:D:140:LEU:HG   | 1:D:153:LYS:HE3  | 2.03                     | 0.40              |
| 3:F:875:THR:HG23 | 3:F:947:LEU:HD11 | 2.04                     | 0.40              |
| 1:G:142:PRO:HD2  | 1:G:154:LEU:H    | 1.86                     | 0.40              |
| 3:I:548:LYS:HE2  | 3:I:548:LYS:HB3  | 1.84                     | 0.40              |
| 3:I:787:ARG:HA   | 3:I:972:ASN:OD1  | 2.21                     | 0.40              |
| 1:J:140:LEU:HG   | 1:J:153:LYS:HE3  | 2.03                     | 0.40              |
| 3:L:158:GLU:HA   | 3:L:161:GLU:O    | 2.21                     | 0.40              |
| 3:L:307:ILE:HD13 | 3:L:307:ILE:HA   | 1.89                     | 0.40              |
| 3:L:407:ASP:HB3  | 3:L:413:LYS:HE3  | 2.03                     | 0.40              |
| 3:L:615:LEU:HD23 | 3:L:615:LEU:HA   | 1.95                     | 0.40              |

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed         | Favoured   | Allowed  | Outliers | Percentiles |     |
|-----|-------|------------------|------------|----------|----------|-------------|-----|
| 1   | A     | 148/178 (83%)    | 138 (93%)  | 6 (4%)   | 4 (3%)   | 4           | 22  |
| 1   | D     | 148/178 (83%)    | 138 (93%)  | 6 (4%)   | 4 (3%)   | 4           | 22  |
| 1   | G     | 148/178 (83%)    | 138 (93%)  | 6 (4%)   | 4 (3%)   | 4           | 22  |
| 1   | J     | 148/178 (83%)    | 138 (93%)  | 6 (4%)   | 4 (3%)   | 4           | 22  |
| 2   | B     | 582/584 (100%)   | 547 (94%)  | 33 (6%)  | 2 (0%)   | 37          | 70  |
| 2   | E     | 582/584 (100%)   | 547 (94%)  | 33 (6%)  | 2 (0%)   | 37          | 70  |
| 2   | H     | 582/584 (100%)   | 547 (94%)  | 33 (6%)  | 2 (0%)   | 37          | 70  |
| 2   | K     | 582/584 (100%)   | 547 (94%)  | 33 (6%)  | 2 (0%)   | 37          | 70  |
| 3   | C     | 1170/1172 (100%) | 1125 (96%) | 45 (4%)  | 0        | 100         | 100 |
| 3   | F     | 1170/1172 (100%) | 1127 (96%) | 43 (4%)  | 0        | 100         | 100 |
| 3   | I     | 1170/1172 (100%) | 1127 (96%) | 43 (4%)  | 0        | 100         | 100 |
| 3   | L     | 1170/1172 (100%) | 1125 (96%) | 45 (4%)  | 0        | 100         | 100 |
| All | All   | 7600/7736 (98%)  | 7244 (95%) | 332 (4%) | 24 (0%)  | 38          | 70  |

All (24) Ramachandran outliers are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 77  | TYR  |
| 2   | B     | 524 | LYS  |
| 1   | D     | 77  | TYR  |
| 2   | E     | 524 | LYS  |
| 1   | G     | 77  | TYR  |
| 2   | H     | 524 | LYS  |
| 1   | J     | 77  | TYR  |
| 2   | K     | 524 | LYS  |
| 1   | A     | 76  | PHE  |
| 1   | A     | 78  | SER  |
| 1   | D     | 76  | PHE  |
| 1   | D     | 78  | SER  |
| 1   | G     | 76  | PHE  |
| 1   | G     | 78  | SER  |
| 1   | J     | 76  | PHE  |
| 1   | J     | 78  | SER  |
| 1   | A     | 64  | ASP  |
| 1   | D     | 64  | ASP  |
| 1   | G     | 64  | ASP  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | J     | 64  | ASP  |
| 2   | B     | 228 | PRO  |
| 2   | E     | 228 | PRO  |
| 2   | H     | 228 | PRO  |
| 2   | K     | 228 | PRO  |

### 5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

| Mol | Chain | Analysed        | Rotameric   | Outliers | Percentiles |     |
|-----|-------|-----------------|-------------|----------|-------------|-----|
| 1   | A     | 119/142 (84%)   | 119 (100%)  | 0        | 100         | 100 |
| 1   | D     | 119/142 (84%)   | 119 (100%)  | 0        | 100         | 100 |
| 1   | G     | 119/142 (84%)   | 119 (100%)  | 0        | 100         | 100 |
| 1   | J     | 119/142 (84%)   | 119 (100%)  | 0        | 100         | 100 |
| 2   | B     | 471/471 (100%)  | 468 (99%)   | 3 (1%)   | 84          | 93  |
| 2   | E     | 471/471 (100%)  | 468 (99%)   | 3 (1%)   | 84          | 93  |
| 2   | H     | 471/471 (100%)  | 468 (99%)   | 3 (1%)   | 84          | 93  |
| 2   | K     | 471/471 (100%)  | 468 (99%)   | 3 (1%)   | 84          | 93  |
| 3   | C     | 951/951 (100%)  | 945 (99%)   | 6 (1%)   | 84          | 93  |
| 3   | F     | 951/951 (100%)  | 946 (100%)  | 5 (0%)   | 86          | 94  |
| 3   | I     | 951/951 (100%)  | 947 (100%)  | 4 (0%)   | 89          | 95  |
| 3   | L     | 951/951 (100%)  | 946 (100%)  | 5 (0%)   | 86          | 94  |
| All | All   | 6164/6256 (98%) | 6132 (100%) | 32 (0%)  | 85          | 94  |

All (32) residues with a non-rotameric sidechain are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 2   | B     | 47  | TYR  |
| 2   | B     | 183 | ASP  |
| 2   | B     | 184 | GLU  |
| 3   | C     | 251 | LEU  |
| 3   | C     | 272 | ASP  |

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| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 3   | C     | 583 | ASP  |
| 3   | C     | 639 | PHE  |
| 3   | C     | 809 | THR  |
| 3   | C     | 890 | VAL  |
| 2   | E     | 47  | TYR  |
| 2   | E     | 183 | ASP  |
| 2   | E     | 184 | GLU  |
| 3   | F     | 251 | LEU  |
| 3   | F     | 272 | ASP  |
| 3   | F     | 639 | PHE  |
| 3   | F     | 809 | THR  |
| 3   | F     | 890 | VAL  |
| 2   | H     | 47  | TYR  |
| 2   | H     | 183 | ASP  |
| 2   | H     | 184 | GLU  |
| 3   | I     | 251 | LEU  |
| 3   | I     | 272 | ASP  |
| 3   | I     | 639 | PHE  |
| 3   | I     | 809 | THR  |
| 2   | K     | 47  | TYR  |
| 2   | K     | 183 | ASP  |
| 2   | K     | 184 | GLU  |
| 3   | L     | 251 | LEU  |
| 3   | L     | 272 | ASP  |
| 3   | L     | 583 | ASP  |
| 3   | L     | 639 | PHE  |
| 3   | L     | 809 | THR  |

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (45) such sidechains are listed below:

| Mol | Chain | Res | Type |
|-----|-------|-----|------|
| 1   | A     | 83  | ASN  |
| 2   | B     | 25  | GLN  |
| 2   | B     | 29  | ASN  |
| 2   | B     | 306 | ASN  |
| 3   | C     | 37  | HIS  |
| 3   | C     | 72  | GLN  |
| 3   | C     | 125 | GLN  |
| 3   | C     | 168 | GLN  |
| 3   | C     | 262 | ASN  |
| 3   | C     | 545 | GLN  |
| 3   | C     | 734 | HIS  |

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| Mol | Chain | Res  | Type |
|-----|-------|------|------|
| 3   | C     | 887  | ASN  |
| 1   | D     | 83   | ASN  |
| 2   | E     | 25   | GLN  |
| 2   | E     | 29   | ASN  |
| 2   | E     | 306  | ASN  |
| 3   | F     | 7    | ASN  |
| 3   | F     | 125  | GLN  |
| 3   | F     | 168  | GLN  |
| 3   | F     | 545  | GLN  |
| 3   | F     | 734  | HIS  |
| 3   | F     | 887  | ASN  |
| 3   | F     | 1124 | ASN  |
| 1   | G     | 83   | ASN  |
| 2   | H     | 25   | GLN  |
| 2   | H     | 29   | ASN  |
| 2   | H     | 306  | ASN  |
| 3   | I     | 37   | HIS  |
| 3   | I     | 125  | GLN  |
| 3   | I     | 168  | GLN  |
| 3   | I     | 262  | ASN  |
| 3   | I     | 545  | GLN  |
| 3   | I     | 734  | HIS  |
| 3   | I     | 887  | ASN  |
| 1   | J     | 83   | ASN  |
| 2   | K     | 25   | GLN  |
| 2   | K     | 29   | ASN  |
| 3   | L     | 7    | ASN  |
| 3   | L     | 125  | GLN  |
| 3   | L     | 168  | GLN  |
| 3   | L     | 262  | ASN  |
| 3   | L     | 545  | GLN  |
| 3   | L     | 734  | HIS  |
| 3   | L     | 887  | ASN  |
| 3   | L     | 1124 | ASN  |

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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 [i](#)

Of 68 ligands modelled in this entry, 4 are monoatomic - leaving 64 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 |
| 8   | NAD  | H     | 606  | -    | 42,48,48     | 1.56 | 4 (9%)   | 50,73,73    | 1.80 | 8 (16%)  |
| 7   | SF4  | L     | 1208 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 4   | FES  | D     | 201  | 1    | 0,4,4        | -    | -        | -           |      |          |
| 7   | SF4  | L     | 1207 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | L     | 1202 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | I     | 1205 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 8   | NAD  | K     | 606  | -    | 42,48,48     | 1.56 | 4 (9%)   | 50,73,73    | 1.79 | 8 (16%)  |
| 4   | FES  | A     | 201  | 1    | 0,4,4        | -    | -        | -           |      |          |
| 7   | SF4  | H     | 607  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | I     | 1206 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 9   | FAD  | I     | 1201 | -    | 53,58,58     | 0.54 | 1 (1%)   | 68,89,89    | 0.53 | 1 (1%)   |
| 10  | NDP  | I     | 1203 | -    | 45,52,52     | 1.24 | 5 (11%)  | 53,80,80    | 2.07 | 13 (24%) |
| 7   | SF4  | C     | 1208 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | I     | 1202 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 4   | FES  | J     | 201  | 1    | 0,4,4        | -    | -        | -           |      |          |
| 7   | SF4  | L     | 1206 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 8   | NAD  | B     | 606  | -    | 42,48,48     | 1.56 | 4 (9%)   | 50,73,73    | 1.80 | 8 (16%)  |
| 4   | FES  | B     | 602  | 2    | 0,4,4        | -    | -        | -           |      |          |
| 7   | SF4  | C     | 1205 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 4   | FES  | E     | 602  | 2    | 0,4,4        | -    | -        | -           |      |          |
| 8   | NAD  | E     | 606  | -    | 42,48,48     | 1.56 | 4 (9%)   | 50,73,73    | 1.80 | 8 (16%)  |
| 7   | SF4  | C     | 1204 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | E     | 605  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 4   | FES  | G     | 201  | 1    | 0,4,4        | -    | -        | -           |      |          |
| 7   | SF4  | F     | 1202 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | F     | 1207 | 3    | 0,12,12      | -    | -        | -           |      |          |

| Mol | Type | Chain | Res  | Link | Bond lengths |      |          | Bond angles |      |          |
|-----|------|-------|------|------|--------------|------|----------|-------------|------|----------|
|     |      |       |      |      | Counts       | RMSZ | # Z  > 2 | Counts      | RMSZ | # Z  > 2 |
| 7   | SF4  | C     | 1206 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | K     | 605  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | K     | 607  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 4   | FES  | I     | 1209 | 3    | 0,4,4        | -    | -        | -           |      |          |
| 7   | SF4  | H     | 605  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | B     | 604  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | B     | 605  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 4   | FES  | L     | 1209 | 3    | 0,4,4        | -    | -        | -           |      |          |
| 7   | SF4  | B     | 607  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 4   | FES  | F     | 1209 | 3    | 0,4,4        | -    | -        | -           |      |          |
| 4   | FES  | H     | 602  | 2    | 0,4,4        | -    | -        | -           |      |          |
| 7   | SF4  | E     | 604  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | K     | 604  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | I     | 1204 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 9   | FAD  | L     | 1201 | -    | 53,58,58     | 0.54 | 1 (1%)   | 68,89,89    | 0.53 | 1 (1%)   |
| 10  | NDP  | C     | 1203 | -    | 45,52,52     | 1.24 | 5 (11%)  | 53,80,80    | 2.07 | 13 (24%) |
| 7   | SF4  | H     | 604  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 6   | FMN  | H     | 603  | -    | 33,33,33     | 1.11 | 2 (6%)   | 48,50,50    | 1.31 | 8 (16%)  |
| 4   | FES  | K     | 602  | 2    | 0,4,4        | -    | -        | -           |      |          |
| 10  | NDP  | F     | 1203 | -    | 45,52,52     | 1.25 | 5 (11%)  | 53,80,80    | 2.07 | 13 (24%) |
| 7   | SF4  | C     | 1207 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | I     | 1208 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | L     | 1204 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 10  | NDP  | L     | 1203 | -    | 45,52,52     | 1.25 | 5 (11%)  | 53,80,80    | 2.07 | 13 (24%) |
| 7   | SF4  | L     | 1205 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 6   | FMN  | K     | 603  | -    | 33,33,33     | 1.11 | 2 (6%)   | 48,50,50    | 1.32 | 8 (16%)  |
| 7   | SF4  | F     | 1208 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 9   | FAD  | C     | 1201 | -    | 53,58,58     | 0.54 | 1 (1%)   | 68,89,89    | 0.53 | 1 (1%)   |
| 7   | SF4  | I     | 1207 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | F     | 1205 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 9   | FAD  | F     | 1201 | -    | 53,58,58     | 0.54 | 1 (1%)   | 68,89,89    | 0.53 | 1 (1%)   |
| 7   | SF4  | C     | 1202 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 6   | FMN  | B     | 603  | -    | 33,33,33     | 1.11 | 2 (6%)   | 48,50,50    | 1.32 | 8 (16%)  |
| 6   | FMN  | E     | 603  | -    | 33,33,33     | 1.10 | 2 (6%)   | 48,50,50    | 1.32 | 8 (16%)  |
| 7   | SF4  | F     | 1204 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | E     | 607  | 2    | 0,12,12      | -    | -        | -           |      |          |
| 7   | SF4  | F     | 1206 | 3    | 0,12,12      | -    | -        | -           |      |          |
| 4   | FES  | C     | 1209 | 3    | 0,4,4        | -    | -        | -           |      |          |

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   |
|-----|------|-------|------|------|---------|-------------|---------|
| 8   | NAD  | H     | 606  | -    | -       | 11/26/62/62 | 0/5/5/5 |
| 7   | SF4  | L     | 1208 | 3    | -       | -           | 0/6/5/5 |
| 8   | NAD  | K     | 606  | -    | -       | 11/26/62/62 | 0/5/5/5 |
| 4   | FES  | D     | 201  | 1    | -       | -           | 0/1/1/1 |
| 7   | SF4  | L     | 1202 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | I     | 1205 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | L     | 1207 | 3    | -       | -           | 0/6/5/5 |
| 4   | FES  | A     | 201  | 1    | -       | -           | 0/1/1/1 |
| 7   | SF4  | H     | 607  | 2    | -       | -           | 0/6/5/5 |
| 7   | SF4  | I     | 1206 | 3    | -       | -           | 0/6/5/5 |
| 10  | NDP  | I     | 1203 | -    | -       | 12/30/77/77 | 0/5/5/5 |
| 9   | FAD  | I     | 1201 | -    | -       | 8/30/50/50  | 0/6/6/6 |
| 7   | SF4  | C     | 1208 | 3    | -       | -           | 0/6/5/5 |
| 8   | NAD  | B     | 606  | -    | -       | 11/26/62/62 | 0/5/5/5 |
| 4   | FES  | J     | 201  | 1    | -       | -           | 0/1/1/1 |
| 7   | SF4  | I     | 1202 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | L     | 1206 | 3    | -       | -           | 0/6/5/5 |
| 4   | FES  | B     | 602  | 2    | -       | -           | 0/1/1/1 |
| 7   | SF4  | C     | 1205 | 3    | -       | -           | 0/6/5/5 |
| 8   | NAD  | E     | 606  | -    | -       | 11/26/62/62 | 0/5/5/5 |
| 4   | FES  | E     | 602  | 2    | -       | -           | 0/1/1/1 |
| 7   | SF4  | C     | 1204 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | E     | 605  | 2    | -       | -           | 0/6/5/5 |
| 4   | FES  | G     | 201  | 1    | -       | -           | 0/1/1/1 |
| 7   | SF4  | F     | 1202 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | F     | 1207 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | C     | 1206 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | K     | 605  | 2    | -       | -           | 0/6/5/5 |
| 7   | SF4  | K     | 607  | 2    | -       | -           | 0/6/5/5 |
| 4   | FES  | I     | 1209 | 3    | -       | -           | 0/1/1/1 |
| 7   | SF4  | H     | 605  | 2    | -       | -           | 0/6/5/5 |
| 7   | SF4  | B     | 604  | 2    | -       | -           | 0/6/5/5 |
| 7   | SF4  | B     | 605  | 2    | -       | -           | 0/6/5/5 |
| 4   | FES  | L     | 1209 | 3    | -       | -           | 0/1/1/1 |
| 7   | SF4  | B     | 607  | 2    | -       | -           | 0/6/5/5 |
| 4   | FES  | F     | 1209 | 3    | -       | -           | 0/1/1/1 |
| 4   | FES  | H     | 602  | 2    | -       | -           | 0/1/1/1 |
| 7   | SF4  | E     | 604  | 2    | -       | -           | 0/6/5/5 |
| 7   | SF4  | K     | 604  | 2    | -       | -           | 0/6/5/5 |

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| Mol | Type | Chain | Res  | Link | Chirals | Torsions    | Rings   |
|-----|------|-------|------|------|---------|-------------|---------|
| 7   | SF4  | I     | 1204 | 3    | -       | -           | 0/6/5/5 |
| 9   | FAD  | L     | 1201 | -    | -       | 8/30/50/50  | 0/6/6/6 |
| 10  | NDP  | C     | 1203 | -    | -       | 12/30/77/77 | 0/5/5/5 |
| 10  | NDP  | L     | 1203 | -    | -       | 12/30/77/77 | 0/5/5/5 |
| 6   | FMN  | H     | 603  | -    | -       | 7/18/18/18  | 0/3/3/3 |
| 10  | NDP  | F     | 1203 | -    | -       | 12/30/77/77 | 0/5/5/5 |
| 4   | FES  | K     | 602  | 2    | -       | -           | 0/1/1/1 |
| 7   | SF4  | C     | 1207 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | H     | 604  | 2    | -       | -           | 0/6/5/5 |
| 7   | SF4  | I     | 1208 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | L     | 1204 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | L     | 1205 | 3    | -       | -           | 0/6/5/5 |
| 6   | FMN  | K     | 603  | -    | -       | 7/18/18/18  | 0/3/3/3 |
| 7   | SF4  | F     | 1208 | 3    | -       | -           | 0/6/5/5 |
| 9   | FAD  | C     | 1201 | -    | -       | 8/30/50/50  | 0/6/6/6 |
| 7   | SF4  | I     | 1207 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | F     | 1205 | 3    | -       | -           | 0/6/5/5 |
| 9   | FAD  | F     | 1201 | -    | -       | 8/30/50/50  | 0/6/6/6 |
| 7   | SF4  | C     | 1202 | 3    | -       | -           | 0/6/5/5 |
| 6   | FMN  | B     | 603  | -    | -       | 7/18/18/18  | 0/3/3/3 |
| 6   | FMN  | E     | 603  | -    | -       | 7/18/18/18  | 0/3/3/3 |
| 7   | SF4  | F     | 1204 | 3    | -       | -           | 0/6/5/5 |
| 7   | SF4  | E     | 607  | 2    | -       | -           | 0/6/5/5 |
| 7   | SF4  | F     | 1206 | 3    | -       | -           | 0/6/5/5 |
| 4   | FES  | C     | 1209 | 3    | -       | -           | 0/1/1/1 |

All (48) bond length outliers are listed below:

| Mol | Chain | Res | Type | Atoms   | Z    | Observed(Å) | Ideal(Å) |
|-----|-------|-----|------|---------|------|-------------|----------|
| 8   | B     | 606 | NAD  | C4N-C3N | 6.86 | 1.51        | 1.39     |
| 8   | K     | 606 | NAD  | C4N-C3N | 6.86 | 1.51        | 1.39     |
| 8   | H     | 606 | NAD  | C4N-C3N | 6.84 | 1.51        | 1.39     |
| 8   | E     | 606 | NAD  | C4N-C3N | 6.83 | 1.51        | 1.39     |
| 6   | B     | 603 | FMN  | C4A-N5  | 3.73 | 1.38        | 1.30     |
| 6   | K     | 603 | FMN  | C4A-N5  | 3.73 | 1.38        | 1.30     |
| 6   | H     | 603 | FMN  | C4A-N5  | 3.72 | 1.38        | 1.30     |
| 6   | E     | 603 | FMN  | C4A-N5  | 3.69 | 1.37        | 1.30     |
| 8   | B     | 606 | NAD  | C5N-C4N | 3.62 | 1.46        | 1.38     |
| 8   | E     | 606 | NAD  | C5N-C4N | 3.62 | 1.46        | 1.38     |
| 8   | H     | 606 | NAD  | C5N-C4N | 3.61 | 1.46        | 1.38     |

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| Mol | Chain | Res  | Type | Atoms   | Z     | Observed(Å) | Ideal(Å) |
|-----|-------|------|------|---------|-------|-------------|----------|
| 8   | K     | 606  | NAD  | C5N-C4N | 3.61  | 1.46        | 1.38     |
| 10  | C     | 1203 | NDP  | C5A-C4A | 3.41  | 1.49        | 1.40     |
| 10  | F     | 1203 | NDP  | C5A-C4A | 3.41  | 1.49        | 1.40     |
| 10  | L     | 1203 | NDP  | C5A-C4A | 3.41  | 1.49        | 1.40     |
| 10  | I     | 1203 | NDP  | C5A-C4A | 3.38  | 1.49        | 1.40     |
| 8   | E     | 606  | NAD  | C2D-C1D | -3.17 | 1.48        | 1.53     |
| 8   | H     | 606  | NAD  | C2D-C1D | -3.14 | 1.49        | 1.53     |
| 8   | B     | 606  | NAD  | C2D-C1D | -3.12 | 1.49        | 1.53     |
| 8   | K     | 606  | NAD  | C2D-C1D | -3.08 | 1.49        | 1.53     |
| 10  | I     | 1203 | NDP  | C6N-C5N | 3.01  | 1.38        | 1.33     |
| 10  | C     | 1203 | NDP  | C6N-C5N | 3.01  | 1.38        | 1.33     |
| 10  | F     | 1203 | NDP  | C6N-C5N | 3.01  | 1.38        | 1.33     |
| 10  | L     | 1203 | NDP  | C6N-C5N | 2.97  | 1.38        | 1.33     |
| 10  | I     | 1203 | NDP  | C6A-C5A | 2.69  | 1.53        | 1.43     |
| 10  | L     | 1203 | NDP  | C6A-C5A | 2.67  | 1.53        | 1.43     |
| 10  | C     | 1203 | NDP  | C6A-C5A | 2.67  | 1.53        | 1.43     |
| 10  | F     | 1203 | NDP  | C6A-C5A | 2.67  | 1.53        | 1.43     |
| 6   | H     | 603  | FMN  | C10-N1  | 2.50  | 1.38        | 1.33     |
| 6   | K     | 603  | FMN  | C10-N1  | 2.49  | 1.38        | 1.33     |
| 6   | B     | 603  | FMN  | C10-N1  | 2.46  | 1.38        | 1.33     |
| 6   | E     | 603  | FMN  | C10-N1  | 2.42  | 1.38        | 1.33     |
| 8   | H     | 606  | NAD  | C2B-C1B | -2.32 | 1.50        | 1.53     |
| 8   | B     | 606  | NAD  | C2B-C1B | -2.31 | 1.50        | 1.53     |
| 8   | K     | 606  | NAD  | C2B-C1B | -2.31 | 1.50        | 1.53     |
| 10  | C     | 1203 | NDP  | P2B-O2B | 2.27  | 1.63        | 1.59     |
| 10  | I     | 1203 | NDP  | P2B-O2B | 2.27  | 1.63        | 1.59     |
| 10  | F     | 1203 | NDP  | P2B-O2B | 2.27  | 1.63        | 1.59     |
| 10  | L     | 1203 | NDP  | P2B-O2B | 2.27  | 1.63        | 1.59     |
| 8   | E     | 606  | NAD  | C2B-C1B | -2.26 | 1.50        | 1.53     |
| 10  | C     | 1203 | NDP  | O7N-C7N | -2.10 | 1.19        | 1.24     |
| 10  | F     | 1203 | NDP  | O7N-C7N | -2.10 | 1.19        | 1.24     |
| 10  | I     | 1203 | NDP  | O7N-C7N | -2.10 | 1.19        | 1.24     |
| 10  | L     | 1203 | NDP  | O7N-C7N | -2.10 | 1.19        | 1.24     |
| 9   | C     | 1201 | FAD  | P-O2P   | -2.03 | 1.45        | 1.55     |
| 9   | F     | 1201 | FAD  | P-O2P   | -2.03 | 1.45        | 1.55     |
| 9   | L     | 1201 | FAD  | P-O2P   | -2.03 | 1.45        | 1.55     |
| 9   | I     | 1201 | FAD  | P-O2P   | -2.02 | 1.45        | 1.55     |

All (120) bond angle outliers are listed below:

| Mol | Chain | Res  | Type | Atoms       | Z    | Observed(°) | Ideal(°) |
|-----|-------|------|------|-------------|------|-------------|----------|
| 10  | C     | 1203 | NDP  | C5A-C6A-N6A | 7.54 | 131.81      | 120.35   |

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| Mol | Chain | Res  | Type | Atoms       | Z     | Observed(°) | Ideal(°) |
|-----|-------|------|------|-------------|-------|-------------|----------|
| 10  | F     | 1203 | NDP  | C5A-C6A-N6A | 7.54  | 131.81      | 120.35   |
| 10  | I     | 1203 | NDP  | C5A-C6A-N6A | 7.54  | 131.80      | 120.35   |
| 10  | L     | 1203 | NDP  | C5A-C6A-N6A | 7.52  | 131.78      | 120.35   |
| 8   | E     | 606  | NAD  | C5N-C4N-C3N | -7.05 | 112.00      | 120.34   |
| 8   | B     | 606  | NAD  | C5N-C4N-C3N | -7.03 | 112.03      | 120.34   |
| 8   | H     | 606  | NAD  | C5N-C4N-C3N | -7.02 | 112.04      | 120.34   |
| 8   | K     | 606  | NAD  | C5N-C4N-C3N | -6.99 | 112.07      | 120.34   |
| 10  | C     | 1203 | NDP  | C4A-C5A-N7A | -6.98 | 102.12      | 109.40   |
| 10  | F     | 1203 | NDP  | C4A-C5A-N7A | -6.98 | 102.12      | 109.40   |
| 10  | L     | 1203 | NDP  | C4A-C5A-N7A | -6.98 | 102.13      | 109.40   |
| 10  | I     | 1203 | NDP  | C4A-C5A-N7A | -6.96 | 102.14      | 109.40   |
| 8   | B     | 606  | NAD  | C3N-C2N-N1N | 4.64  | 124.96      | 120.43   |
| 8   | E     | 606  | NAD  | C3N-C2N-N1N | 4.64  | 124.96      | 120.43   |
| 8   | K     | 606  | NAD  | C3N-C2N-N1N | 4.63  | 124.95      | 120.43   |
| 8   | H     | 606  | NAD  | C3N-C2N-N1N | 4.59  | 124.92      | 120.43   |
| 10  | I     | 1203 | NDP  | C2A-N1A-C6A | 3.82  | 125.29      | 118.75   |
| 10  | L     | 1203 | NDP  | C2A-N1A-C6A | 3.82  | 125.29      | 118.75   |
| 10  | C     | 1203 | NDP  | C2A-N1A-C6A | 3.81  | 125.28      | 118.75   |
| 10  | F     | 1203 | NDP  | C2A-N1A-C6A | 3.80  | 125.25      | 118.75   |
| 8   | B     | 606  | NAD  | N3A-C2A-N1A | -3.57 | 123.09      | 128.68   |
| 8   | H     | 606  | NAD  | N3A-C2A-N1A | -3.57 | 123.09      | 128.68   |
| 8   | E     | 606  | NAD  | N3A-C2A-N1A | -3.55 | 123.12      | 128.68   |
| 8   | K     | 606  | NAD  | N3A-C2A-N1A | -3.55 | 123.12      | 128.68   |
| 10  | I     | 1203 | NDP  | O4B-C1B-C2B | -3.54 | 100.45      | 106.59   |
| 10  | L     | 1203 | NDP  | O4B-C1B-C2B | -3.53 | 100.47      | 106.59   |
| 10  | C     | 1203 | NDP  | O4B-C1B-C2B | -3.52 | 100.48      | 106.59   |
| 10  | F     | 1203 | NDP  | O4B-C1B-C2B | -3.52 | 100.48      | 106.59   |
| 6   | K     | 603  | FMN  | C4-N3-C2    | -3.43 | 119.30      | 125.64   |
| 6   | B     | 603  | FMN  | C4-N3-C2    | -3.41 | 119.34      | 125.64   |
| 6   | H     | 603  | FMN  | C4-N3-C2    | -3.41 | 119.34      | 125.64   |
| 6   | E     | 603  | FMN  | C4-N3-C2    | -3.39 | 119.38      | 125.64   |
| 10  | I     | 1203 | NDP  | C5A-C6A-N1A | -3.36 | 112.74      | 120.35   |
| 10  | C     | 1203 | NDP  | C5A-C6A-N1A | -3.35 | 112.77      | 120.35   |
| 10  | L     | 1203 | NDP  | C5A-C6A-N1A | -3.34 | 112.79      | 120.35   |
| 10  | F     | 1203 | NDP  | C5A-C6A-N1A | -3.34 | 112.79      | 120.35   |
| 8   | B     | 606  | NAD  | O4D-C1D-C2D | -3.31 | 102.08      | 106.93   |
| 8   | E     | 606  | NAD  | O4D-C1D-C2D | -3.30 | 102.10      | 106.93   |
| 8   | K     | 606  | NAD  | O4D-C1D-C2D | -3.29 | 102.11      | 106.93   |
| 8   | H     | 606  | NAD  | O4D-C1D-C2D | -3.28 | 102.13      | 106.93   |
| 8   | K     | 606  | NAD  | C2N-N1N-C1D | -2.98 | 112.51      | 119.14   |
| 8   | H     | 606  | NAD  | C2N-N1N-C1D | -2.97 | 112.53      | 119.14   |
| 6   | K     | 603  | FMN  | C4A-C4-N3   | 2.96  | 120.71      | 113.19   |

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| Mol | Chain | Res  | Type | Atoms       | Z     | Observed(°) | Ideal(°) |
|-----|-------|------|------|-------------|-------|-------------|----------|
| 8   | B     | 606  | NAD  | C2N-N1N-C1D | -2.96 | 112.55      | 119.14   |
| 6   | B     | 603  | FMN  | C4A-C4-N3   | 2.95  | 120.67      | 113.19   |
| 6   | H     | 603  | FMN  | C4A-C4-N3   | 2.95  | 120.67      | 113.19   |
| 8   | E     | 606  | NAD  | C2N-N1N-C1D | -2.93 | 112.60      | 119.14   |
| 6   | E     | 603  | FMN  | C4A-C4-N3   | 2.93  | 120.64      | 113.19   |
| 8   | E     | 606  | NAD  | O4B-C1B-C2B | -2.79 | 102.84      | 106.93   |
| 8   | H     | 606  | NAD  | O4B-C1B-C2B | -2.79 | 102.85      | 106.93   |
| 8   | B     | 606  | NAD  | O4B-C1B-C2B | -2.76 | 102.89      | 106.93   |
| 8   | K     | 606  | NAD  | O4B-C1B-C2B | -2.76 | 102.89      | 106.93   |
| 10  | F     | 1203 | NDP  | O2B-C2B-C1B | 2.75  | 120.01      | 110.10   |
| 10  | I     | 1203 | NDP  | O2B-C2B-C1B | 2.75  | 120.01      | 110.10   |
| 10  | C     | 1203 | NDP  | O2B-C2B-C1B | 2.74  | 119.98      | 110.10   |
| 10  | L     | 1203 | NDP  | O2B-C2B-C1B | 2.74  | 119.97      | 110.10   |
| 6   | K     | 603  | FMN  | O4-C4-C4A   | -2.70 | 119.42      | 126.60   |
| 6   | B     | 603  | FMN  | O4-C4-C4A   | -2.69 | 119.46      | 126.60   |
| 6   | E     | 603  | FMN  | O4-C4-C4A   | -2.67 | 119.50      | 126.60   |
| 6   | H     | 603  | FMN  | O4-C4-C4A   | -2.67 | 119.50      | 126.60   |
| 8   | H     | 606  | NAD  | C4A-C5A-N7A | -2.67 | 106.61      | 109.40   |
| 8   | K     | 606  | NAD  | C4A-C5A-N7A | -2.67 | 106.61      | 109.40   |
| 6   | K     | 603  | FMN  | C4A-C10-N1  | -2.67 | 118.54      | 124.73   |
| 6   | B     | 603  | FMN  | C4A-C10-N1  | -2.66 | 118.55      | 124.73   |
| 6   | E     | 603  | FMN  | C4A-C10-N1  | -2.65 | 118.57      | 124.73   |
| 6   | H     | 603  | FMN  | C4A-C10-N1  | -2.65 | 118.58      | 124.73   |
| 8   | B     | 606  | NAD  | C4A-C5A-N7A | -2.64 | 106.65      | 109.40   |
| 8   | E     | 606  | NAD  | C4A-C5A-N7A | -2.64 | 106.65      | 109.40   |
| 10  | C     | 1203 | NDP  | O3B-C3B-C4B | -2.64 | 103.43      | 111.05   |
| 10  | F     | 1203 | NDP  | O3B-C3B-C4B | -2.64 | 103.43      | 111.05   |
| 10  | I     | 1203 | NDP  | O3B-C3B-C4B | -2.63 | 103.44      | 111.05   |
| 8   | E     | 606  | NAD  | C6N-C5N-C4N | 2.63  | 123.26      | 119.44   |
| 10  | L     | 1203 | NDP  | O3B-C3B-C4B | -2.62 | 103.46      | 111.05   |
| 10  | C     | 1203 | NDP  | N3A-C2A-N1A | -2.62 | 124.58      | 128.68   |
| 10  | F     | 1203 | NDP  | N3A-C2A-N1A | -2.62 | 124.58      | 128.68   |
| 10  | I     | 1203 | NDP  | N3A-C2A-N1A | -2.62 | 124.58      | 128.68   |
| 10  | L     | 1203 | NDP  | N3A-C2A-N1A | -2.61 | 124.59      | 128.68   |
| 8   | B     | 606  | NAD  | C6N-C5N-C4N | 2.59  | 123.21      | 119.44   |
| 8   | H     | 606  | NAD  | C6N-C5N-C4N | 2.59  | 123.20      | 119.44   |
| 10  | C     | 1203 | NDP  | O2B-C2B-C3B | -2.57 | 102.36      | 111.68   |
| 8   | K     | 606  | NAD  | C6N-C5N-C4N | 2.57  | 123.18      | 119.44   |
| 10  | F     | 1203 | NDP  | O2B-C2B-C3B | -2.57 | 102.36      | 111.68   |
| 10  | L     | 1203 | NDP  | O2B-C2B-C3B | -2.57 | 102.37      | 111.68   |
| 10  | I     | 1203 | NDP  | O2B-C2B-C3B | -2.57 | 102.37      | 111.68   |
| 6   | B     | 603  | FMN  | C5A-C9A-N10 | 2.52  | 120.56      | 117.95   |

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| Mol | Chain | Res  | Type | Atoms       | Z     | Observed(°) | Ideal(°) |
|-----|-------|------|------|-------------|-------|-------------|----------|
| 6   | E     | 603  | FMN  | C5A-C9A-N10 | 2.52  | 120.56      | 117.95   |
| 6   | H     | 603  | FMN  | C5A-C9A-N10 | 2.52  | 120.56      | 117.95   |
| 6   | K     | 603  | FMN  | C5A-C9A-N10 | 2.49  | 120.53      | 117.95   |
| 10  | L     | 1203 | NDP  | O2D-C2D-C1D | 2.44  | 118.17      | 110.02   |
| 10  | C     | 1203 | NDP  | O2D-C2D-C1D | 2.44  | 118.17      | 110.02   |
| 10  | I     | 1203 | NDP  | O2D-C2D-C1D | 2.43  | 118.16      | 110.02   |
| 10  | F     | 1203 | NDP  | O2D-C2D-C1D | 2.43  | 118.14      | 110.02   |
| 6   | K     | 603  | FMN  | C4A-C10-N10 | 2.34  | 119.90      | 116.48   |
| 6   | H     | 603  | FMN  | C4A-C10-N10 | 2.31  | 119.86      | 116.48   |
| 6   | B     | 603  | FMN  | C4A-C10-N10 | 2.31  | 119.86      | 116.48   |
| 10  | L     | 1203 | NDP  | O4B-C4B-C5B | 2.30  | 116.95      | 109.37   |
| 10  | C     | 1203 | NDP  | O4B-C4B-C5B | 2.30  | 116.93      | 109.37   |
| 9   | C     | 1201 | FAD  | C5A-C6A-N6A | 2.29  | 123.84      | 120.35   |
| 9   | F     | 1201 | FAD  | C5A-C6A-N6A | 2.29  | 123.84      | 120.35   |
| 9   | I     | 1201 | FAD  | C5A-C6A-N6A | 2.29  | 123.84      | 120.35   |
| 9   | L     | 1201 | FAD  | C5A-C6A-N6A | 2.29  | 123.84      | 120.35   |
| 10  | F     | 1203 | NDP  | O4B-C4B-C5B | 2.29  | 116.92      | 109.37   |
| 10  | I     | 1203 | NDP  | O4B-C4B-C5B | 2.29  | 116.91      | 109.37   |
| 6   | E     | 603  | FMN  | C4A-C10-N10 | 2.29  | 119.83      | 116.48   |
| 6   | E     | 603  | FMN  | C9A-C5A-N5  | -2.27 | 119.96      | 122.43   |
| 6   | B     | 603  | FMN  | C10-N1-C2   | 2.25  | 121.40      | 116.90   |
| 6   | E     | 603  | FMN  | C10-N1-C2   | 2.25  | 121.39      | 116.90   |
| 6   | H     | 603  | FMN  | C9A-C5A-N5  | -2.24 | 120.00      | 122.43   |
| 6   | K     | 603  | FMN  | C10-N1-C2   | 2.23  | 121.37      | 116.90   |
| 6   | H     | 603  | FMN  | C10-N1-C2   | 2.23  | 121.37      | 116.90   |
| 6   | B     | 603  | FMN  | C9A-C5A-N5  | -2.22 | 120.02      | 122.43   |
| 10  | C     | 1203 | NDP  | C1D-N1N-C6N | -2.21 | 116.06      | 120.83   |
| 10  | I     | 1203 | NDP  | C1D-N1N-C6N | -2.21 | 116.06      | 120.83   |
| 10  | L     | 1203 | NDP  | C1D-N1N-C6N | -2.21 | 116.06      | 120.83   |
| 6   | K     | 603  | FMN  | C9A-C5A-N5  | -2.21 | 120.03      | 122.43   |
| 10  | F     | 1203 | NDP  | C1D-N1N-C6N | -2.20 | 116.08      | 120.83   |
| 10  | I     | 1203 | NDP  | PN-O3-PA    | -2.17 | 125.39      | 132.83   |
| 10  | F     | 1203 | NDP  | PN-O3-PA    | -2.16 | 125.41      | 132.83   |
| 10  | C     | 1203 | NDP  | PN-O3-PA    | -2.16 | 125.42      | 132.83   |
| 10  | L     | 1203 | NDP  | PN-O3-PA    | -2.15 | 125.45      | 132.83   |

There are no chirality outliers.

All (152) torsion outliers are listed below:

| Mol | Chain | Res | Type | Atoms           |
|-----|-------|-----|------|-----------------|
| 6   | B     | 603 | FMN  | N10-C1'-C2'-O2' |
| 6   | B     | 603 | FMN  | N10-C1'-C2'-C3' |

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| Mol | Chain | Res  | Type | Atoms           |
|-----|-------|------|------|-----------------|
| 6   | B     | 603  | FMN  | C3'-C4'-C5'-O5' |
| 6   | B     | 603  | FMN  | O4'-C4'-C5'-O5' |
| 6   | E     | 603  | FMN  | N10-C1'-C2'-O2' |
| 6   | E     | 603  | FMN  | N10-C1'-C2'-C3' |
| 6   | E     | 603  | FMN  | C3'-C4'-C5'-O5' |
| 6   | E     | 603  | FMN  | O4'-C4'-C5'-O5' |
| 6   | H     | 603  | FMN  | N10-C1'-C2'-O2' |
| 6   | H     | 603  | FMN  | N10-C1'-C2'-C3' |
| 6   | H     | 603  | FMN  | C3'-C4'-C5'-O5' |
| 6   | H     | 603  | FMN  | O4'-C4'-C5'-O5' |
| 6   | K     | 603  | FMN  | N10-C1'-C2'-O2' |
| 6   | K     | 603  | FMN  | N10-C1'-C2'-C3' |
| 6   | K     | 603  | FMN  | C3'-C4'-C5'-O5' |
| 6   | K     | 603  | FMN  | O4'-C4'-C5'-O5' |
| 8   | B     | 606  | NAD  | C5B-O5B-PA-O1A  |
| 8   | B     | 606  | NAD  | C5B-O5B-PA-O2A  |
| 8   | B     | 606  | NAD  | O4D-C1D-N1N-C2N |
| 8   | B     | 606  | NAD  | O4D-C1D-N1N-C6N |
| 8   | B     | 606  | NAD  | C2D-C1D-N1N-C2N |
| 8   | B     | 606  | NAD  | C2D-C1D-N1N-C6N |
| 8   | E     | 606  | NAD  | C5B-O5B-PA-O1A  |
| 8   | E     | 606  | NAD  | C5B-O5B-PA-O2A  |
| 8   | E     | 606  | NAD  | O4D-C1D-N1N-C2N |
| 8   | E     | 606  | NAD  | O4D-C1D-N1N-C6N |
| 8   | E     | 606  | NAD  | C2D-C1D-N1N-C2N |
| 8   | E     | 606  | NAD  | C2D-C1D-N1N-C6N |
| 8   | H     | 606  | NAD  | C5B-O5B-PA-O1A  |
| 8   | H     | 606  | NAD  | C5B-O5B-PA-O2A  |
| 8   | H     | 606  | NAD  | O4D-C1D-N1N-C2N |
| 8   | H     | 606  | NAD  | O4D-C1D-N1N-C6N |
| 8   | H     | 606  | NAD  | C2D-C1D-N1N-C2N |
| 8   | H     | 606  | NAD  | C2D-C1D-N1N-C6N |
| 8   | K     | 606  | NAD  | C5B-O5B-PA-O1A  |
| 8   | K     | 606  | NAD  | C5B-O5B-PA-O2A  |
| 8   | K     | 606  | NAD  | O4D-C1D-N1N-C2N |
| 8   | K     | 606  | NAD  | O4D-C1D-N1N-C6N |
| 8   | K     | 606  | NAD  | C2D-C1D-N1N-C2N |
| 8   | K     | 606  | NAD  | C2D-C1D-N1N-C6N |
| 9   | C     | 1201 | FAD  | C3'-C4'-C5'-O5' |
| 9   | C     | 1201 | FAD  | O4'-C4'-C5'-O5' |
| 9   | C     | 1201 | FAD  | C5'-O5'-P-O1P   |
| 9   | F     | 1201 | FAD  | C3'-C4'-C5'-O5' |

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| Mol | Chain | Res  | Type | Atoms           |
|-----|-------|------|------|-----------------|
| 9   | F     | 1201 | FAD  | O4'-C4'-C5'-O5' |
| 9   | F     | 1201 | FAD  | C5'-O5'-P-O1P   |
| 9   | I     | 1201 | FAD  | C3'-C4'-C5'-O5' |
| 9   | I     | 1201 | FAD  | O4'-C4'-C5'-O5' |
| 9   | I     | 1201 | FAD  | C5'-O5'-P-O1P   |
| 9   | L     | 1201 | FAD  | C3'-C4'-C5'-O5' |
| 9   | L     | 1201 | FAD  | O4'-C4'-C5'-O5' |
| 9   | L     | 1201 | FAD  | C5'-O5'-P-O1P   |
| 10  | C     | 1203 | NDP  | O4B-C4B-C5B-O5B |
| 10  | C     | 1203 | NDP  | C3B-C4B-C5B-O5B |
| 10  | C     | 1203 | NDP  | C5D-O5D-PN-O3   |
| 10  | C     | 1203 | NDP  | C5D-O5D-PN-O1N  |
| 10  | C     | 1203 | NDP  | C5D-O5D-PN-O2N  |
| 10  | C     | 1203 | NDP  | O4D-C4D-C5D-O5D |
| 10  | C     | 1203 | NDP  | C3D-C4D-C5D-O5D |
| 10  | C     | 1203 | NDP  | C2N-C3N-C7N-N7N |
| 10  | F     | 1203 | NDP  | O4B-C4B-C5B-O5B |
| 10  | F     | 1203 | NDP  | C3B-C4B-C5B-O5B |
| 10  | F     | 1203 | NDP  | C5D-O5D-PN-O3   |
| 10  | F     | 1203 | NDP  | C5D-O5D-PN-O1N  |
| 10  | F     | 1203 | NDP  | C5D-O5D-PN-O2N  |
| 10  | F     | 1203 | NDP  | O4D-C4D-C5D-O5D |
| 10  | F     | 1203 | NDP  | C3D-C4D-C5D-O5D |
| 10  | F     | 1203 | NDP  | C2N-C3N-C7N-N7N |
| 10  | I     | 1203 | NDP  | O4B-C4B-C5B-O5B |
| 10  | I     | 1203 | NDP  | C3B-C4B-C5B-O5B |
| 10  | I     | 1203 | NDP  | C5D-O5D-PN-O3   |
| 10  | I     | 1203 | NDP  | C5D-O5D-PN-O1N  |
| 10  | I     | 1203 | NDP  | C5D-O5D-PN-O2N  |
| 10  | I     | 1203 | NDP  | O4D-C4D-C5D-O5D |
| 10  | I     | 1203 | NDP  | C3D-C4D-C5D-O5D |
| 10  | I     | 1203 | NDP  | C2N-C3N-C7N-N7N |
| 10  | L     | 1203 | NDP  | O4B-C4B-C5B-O5B |
| 10  | L     | 1203 | NDP  | C3B-C4B-C5B-O5B |
| 10  | L     | 1203 | NDP  | C5D-O5D-PN-O3   |
| 10  | L     | 1203 | NDP  | C5D-O5D-PN-O1N  |
| 10  | L     | 1203 | NDP  | C5D-O5D-PN-O2N  |
| 10  | L     | 1203 | NDP  | O4D-C4D-C5D-O5D |
| 10  | L     | 1203 | NDP  | C3D-C4D-C5D-O5D |
| 10  | L     | 1203 | NDP  | C2N-C3N-C7N-N7N |
| 9   | C     | 1201 | FAD  | O4B-C4B-C5B-O5B |
| 9   | F     | 1201 | FAD  | O4B-C4B-C5B-O5B |

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| Mol | Chain | Res  | Type | Atoms           |
|-----|-------|------|------|-----------------|
| 9   | I     | 1201 | FAD  | O4B-C4B-C5B-O5B |
| 9   | L     | 1201 | FAD  | O4B-C4B-C5B-O5B |
| 6   | B     | 603  | FMN  | C5'-O5'-P-O1P   |
| 6   | E     | 603  | FMN  | C5'-O5'-P-O1P   |
| 6   | H     | 603  | FMN  | C5'-O5'-P-O1P   |
| 6   | K     | 603  | FMN  | C5'-O5'-P-O1P   |
| 10  | C     | 1203 | NDP  | C4D-C5D-O5D-PN  |
| 10  | F     | 1203 | NDP  | C4D-C5D-O5D-PN  |
| 10  | I     | 1203 | NDP  | C4D-C5D-O5D-PN  |
| 10  | L     | 1203 | NDP  | C4D-C5D-O5D-PN  |
| 8   | B     | 606  | NAD  | PA-O3-PN-O1N    |
| 8   | E     | 606  | NAD  | PA-O3-PN-O1N    |
| 8   | H     | 606  | NAD  | PA-O3-PN-O1N    |
| 8   | K     | 606  | NAD  | PA-O3-PN-O1N    |
| 8   | B     | 606  | NAD  | O4B-C4B-C5B-O5B |
| 8   | E     | 606  | NAD  | O4B-C4B-C5B-O5B |
| 8   | H     | 606  | NAD  | O4B-C4B-C5B-O5B |
| 8   | K     | 606  | NAD  | O4B-C4B-C5B-O5B |
| 9   | C     | 1201 | FAD  | C3B-C4B-C5B-O5B |
| 9   | F     | 1201 | FAD  | C3B-C4B-C5B-O5B |
| 9   | I     | 1201 | FAD  | C3B-C4B-C5B-O5B |
| 9   | L     | 1201 | FAD  | C3B-C4B-C5B-O5B |
| 8   | B     | 606  | NAD  | PA-O3-PN-O5D    |
| 8   | E     | 606  | NAD  | PA-O3-PN-O5D    |
| 8   | H     | 606  | NAD  | PA-O3-PN-O5D    |
| 8   | K     | 606  | NAD  | PA-O3-PN-O5D    |
| 9   | C     | 1201 | FAD  | PA-O3P-P-O5'    |
| 9   | F     | 1201 | FAD  | PA-O3P-P-O5'    |
| 9   | I     | 1201 | FAD  | PA-O3P-P-O5'    |
| 9   | L     | 1201 | FAD  | PA-O3P-P-O5'    |
| 9   | C     | 1201 | FAD  | C5'-O5'-P-O3P   |
| 9   | F     | 1201 | FAD  | C5'-O5'-P-O3P   |
| 9   | I     | 1201 | FAD  | C5'-O5'-P-O3P   |
| 9   | L     | 1201 | FAD  | C5'-O5'-P-O3P   |
| 8   | B     | 606  | NAD  | C3B-C4B-C5B-O5B |
| 8   | E     | 606  | NAD  | C3B-C4B-C5B-O5B |
| 8   | H     | 606  | NAD  | C3B-C4B-C5B-O5B |
| 8   | K     | 606  | NAD  | C3B-C4B-C5B-O5B |
| 10  | C     | 1203 | NDP  | O4D-C1D-N1N-C6N |
| 10  | F     | 1203 | NDP  | O4D-C1D-N1N-C6N |
| 10  | I     | 1203 | NDP  | O4D-C1D-N1N-C6N |
| 10  | L     | 1203 | NDP  | O4D-C1D-N1N-C6N |

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| Mol | Chain | Res  | Type | Atoms           |
|-----|-------|------|------|-----------------|
| 9   | C     | 1201 | FAD  | C5'-O5'-P-O2P   |
| 9   | F     | 1201 | FAD  | C5'-O5'-P-O2P   |
| 9   | I     | 1201 | FAD  | C5'-O5'-P-O2P   |
| 9   | L     | 1201 | FAD  | C5'-O5'-P-O2P   |
| 10  | C     | 1203 | NDP  | PN-O3-PA-O2A    |
| 10  | F     | 1203 | NDP  | PN-O3-PA-O2A    |
| 10  | I     | 1203 | NDP  | PN-O3-PA-O2A    |
| 10  | L     | 1203 | NDP  | PN-O3-PA-O2A    |
| 6   | B     | 603  | FMN  | C2'-C1'-N10-C10 |
| 6   | E     | 603  | FMN  | C2'-C1'-N10-C10 |
| 6   | H     | 603  | FMN  | C2'-C1'-N10-C10 |
| 6   | K     | 603  | FMN  | C2'-C1'-N10-C10 |
| 6   | B     | 603  | FMN  | C5'-O5'-P-O2P   |
| 6   | E     | 603  | FMN  | C5'-O5'-P-O2P   |
| 6   | H     | 603  | FMN  | C5'-O5'-P-O2P   |
| 6   | K     | 603  | FMN  | C5'-O5'-P-O2P   |
| 8   | B     | 606  | NAD  | C5B-O5B-PA-O3   |
| 8   | E     | 606  | NAD  | C5B-O5B-PA-O3   |
| 8   | H     | 606  | NAD  | C5B-O5B-PA-O3   |
| 8   | K     | 606  | NAD  | C5B-O5B-PA-O3   |
| 10  | C     | 1203 | NDP  | PN-O3-PA-O1A    |
| 10  | F     | 1203 | NDP  | PN-O3-PA-O1A    |
| 10  | I     | 1203 | NDP  | PN-O3-PA-O1A    |
| 10  | L     | 1203 | NDP  | PN-O3-PA-O1A    |

There are no ring outliers.

22 monomers are involved in 61 short contacts:

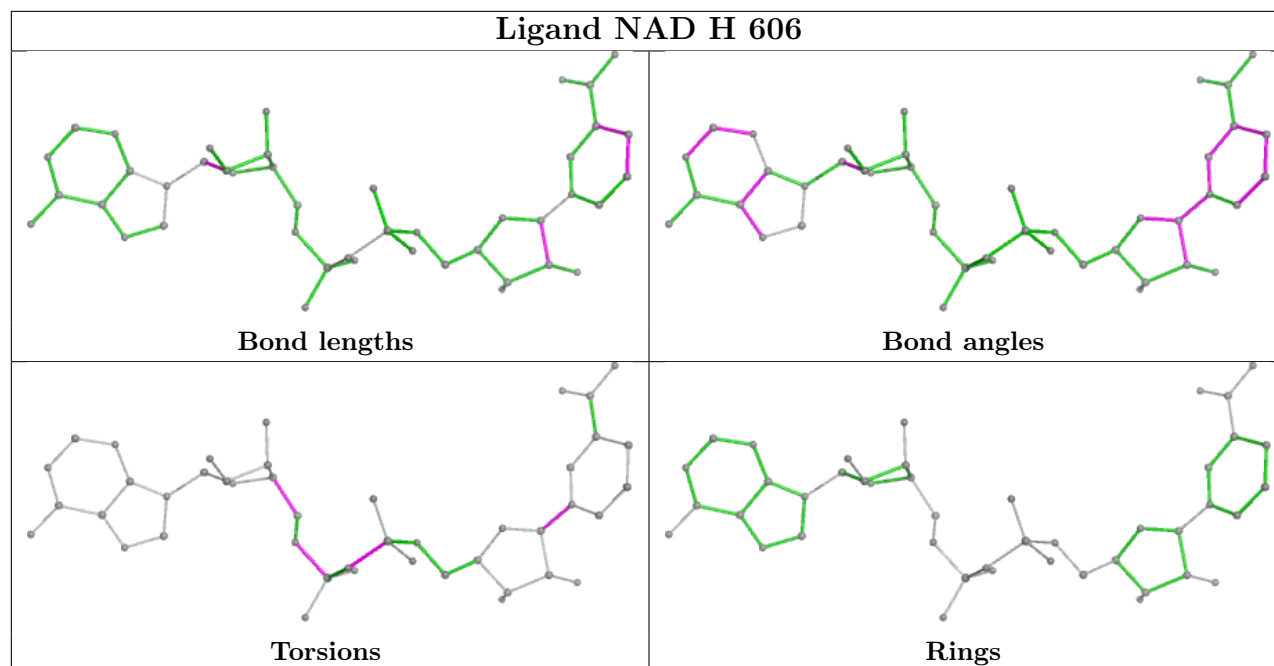
| Mol | Chain | Res  | Type | Clashes | Symm-Clashes |
|-----|-------|------|------|---------|--------------|
| 8   | H     | 606  | NAD  | 3       | 0            |
| 8   | K     | 606  | NAD  | 3       | 0            |
| 7   | I     | 1206 | SF4  | 1       | 0            |
| 10  | I     | 1203 | NDP  | 6       | 0            |
| 7   | L     | 1206 | SF4  | 1       | 0            |
| 8   | B     | 606  | NAD  | 3       | 0            |
| 8   | E     | 606  | NAD  | 3       | 0            |
| 7   | C     | 1206 | SF4  | 1       | 0            |
| 7   | B     | 604  | SF4  | 2       | 0            |
| 7   | E     | 604  | SF4  | 2       | 0            |
| 7   | K     | 604  | SF4  | 2       | 0            |
| 9   | L     | 1201 | FAD  | 1       | 0            |
| 10  | C     | 1203 | NDP  | 6       | 0            |

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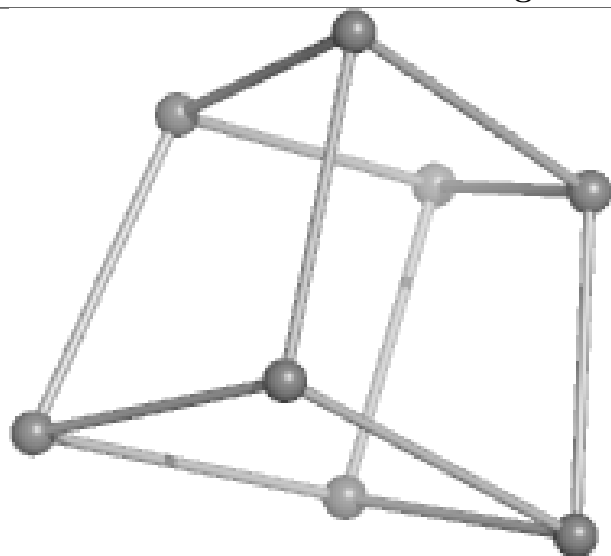
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| Mol | Chain | Res  | Type | Clashes | Symm-Clashes |
|-----|-------|------|------|---------|--------------|
| 7   | H     | 604  | SF4  | 2       | 0            |
| 6   | H     | 603  | FMN  | 3       | 0            |
| 10  | F     | 1203 | NDP  | 6       | 0            |
| 10  | L     | 1203 | NDP  | 6       | 0            |
| 6   | K     | 603  | FMN  | 5       | 0            |
| 9   | F     | 1201 | FAD  | 1       | 0            |
| 6   | B     | 603  | FMN  | 3       | 0            |
| 6   | E     | 603  | FMN  | 4       | 0            |
| 7   | F     | 1206 | SF4  | 1       | 0            |

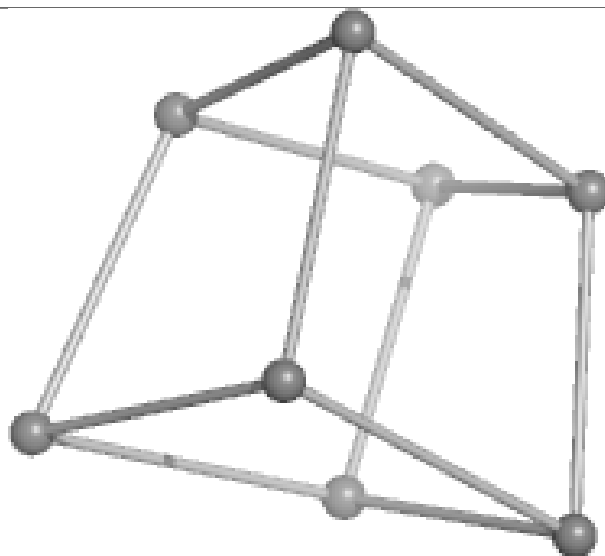
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.



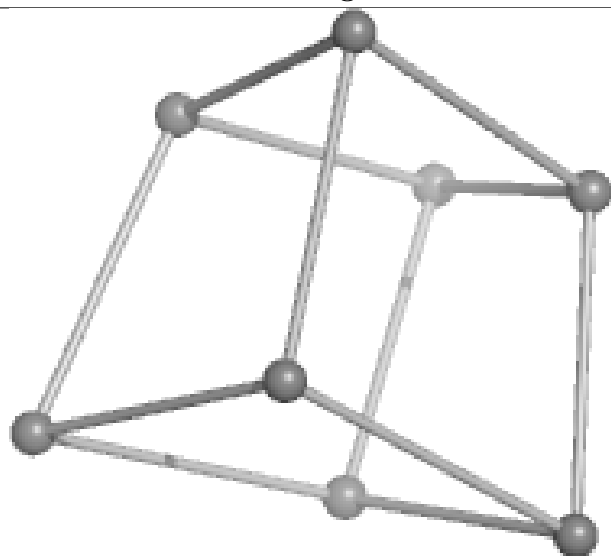
## Ligand SF4 L 1208



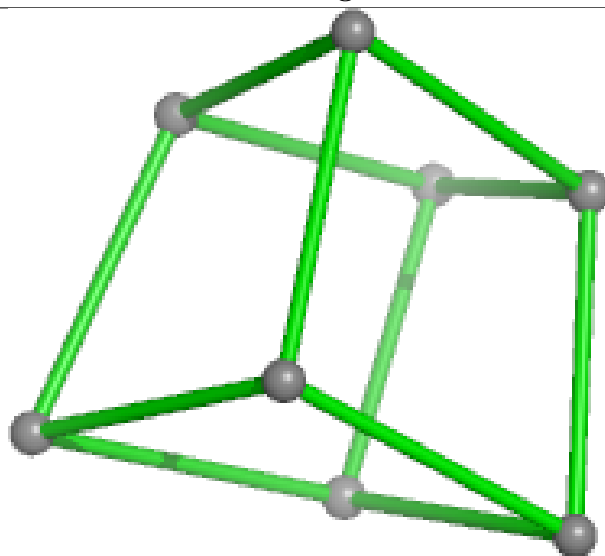
Bond lengths



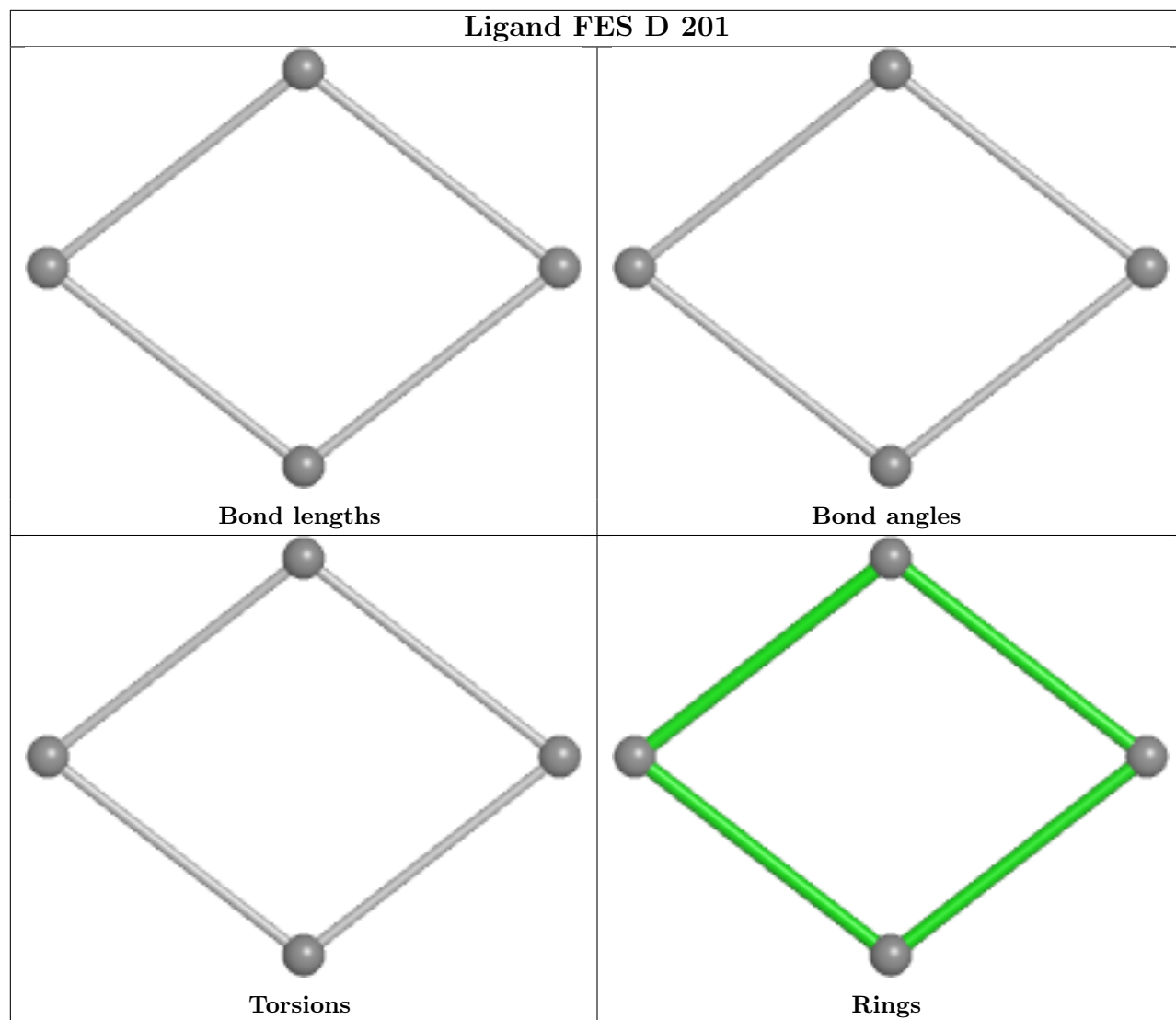
Bond angles

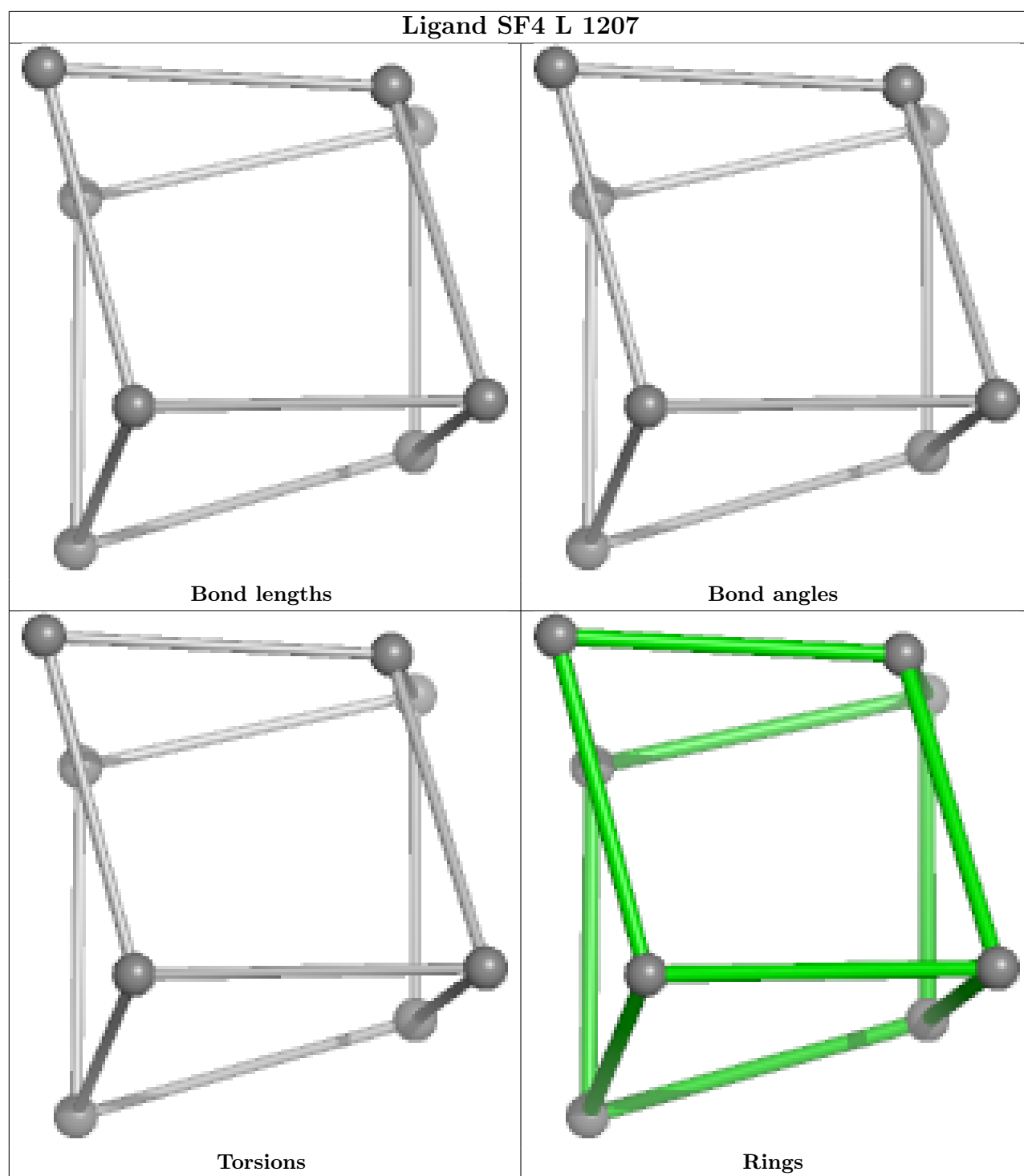


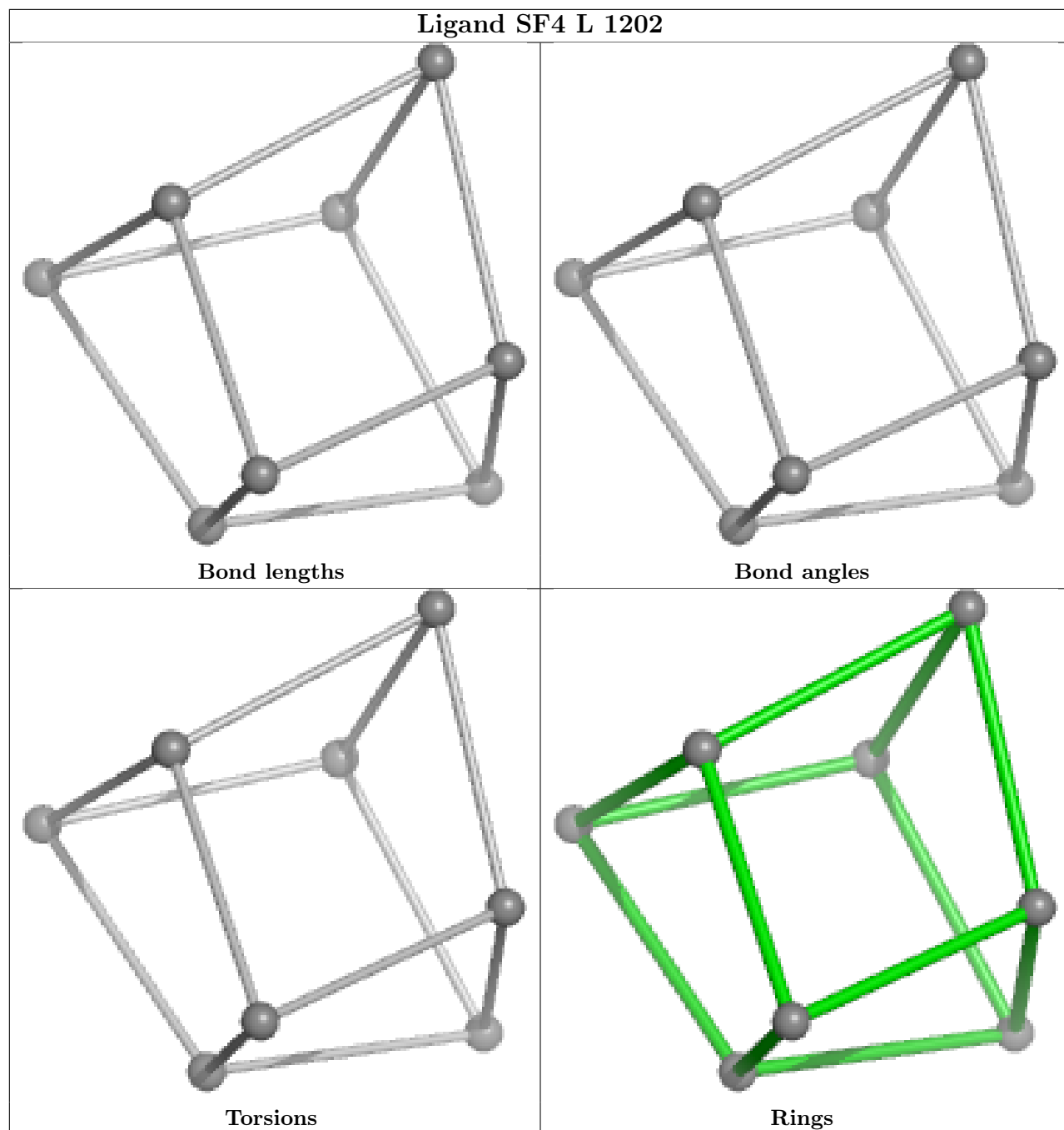
Torsions



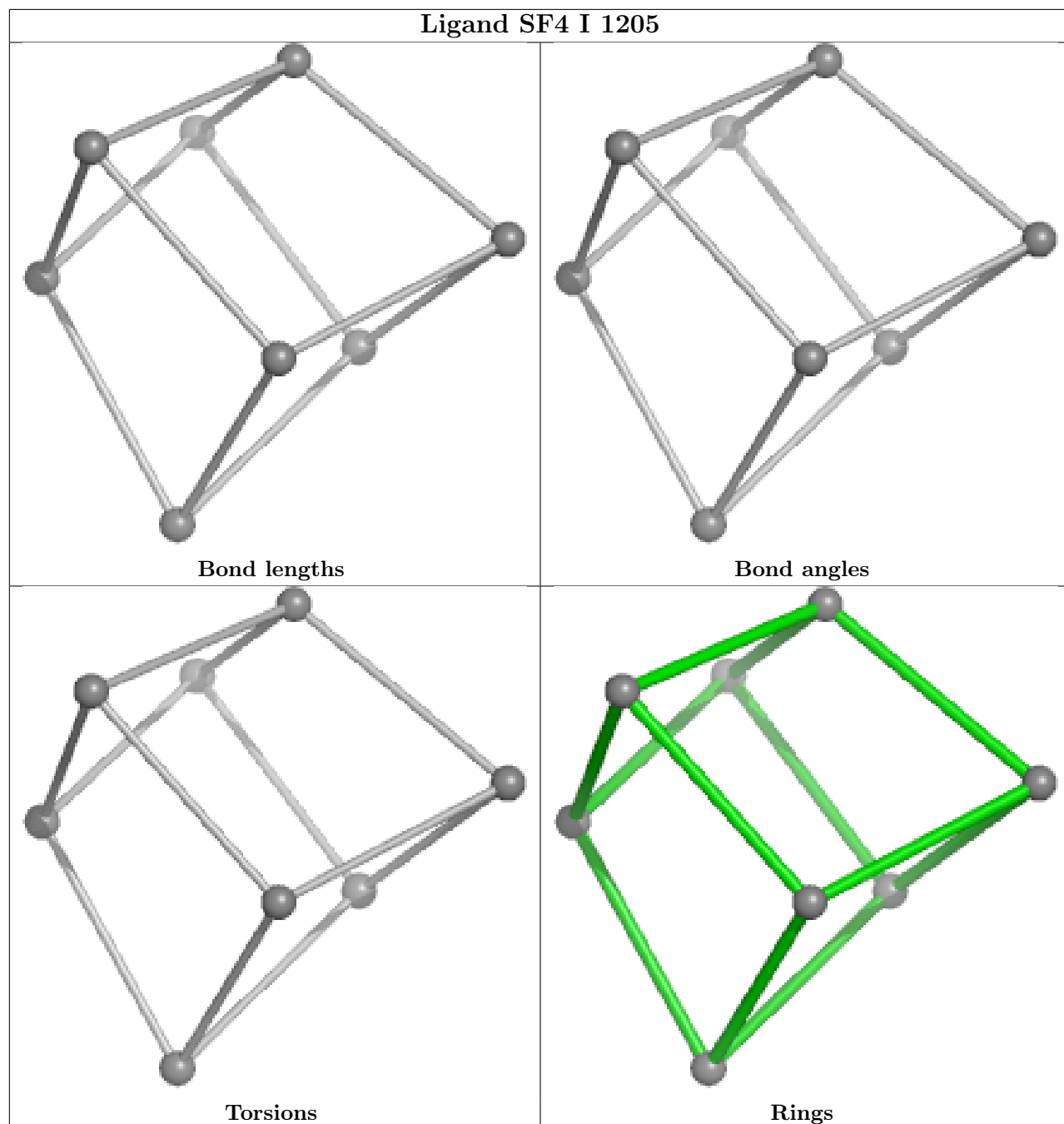
Rings

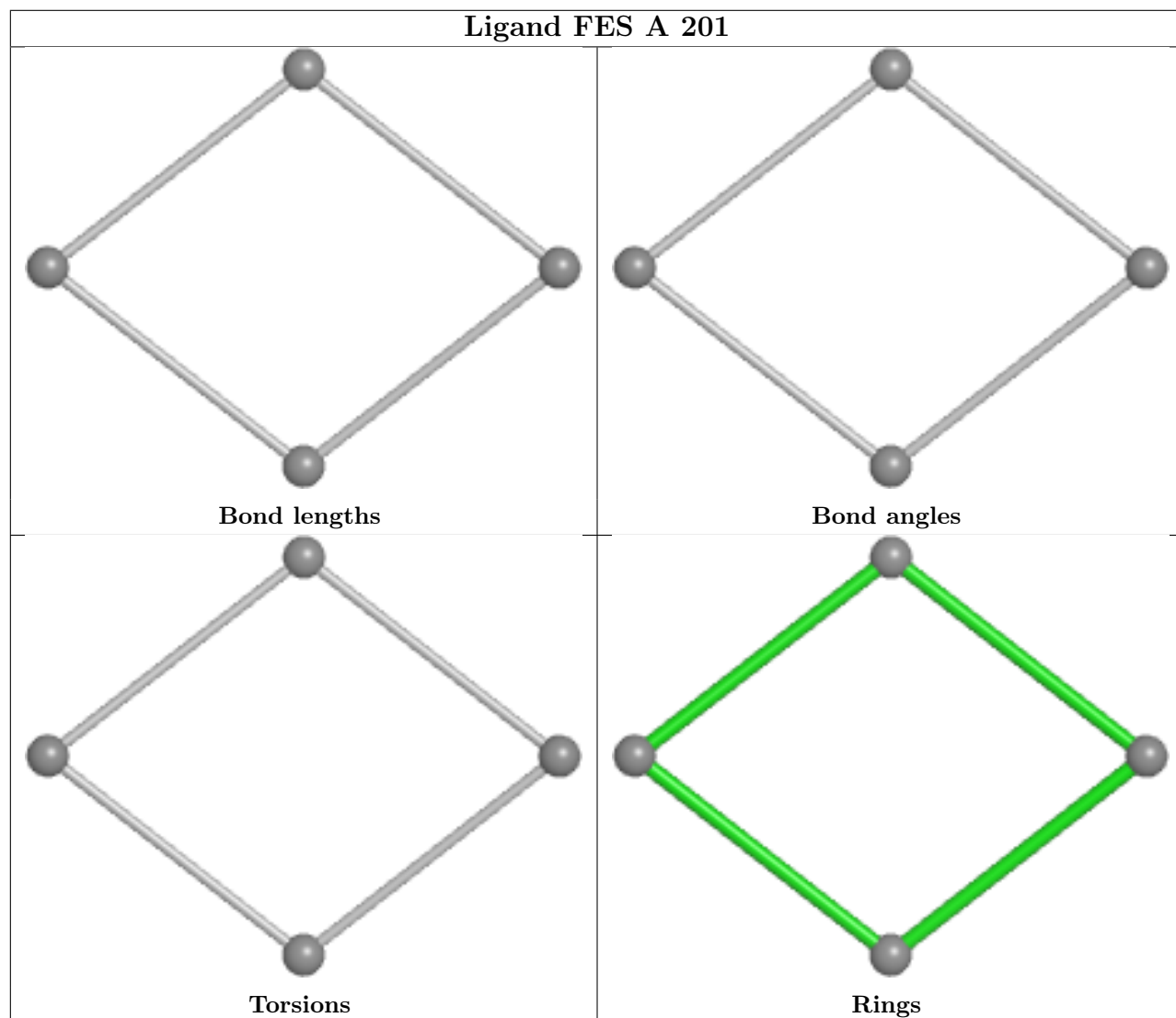
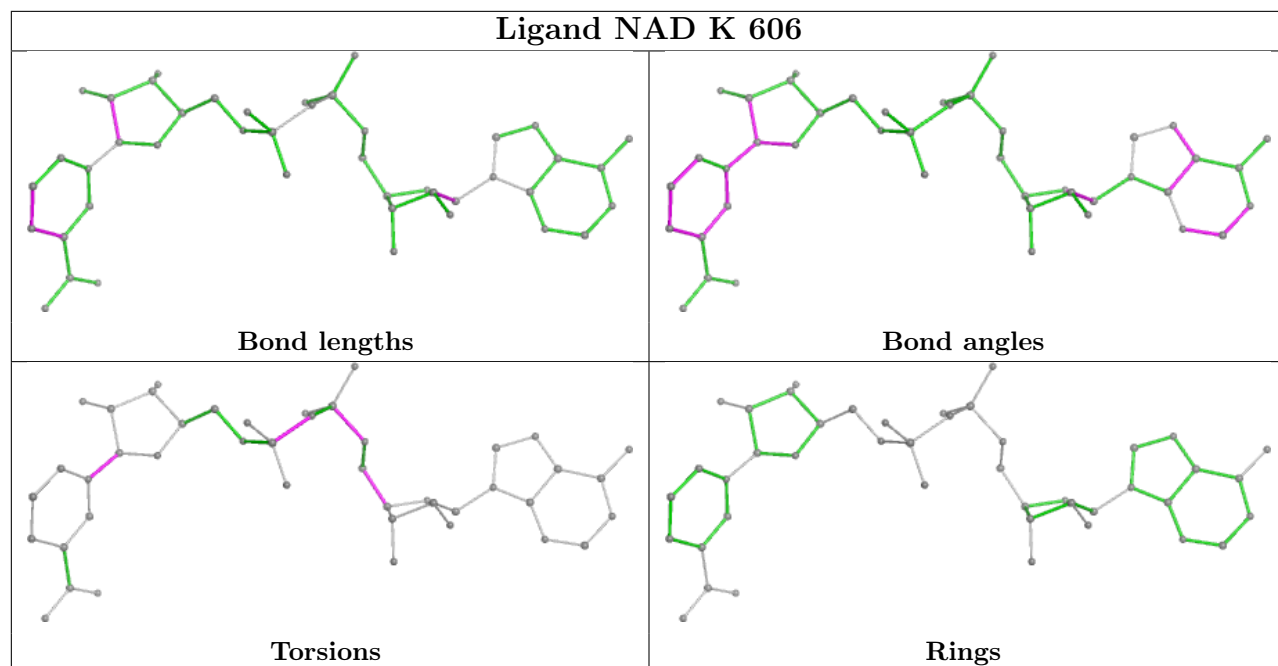


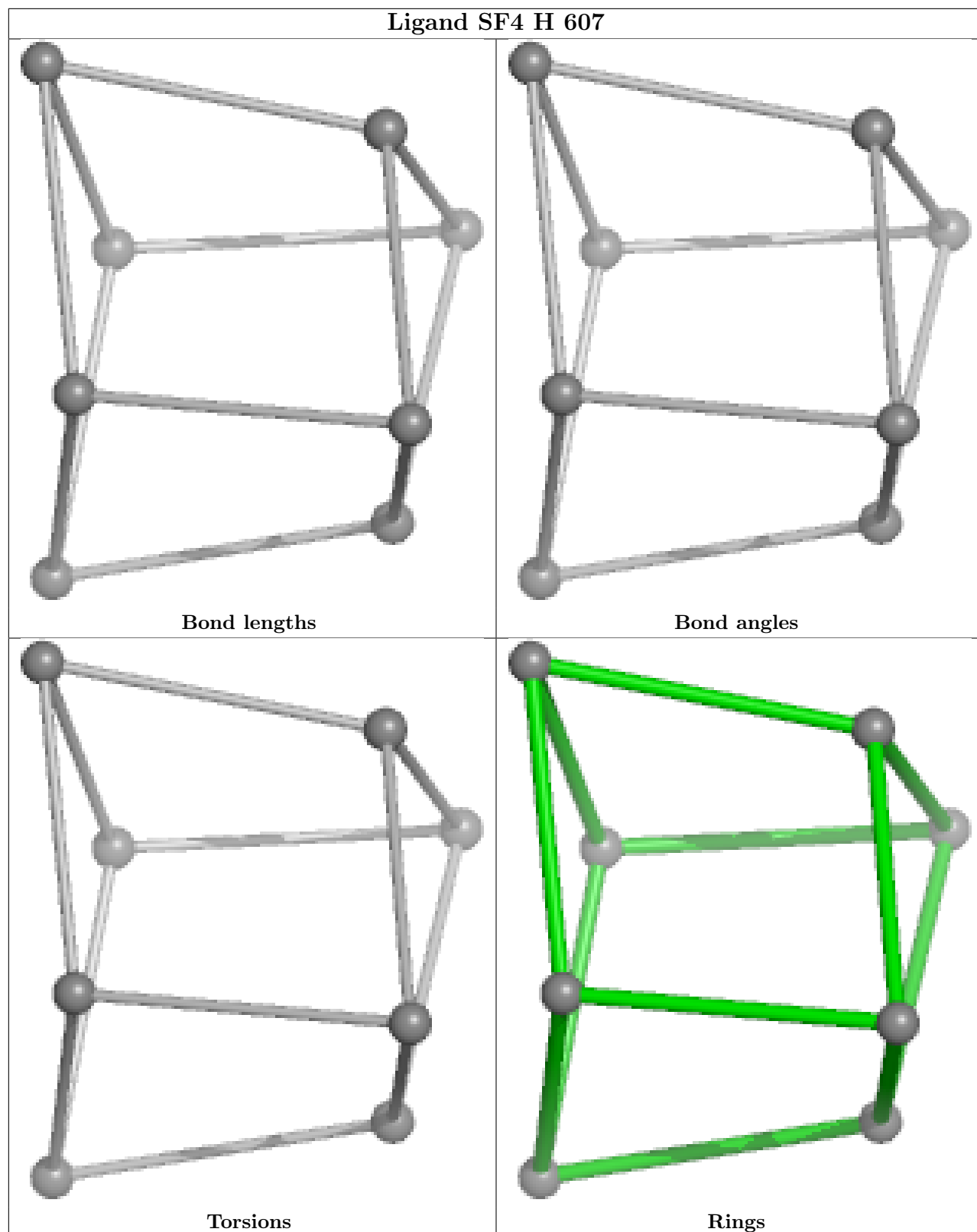


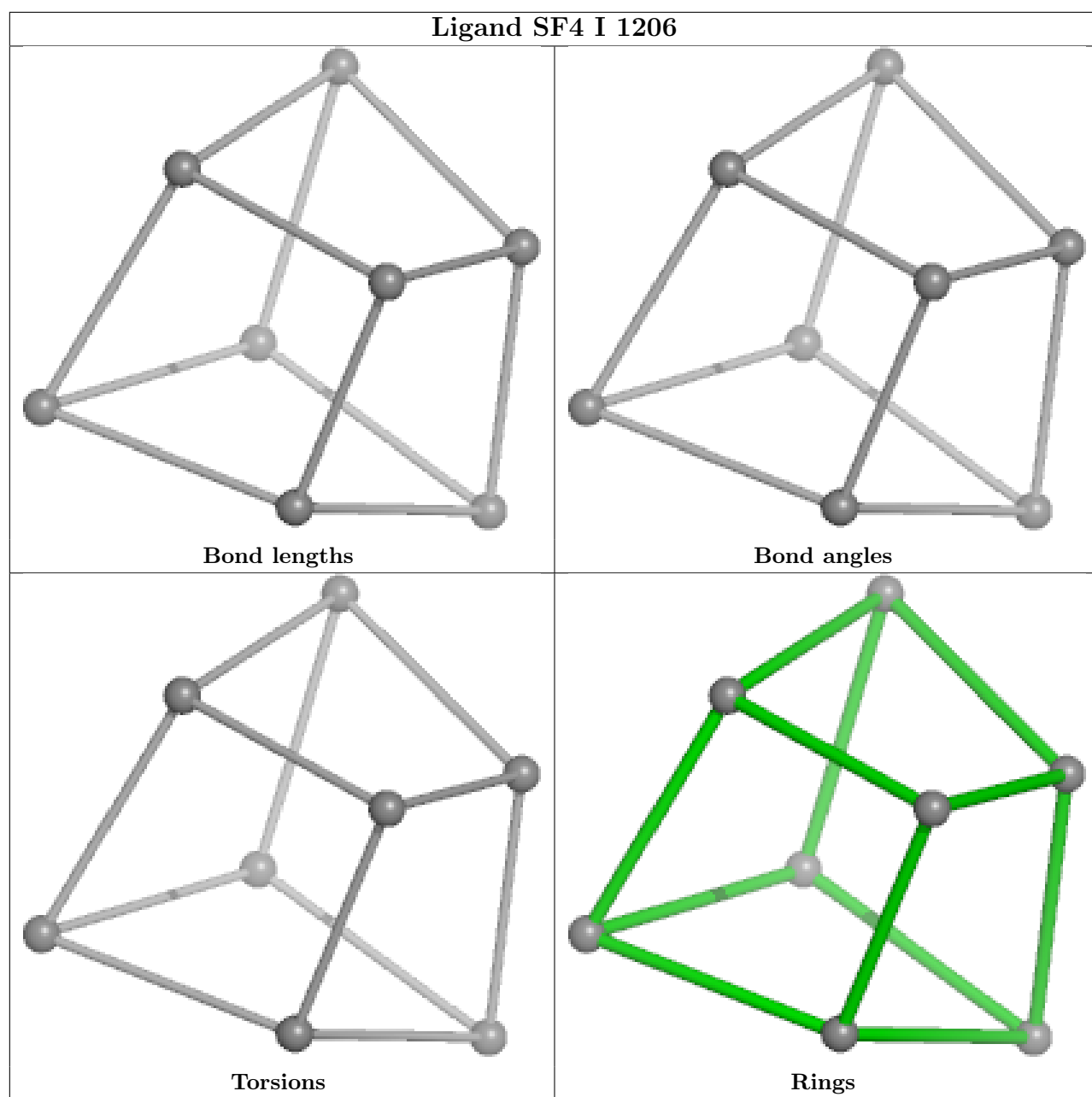


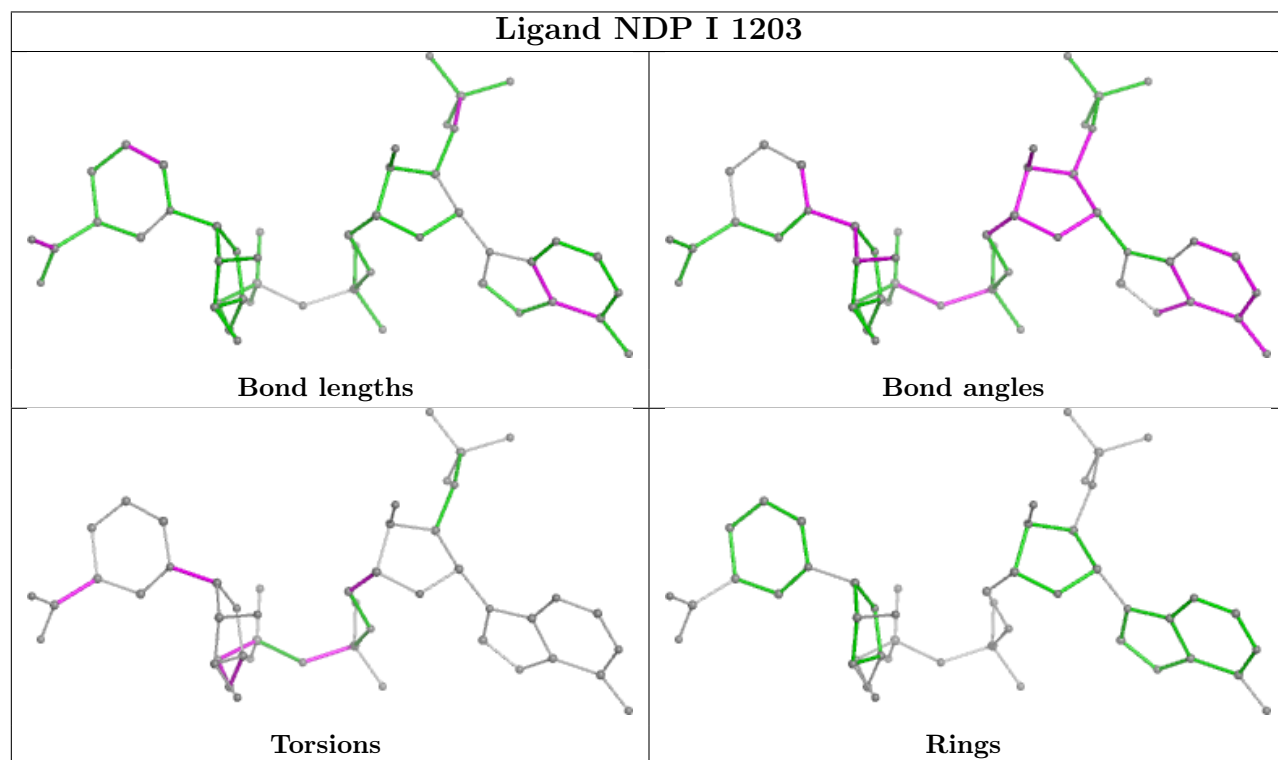
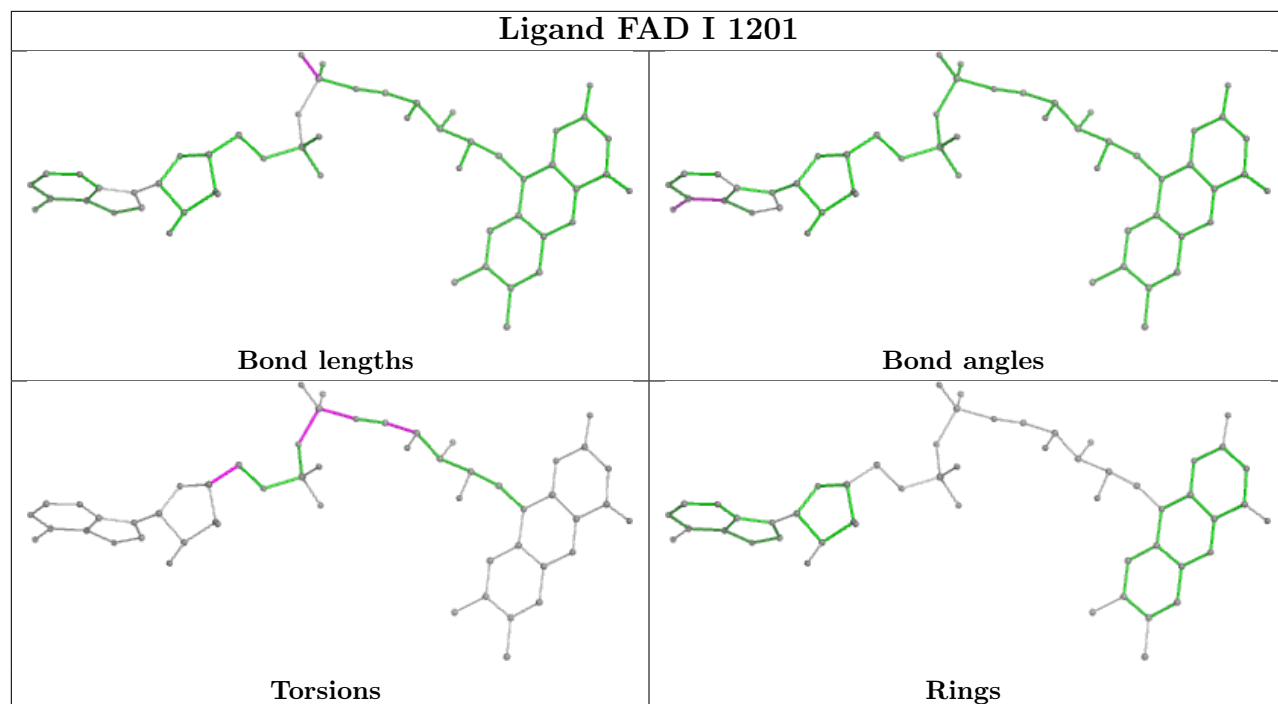
## Ligand SF4 I 1205

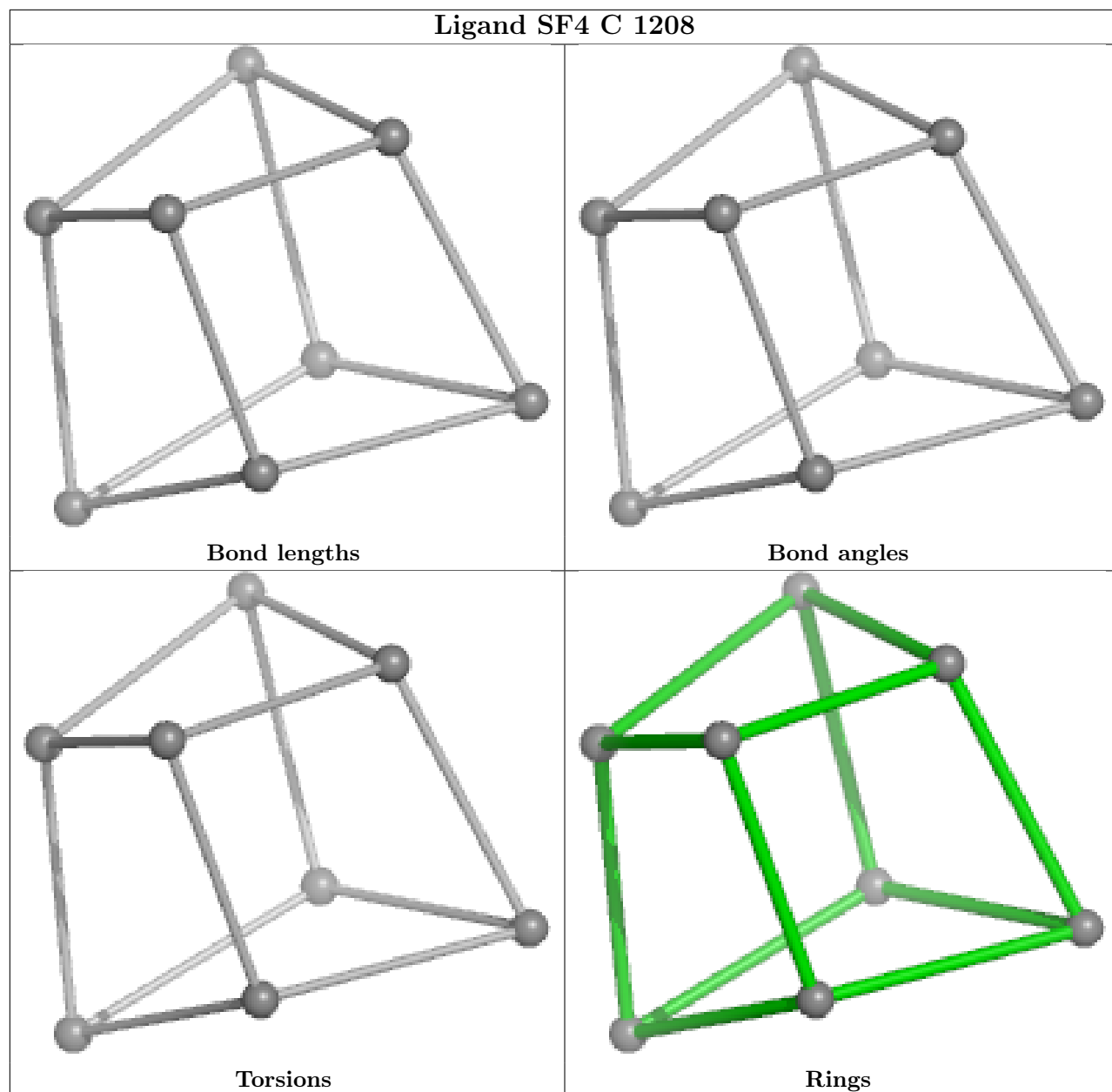


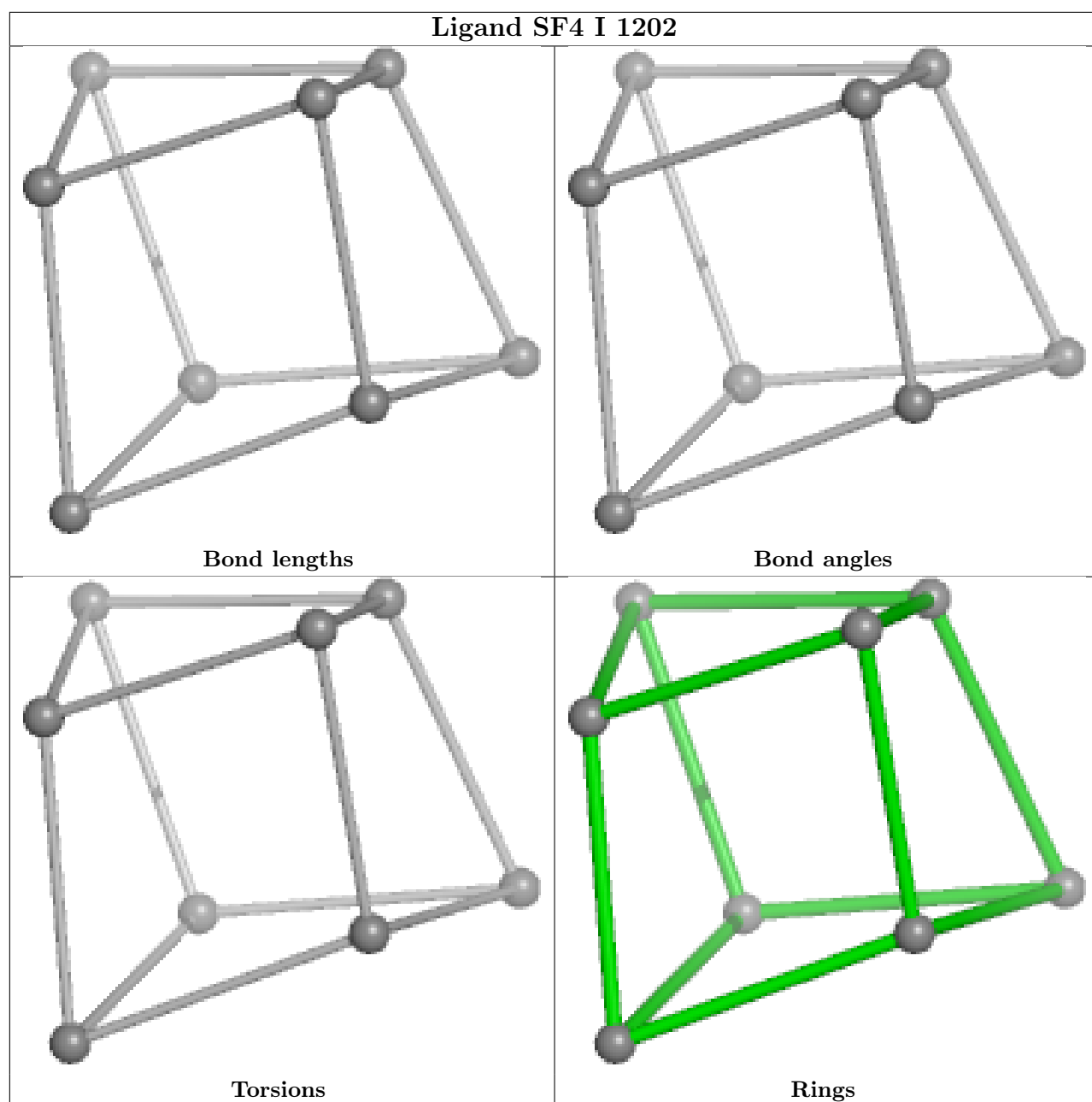


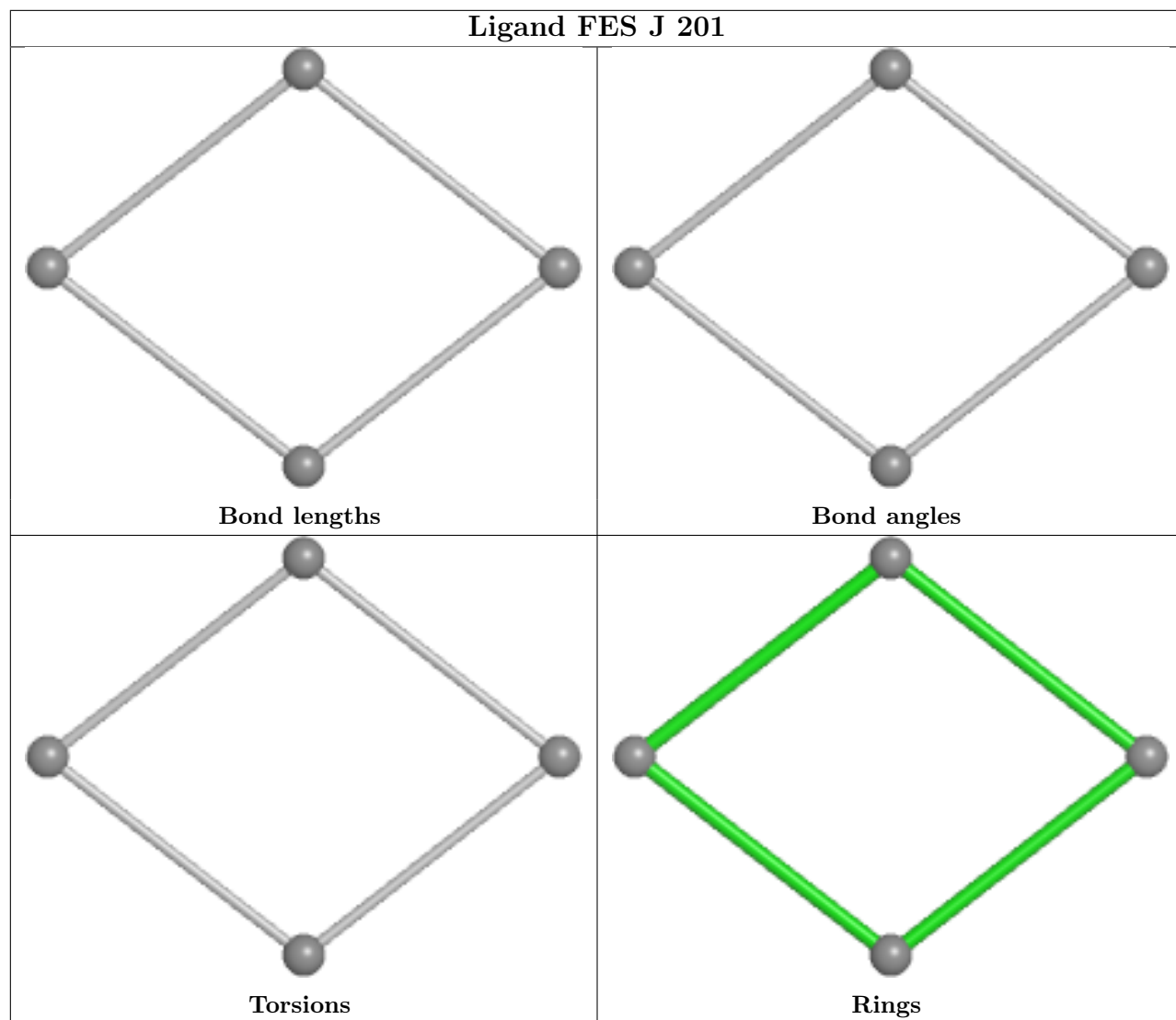


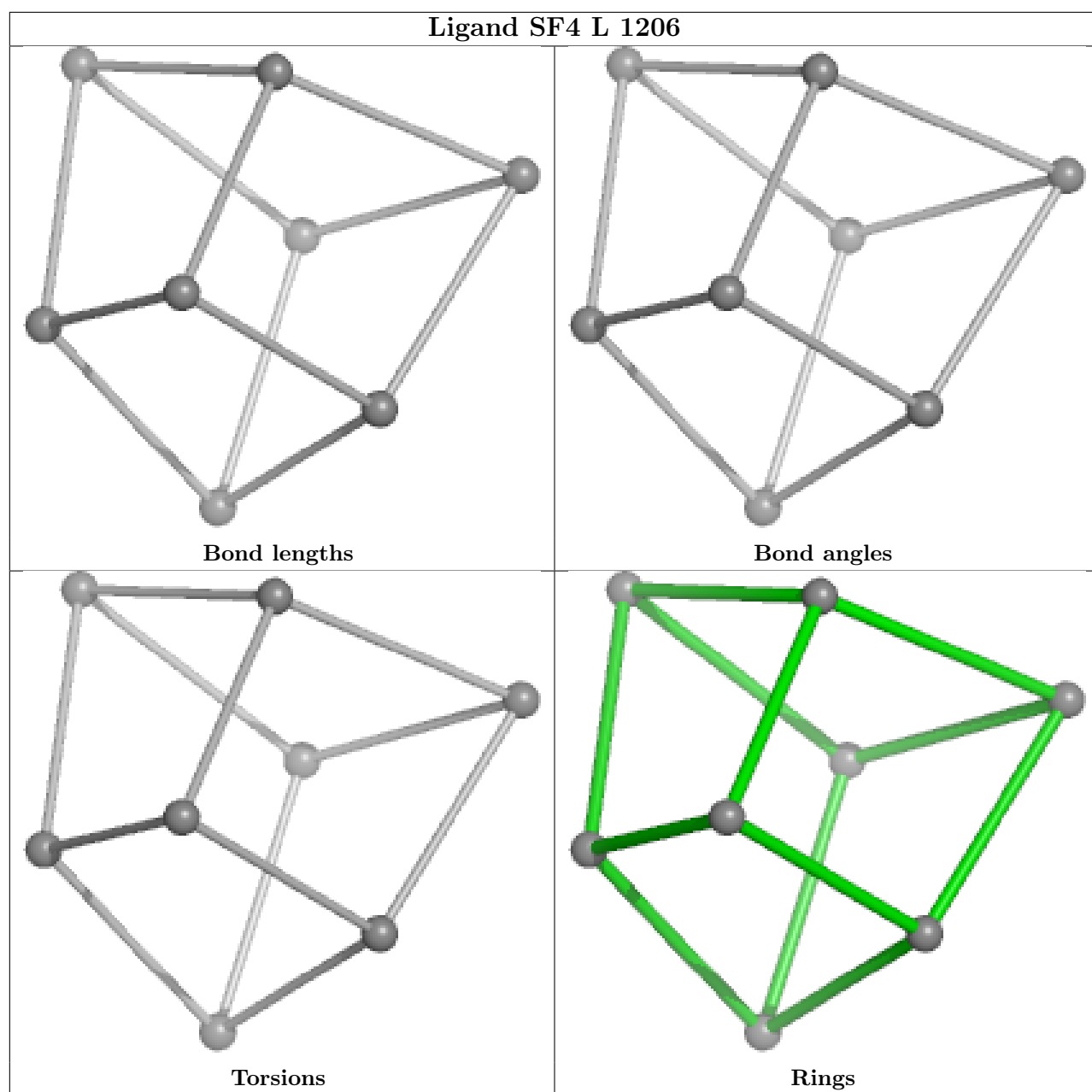


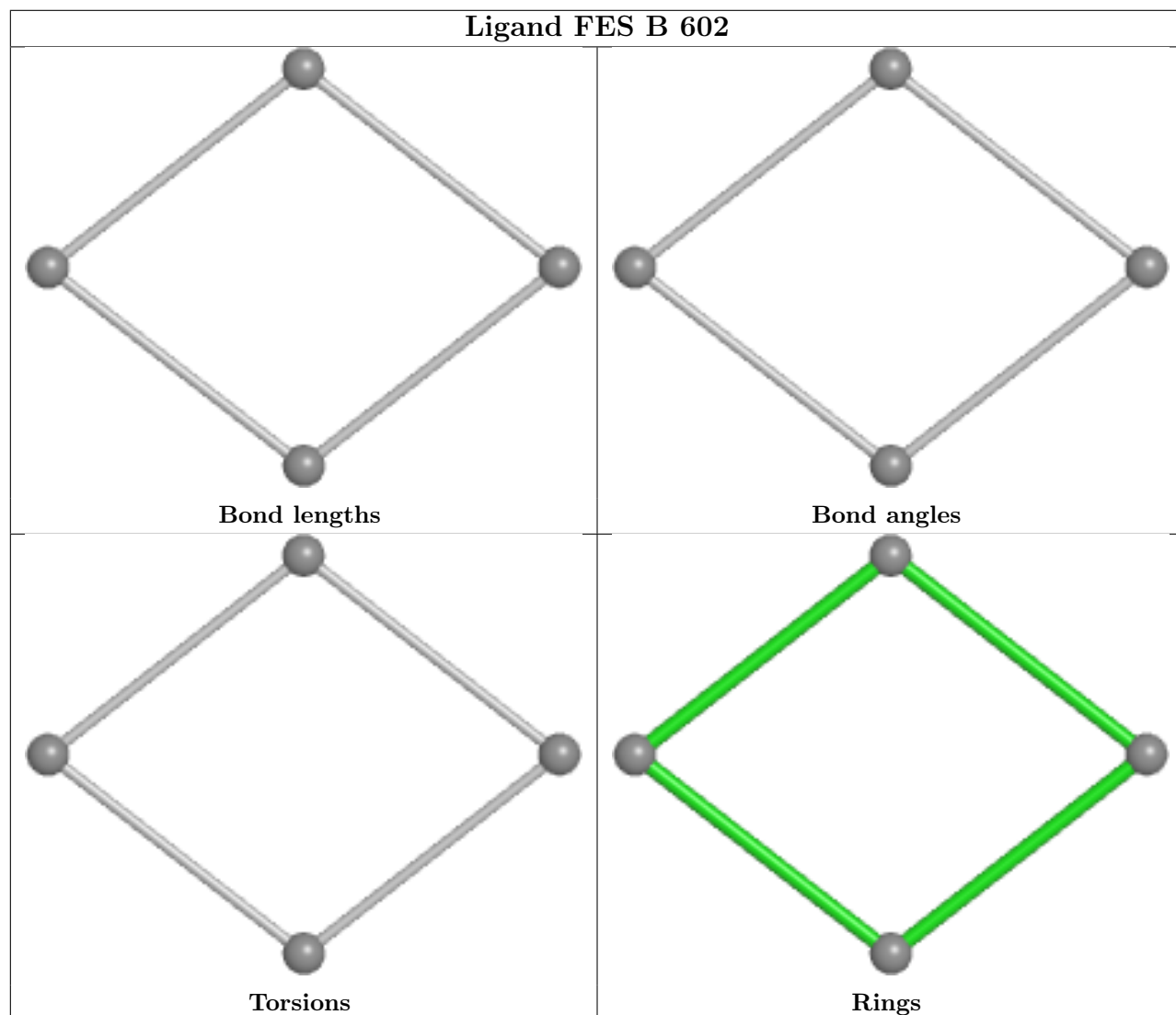
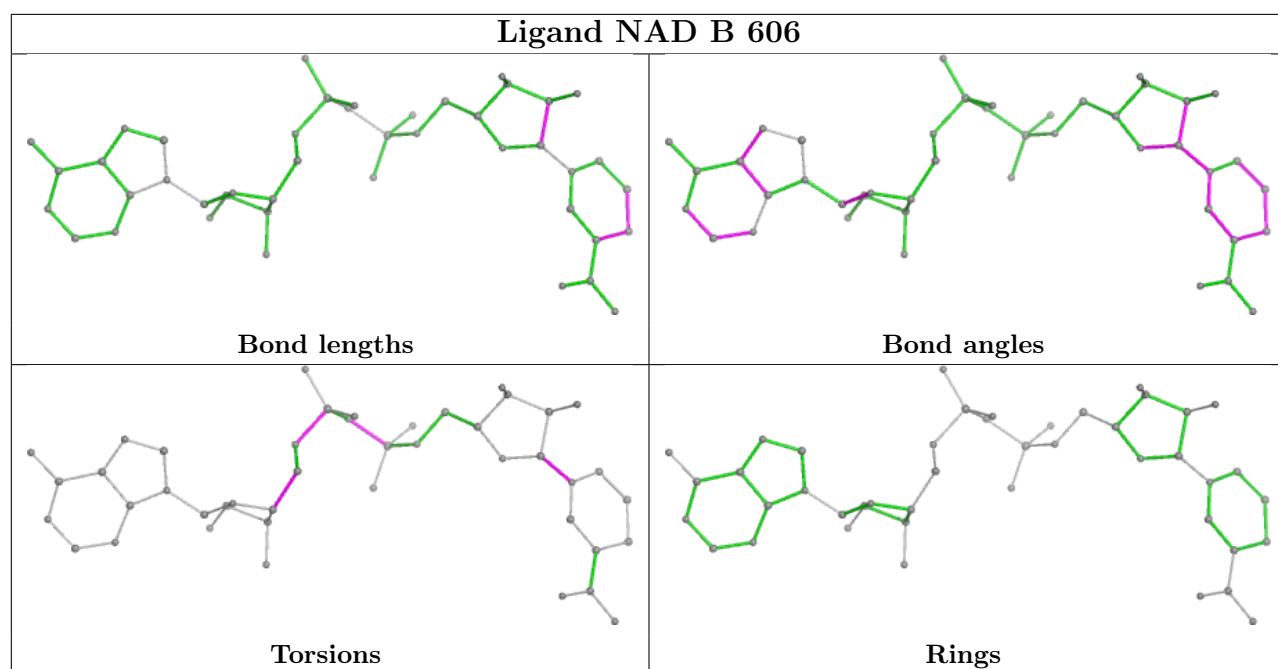


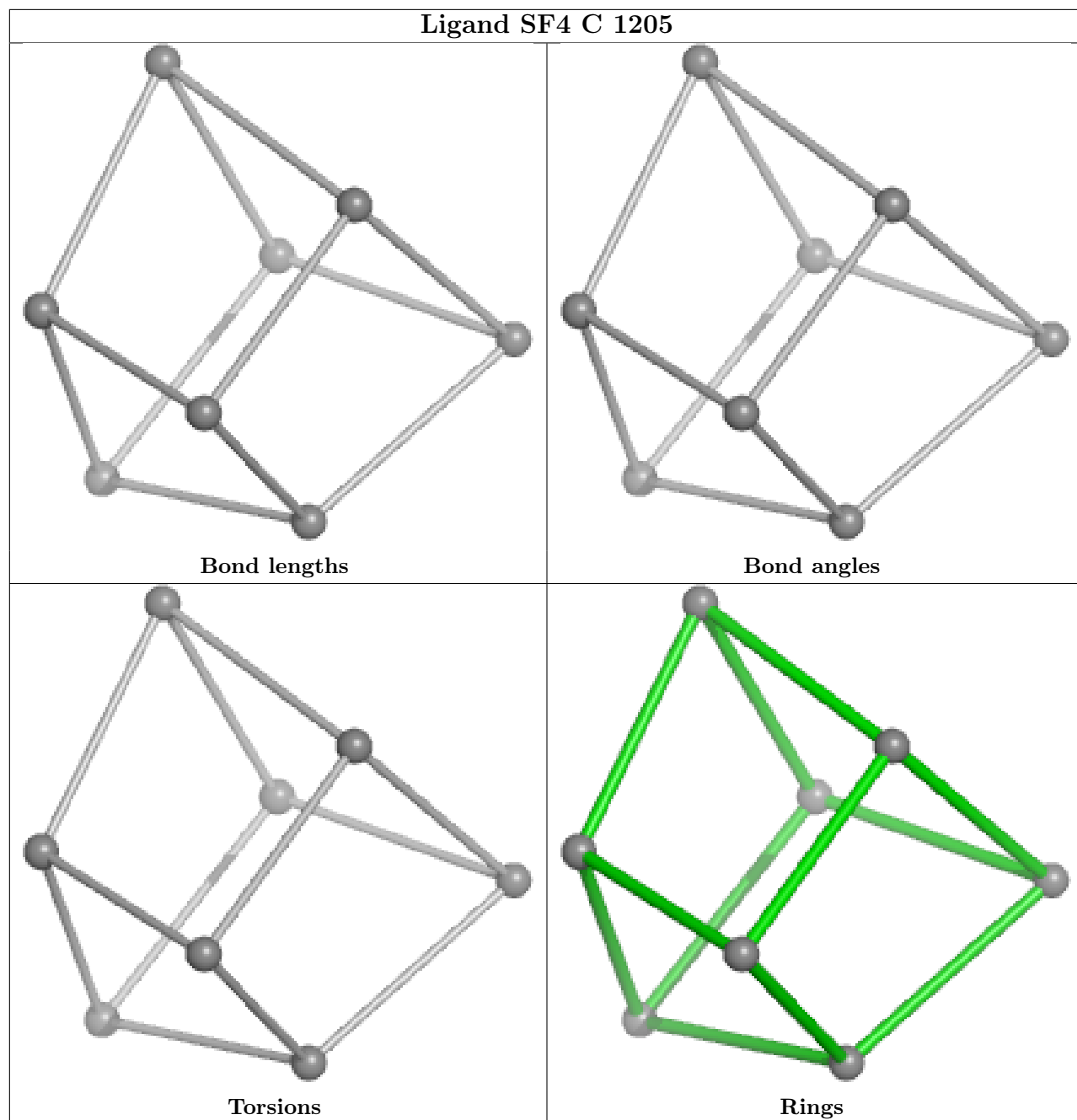


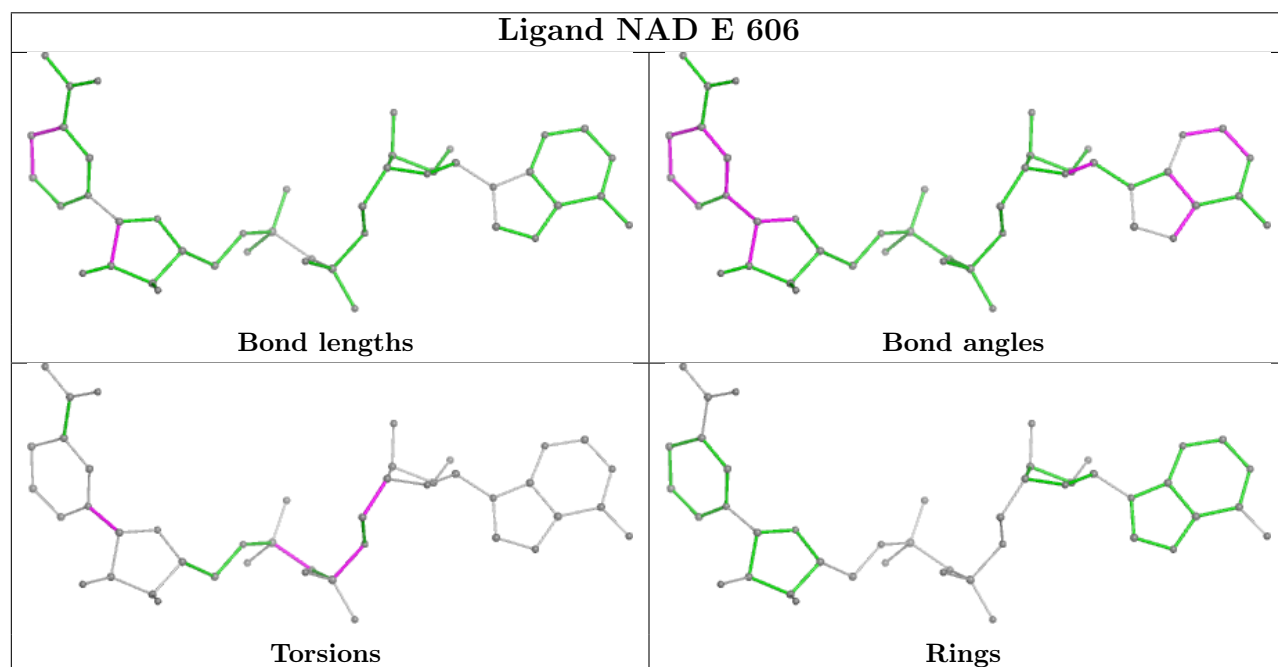
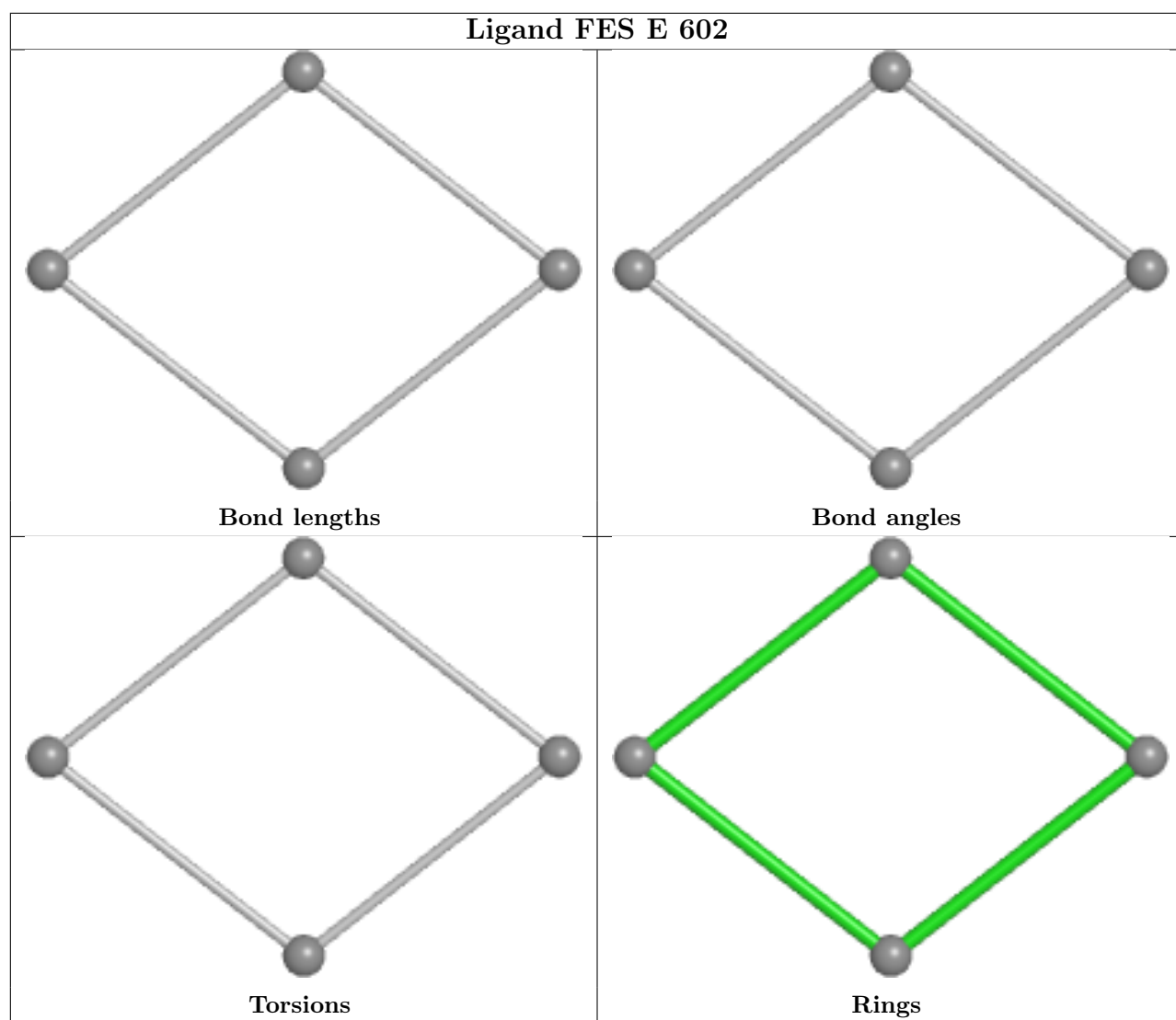


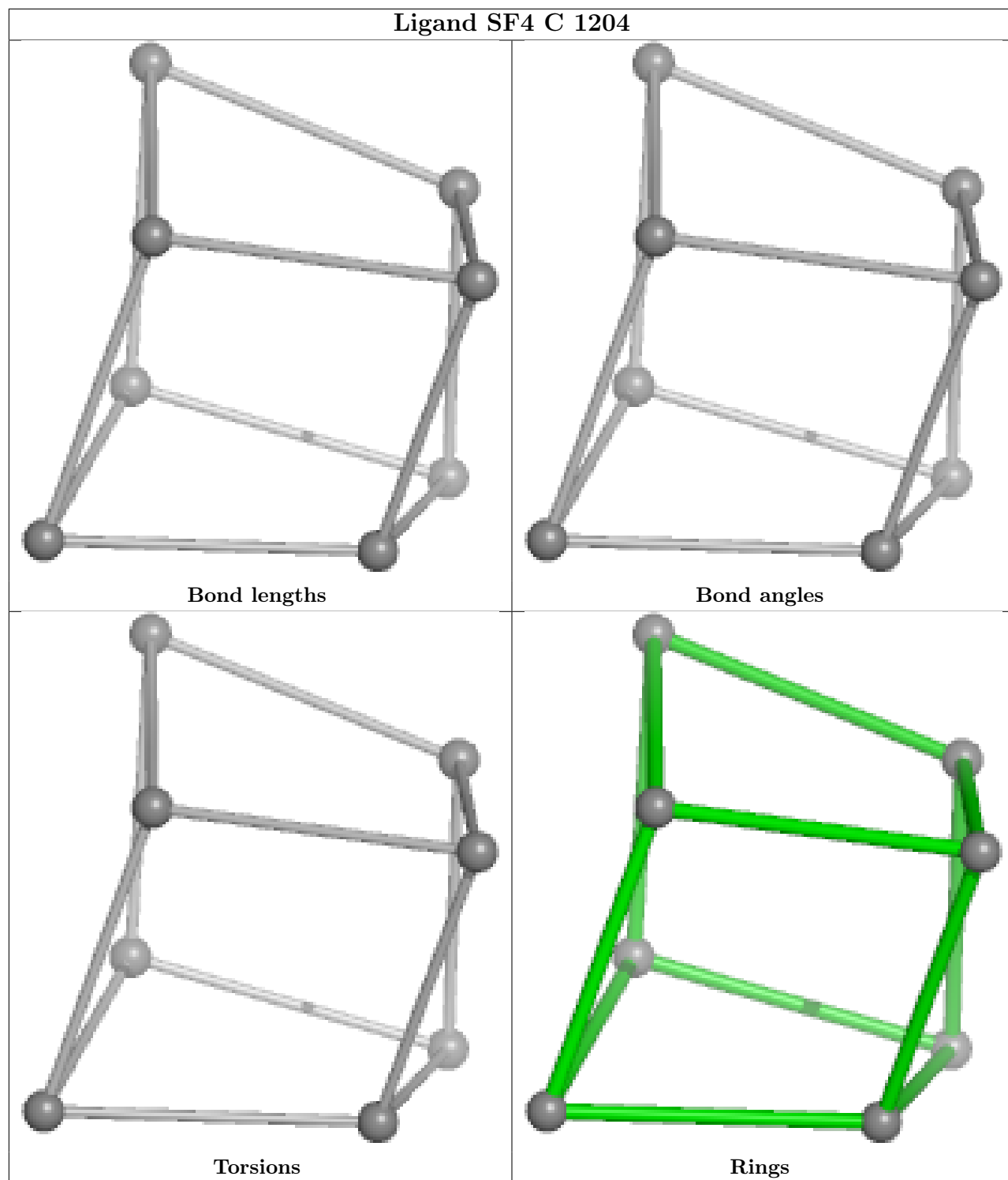


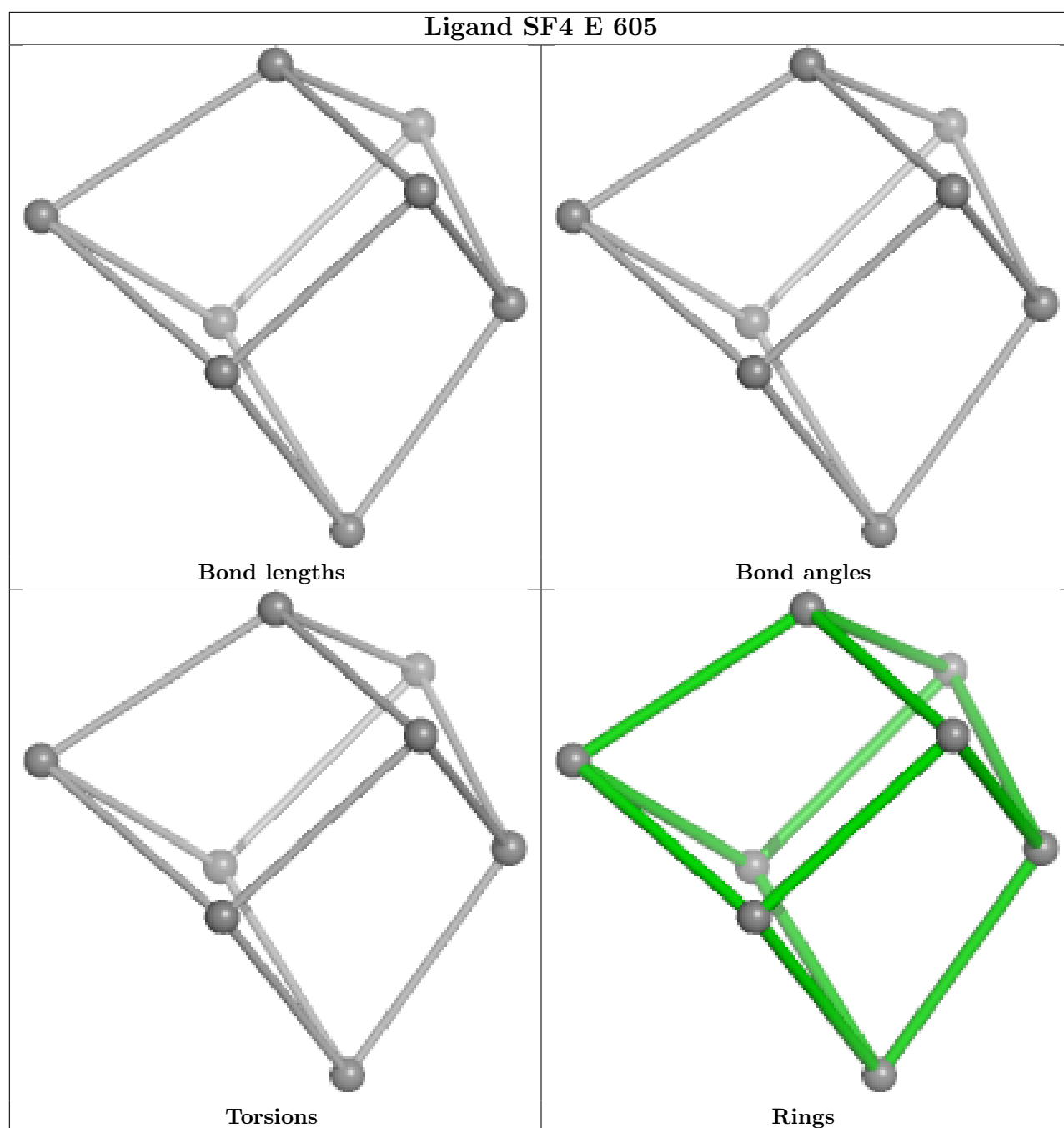


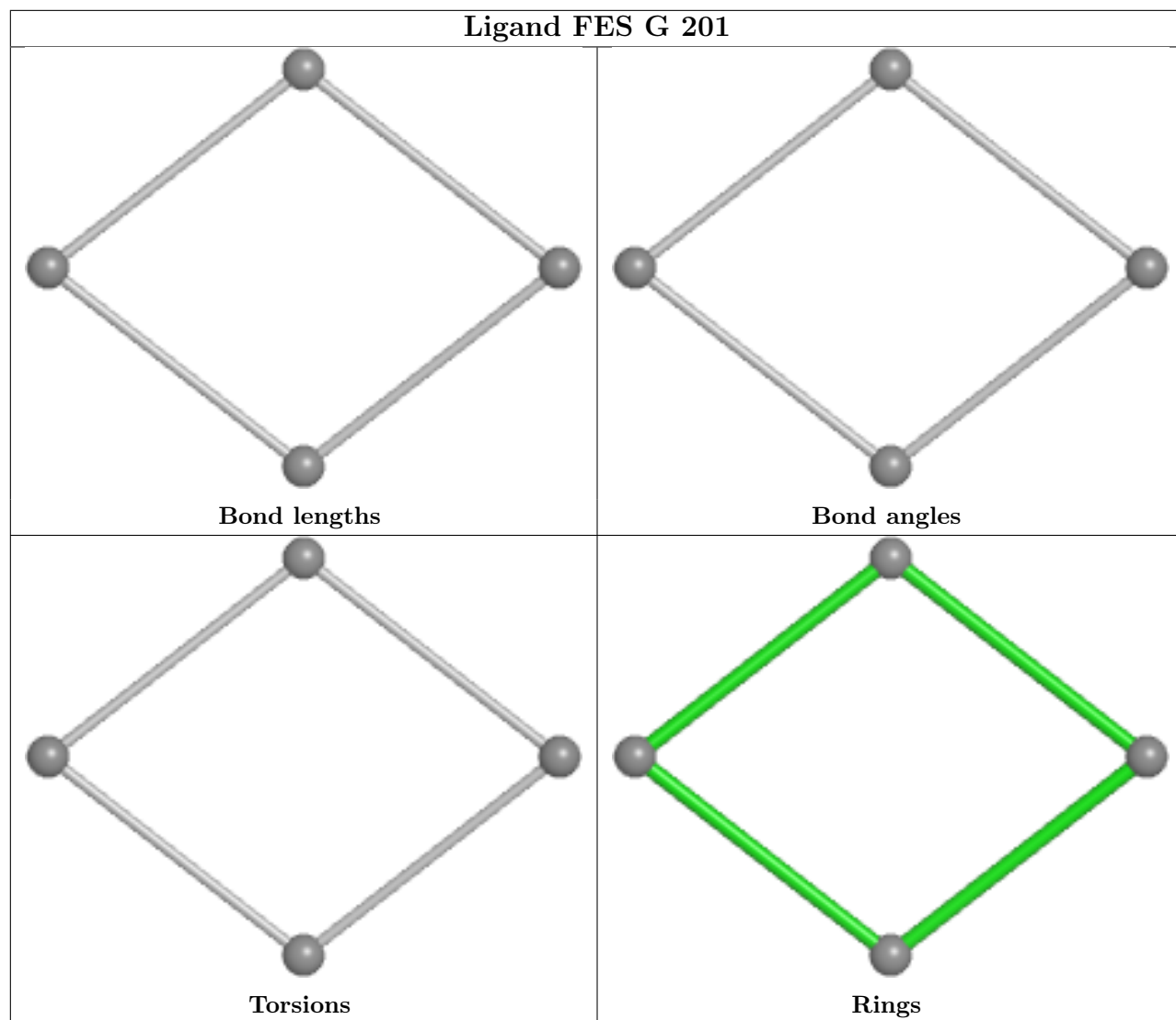


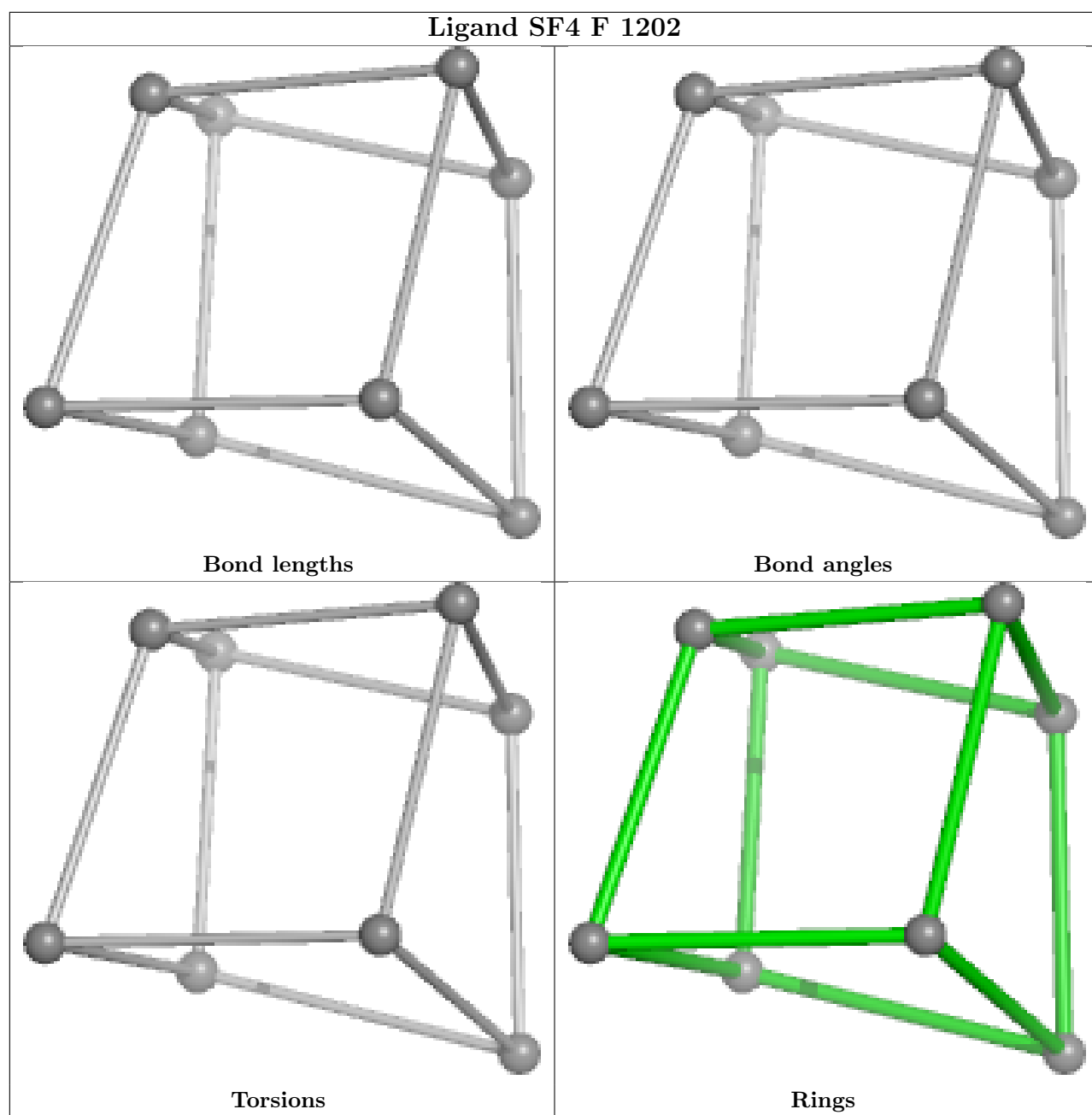


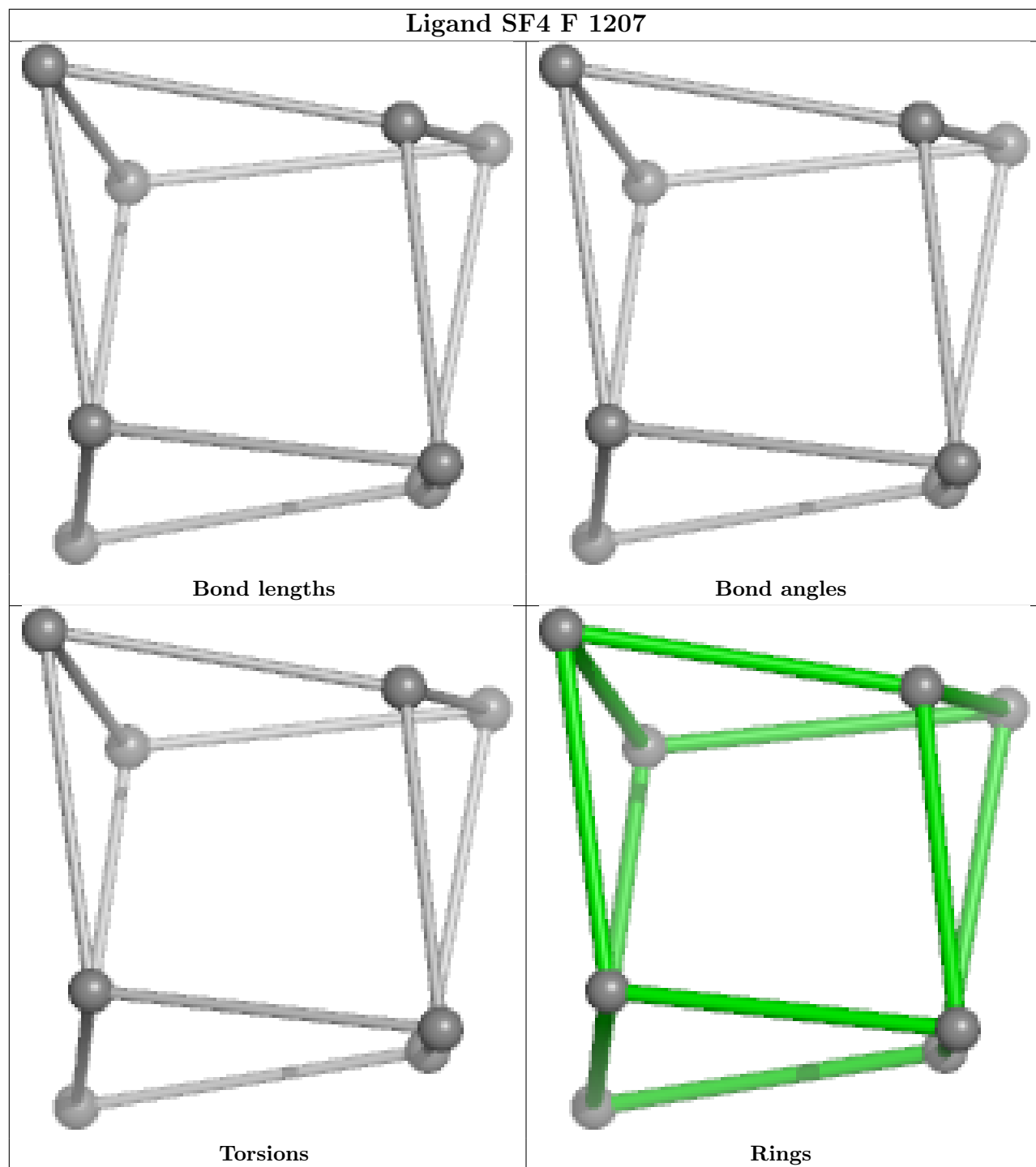


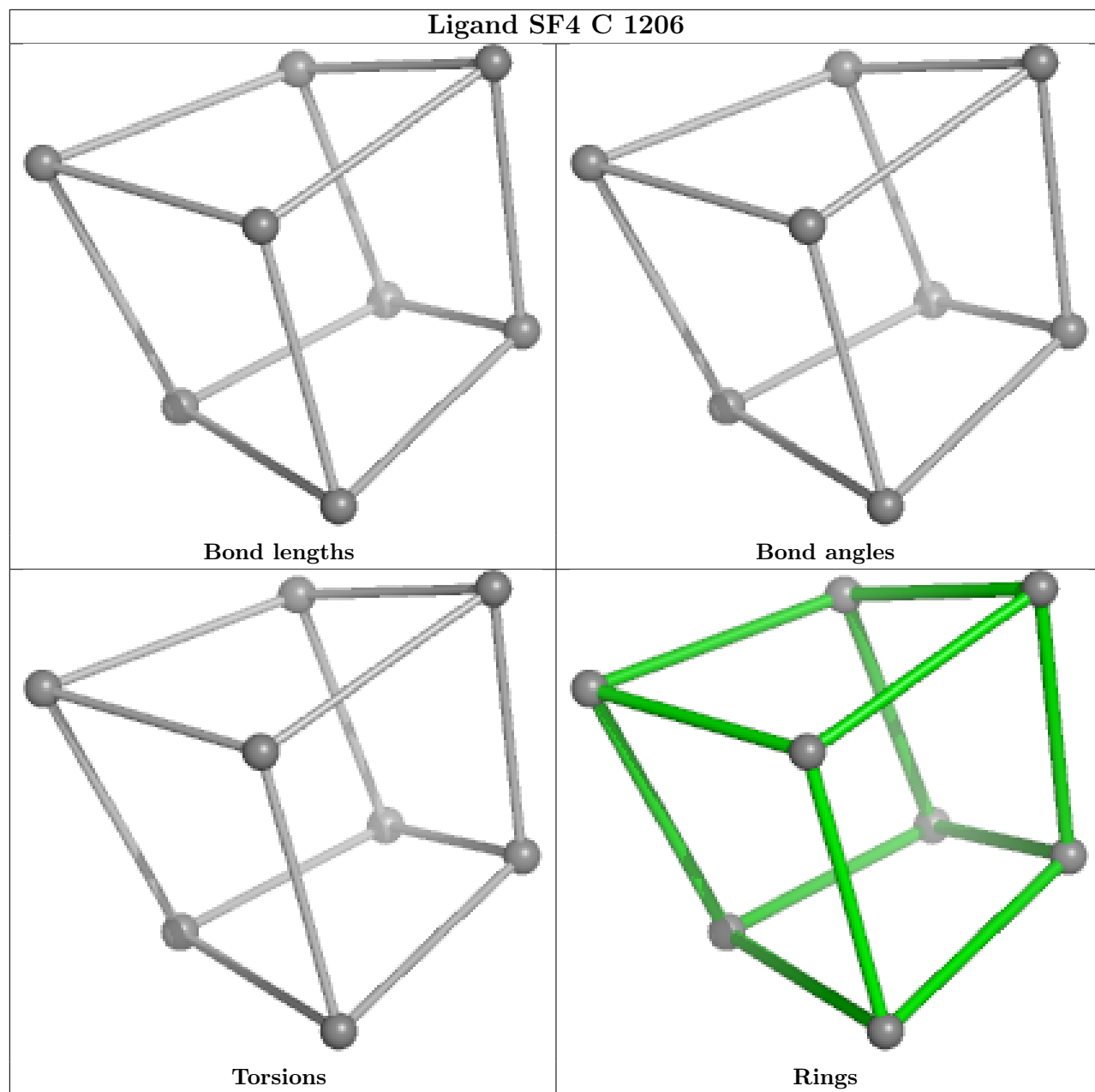


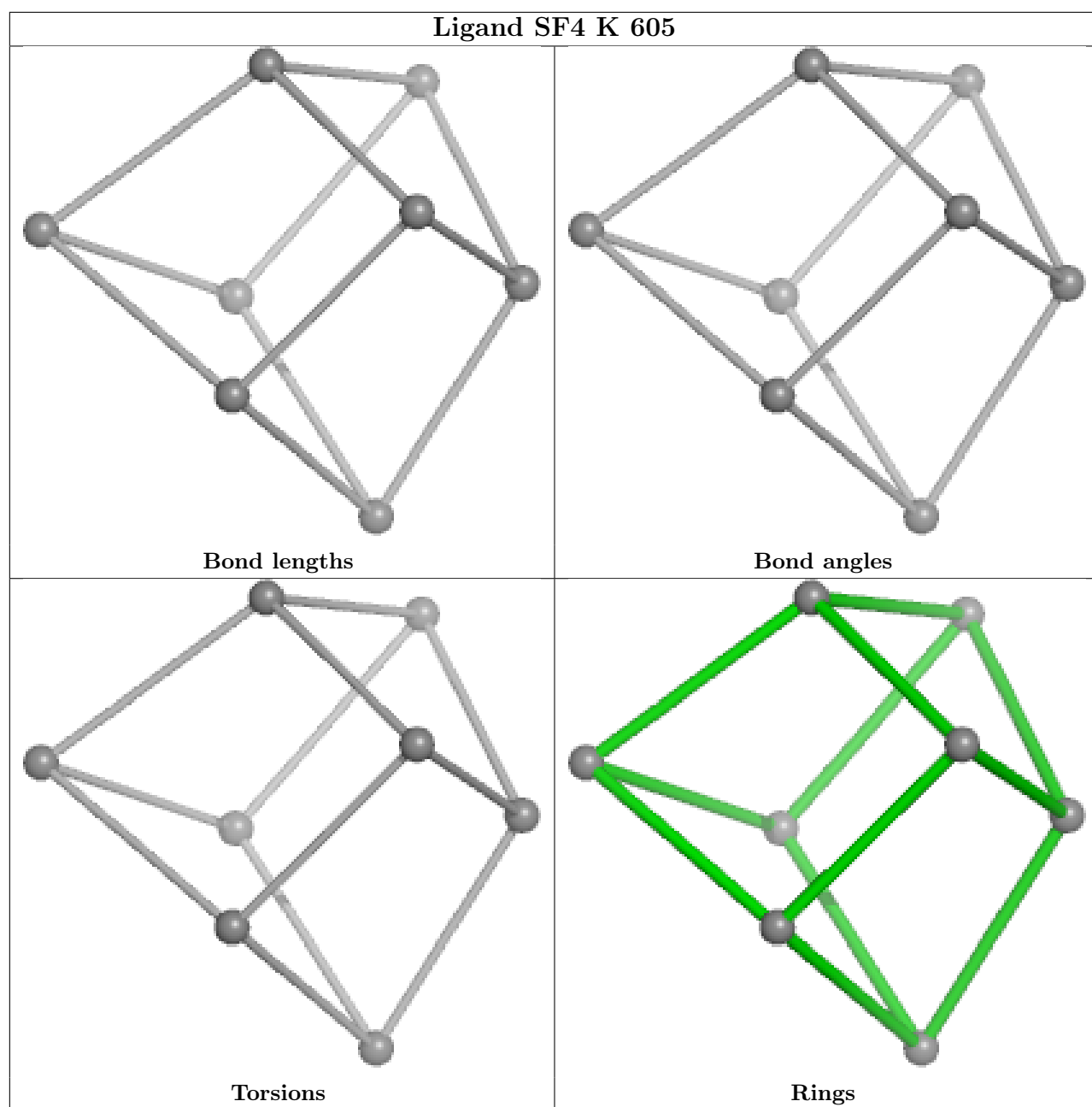




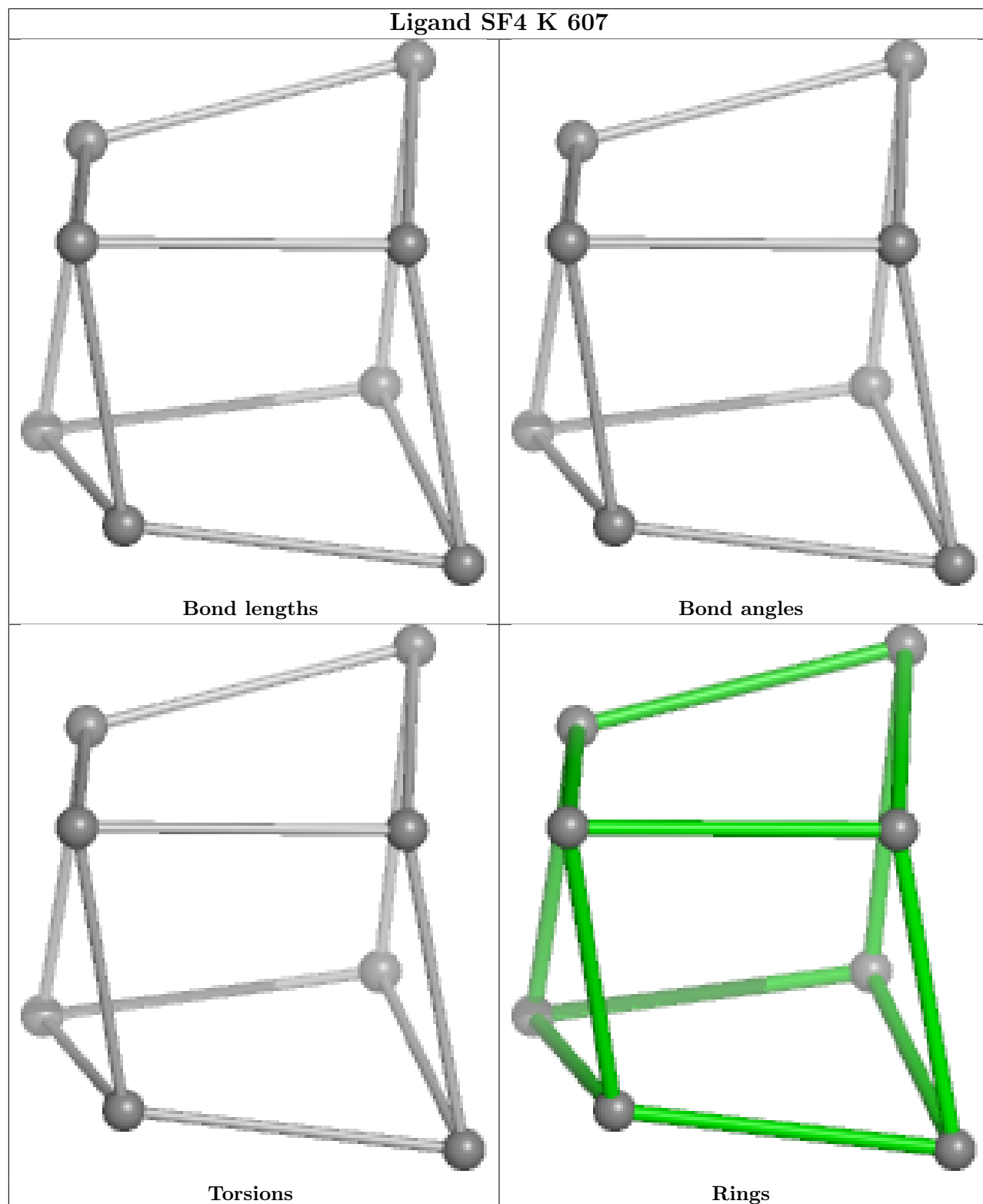


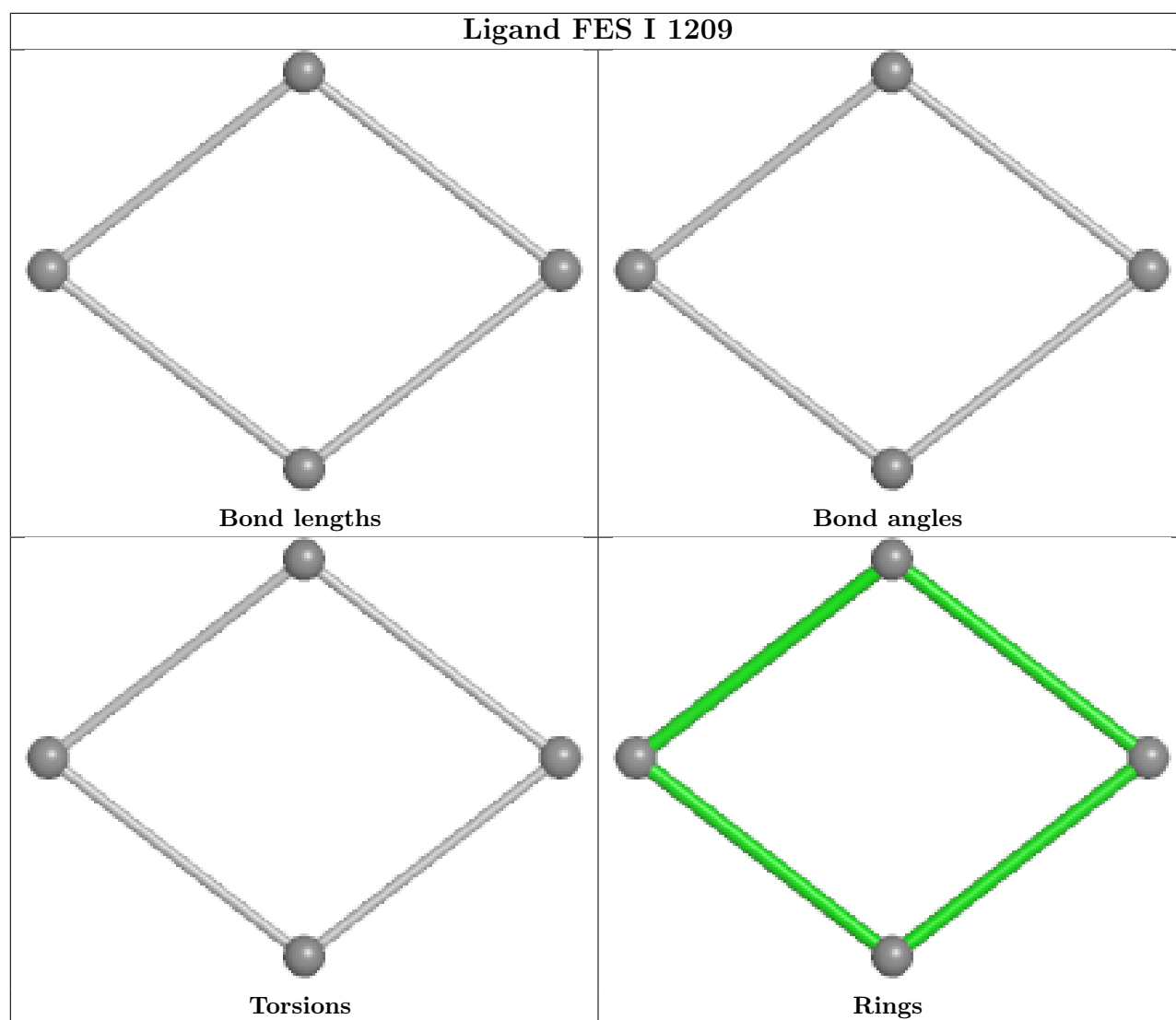




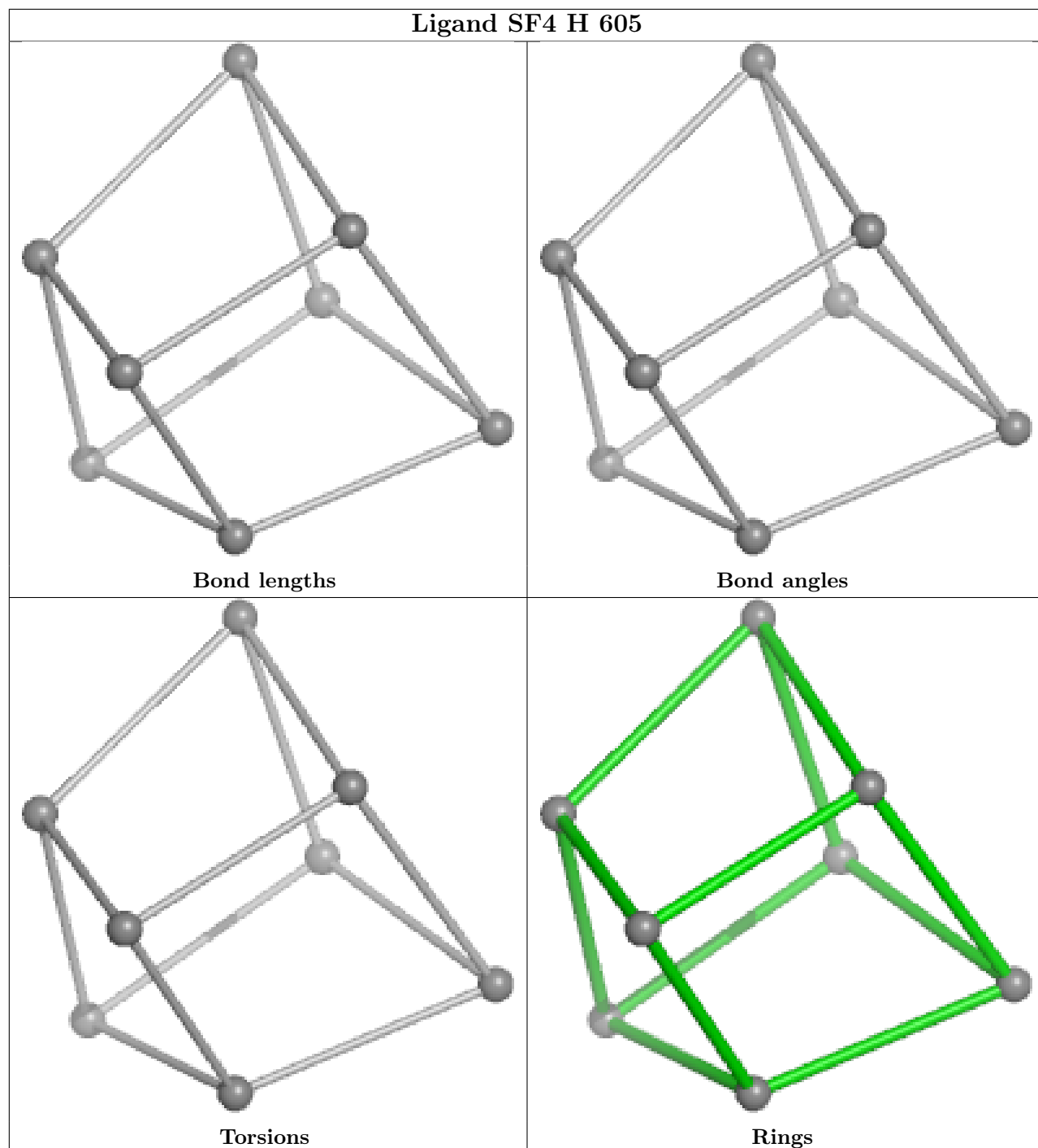


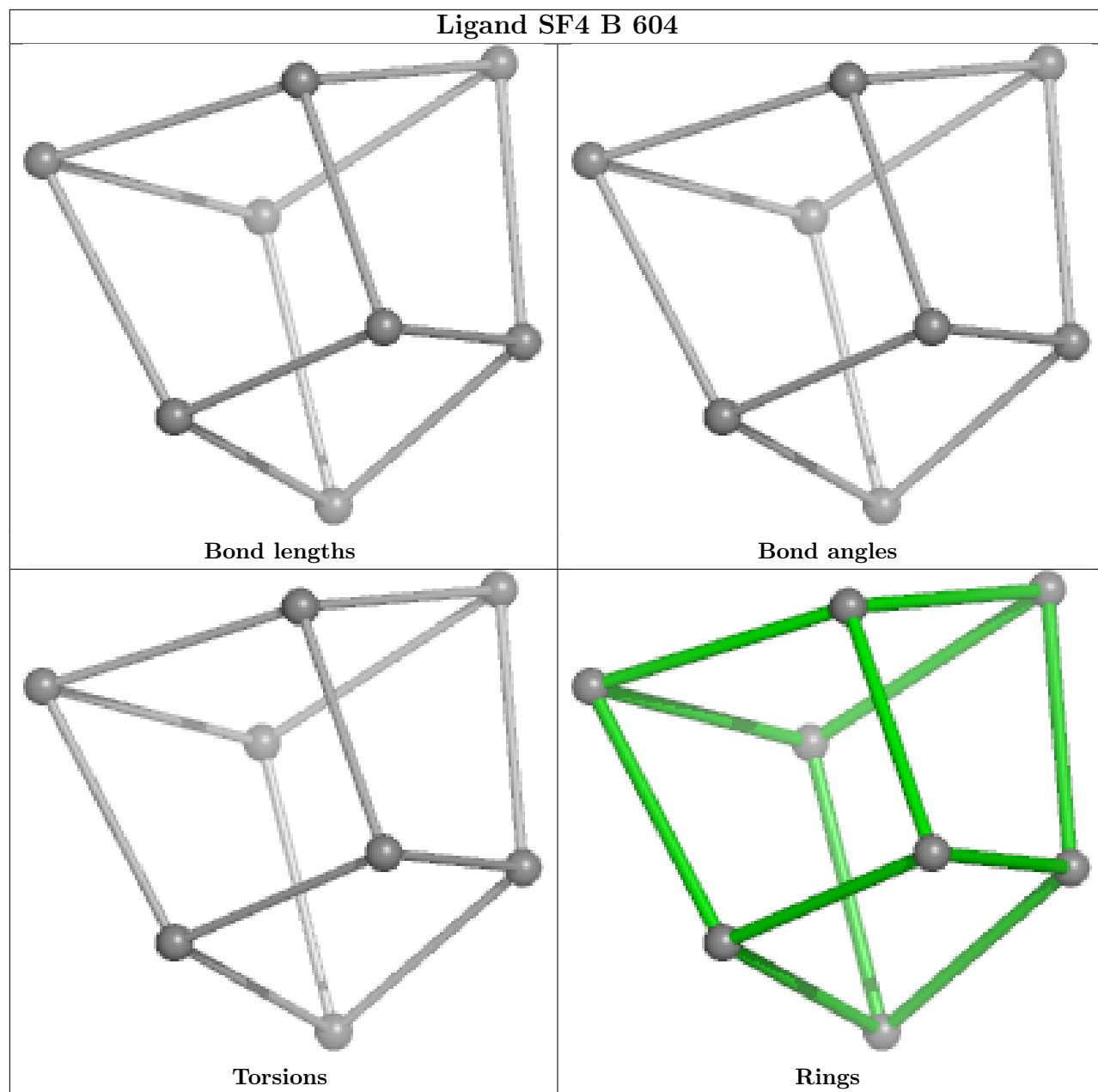
## Ligand SF4 K 607

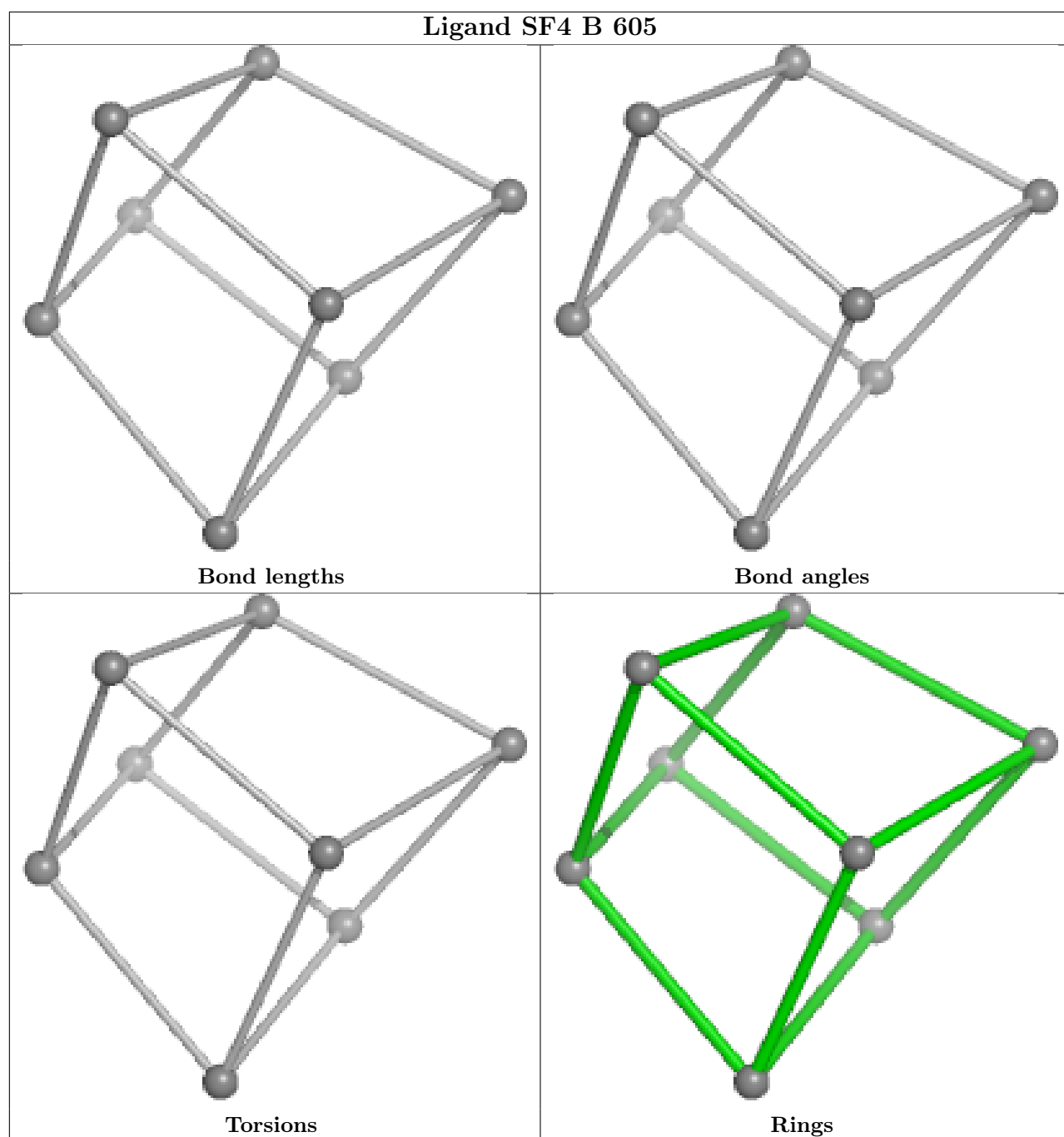


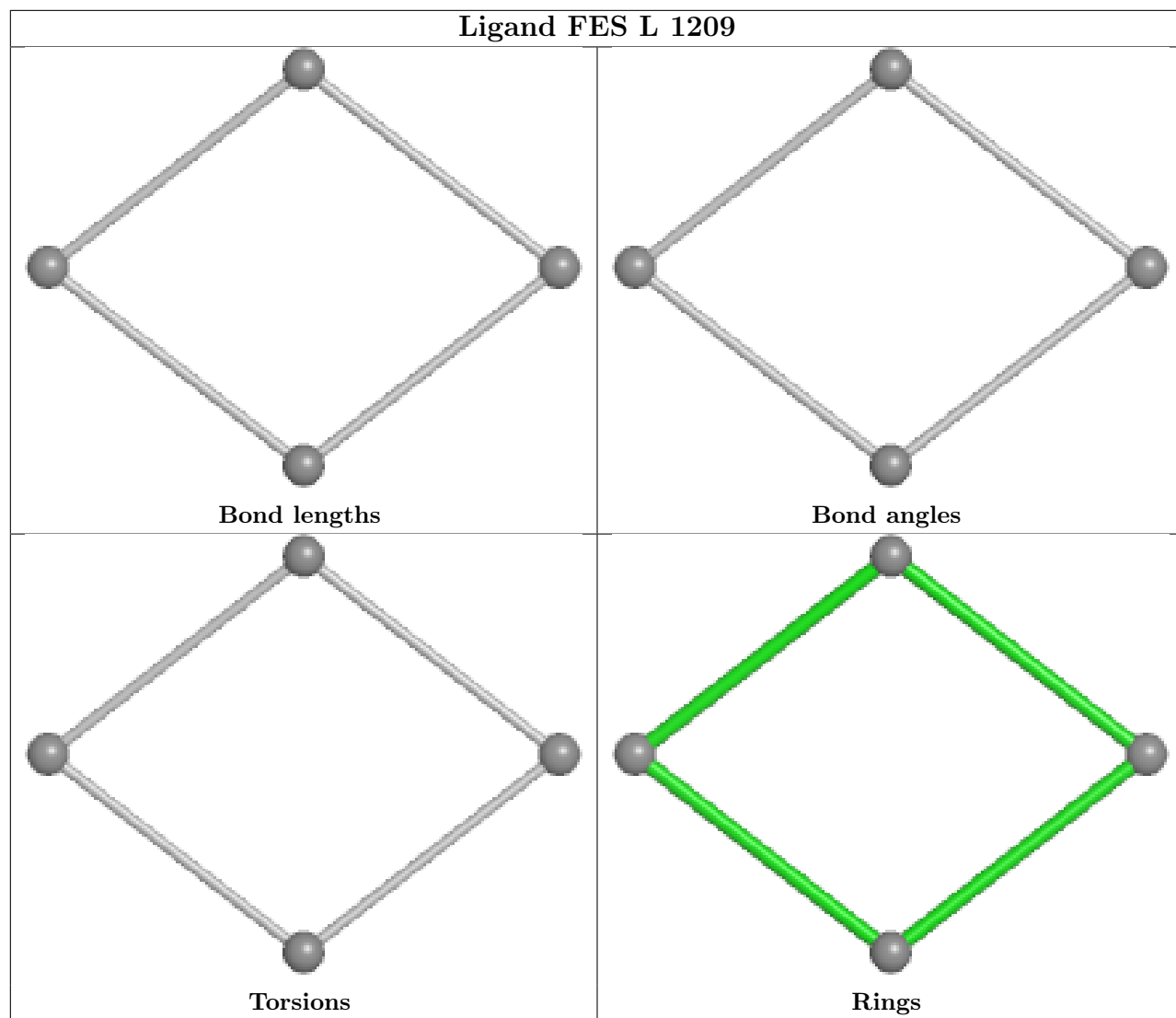


## Ligand SF4 H 605

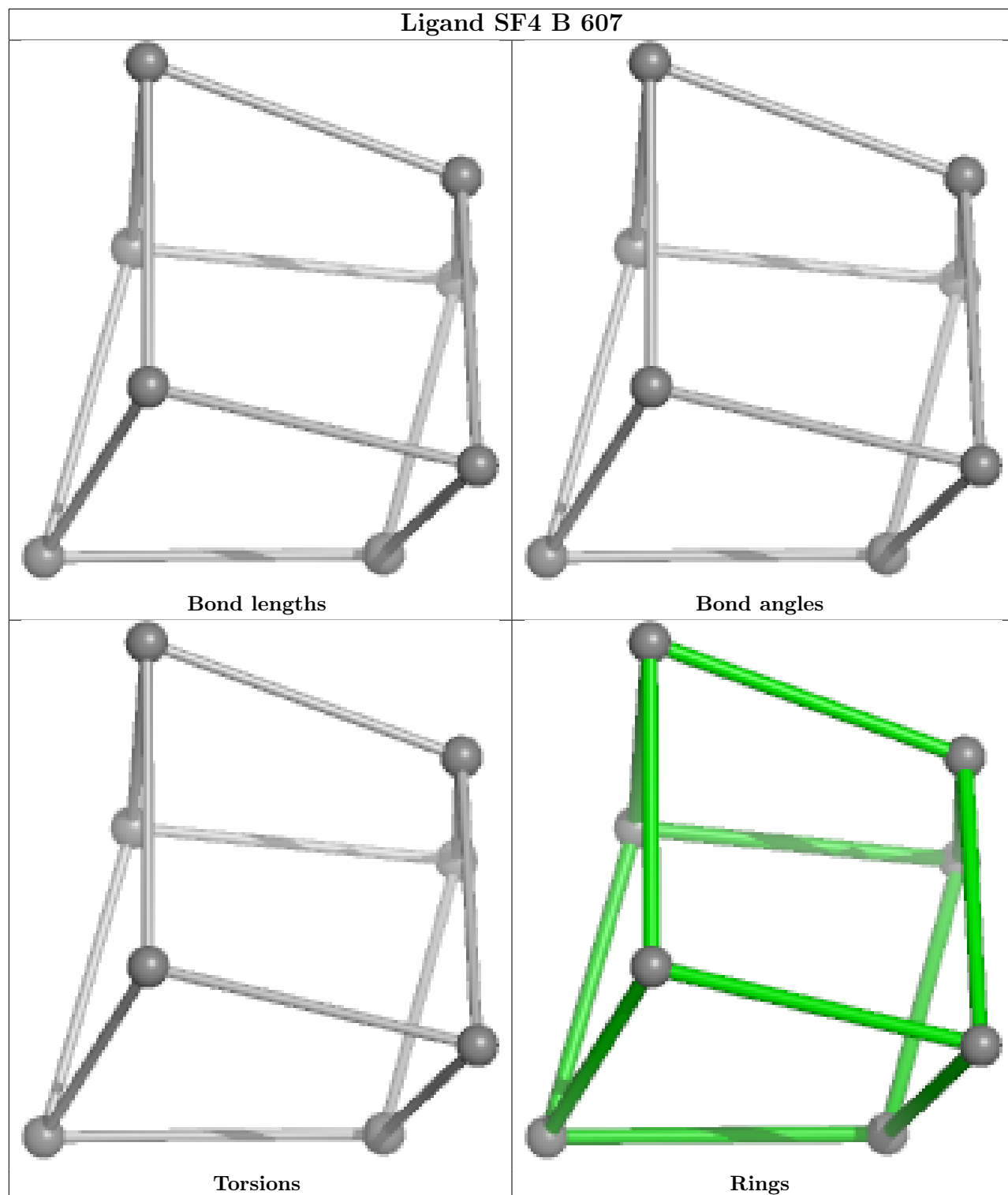


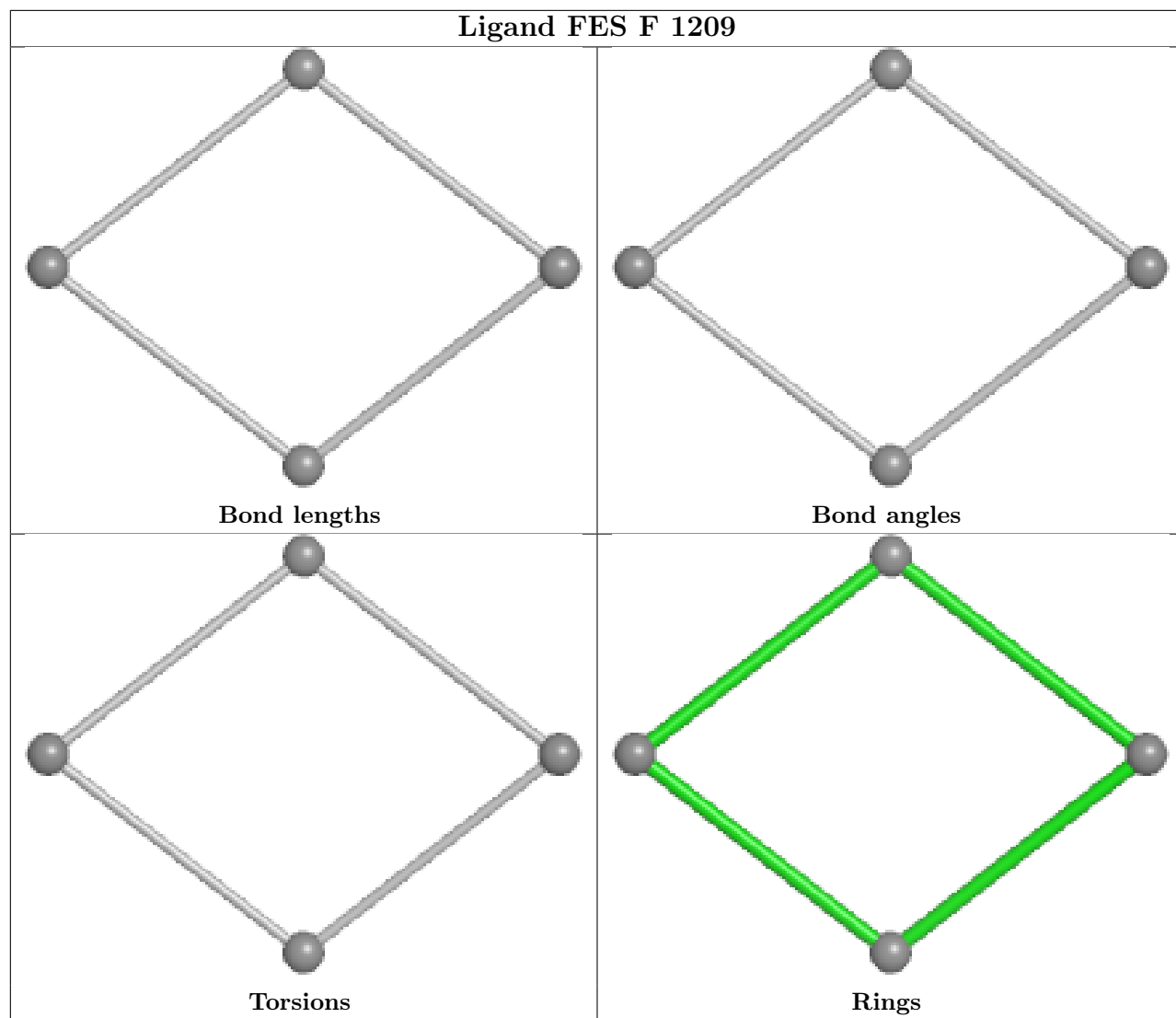


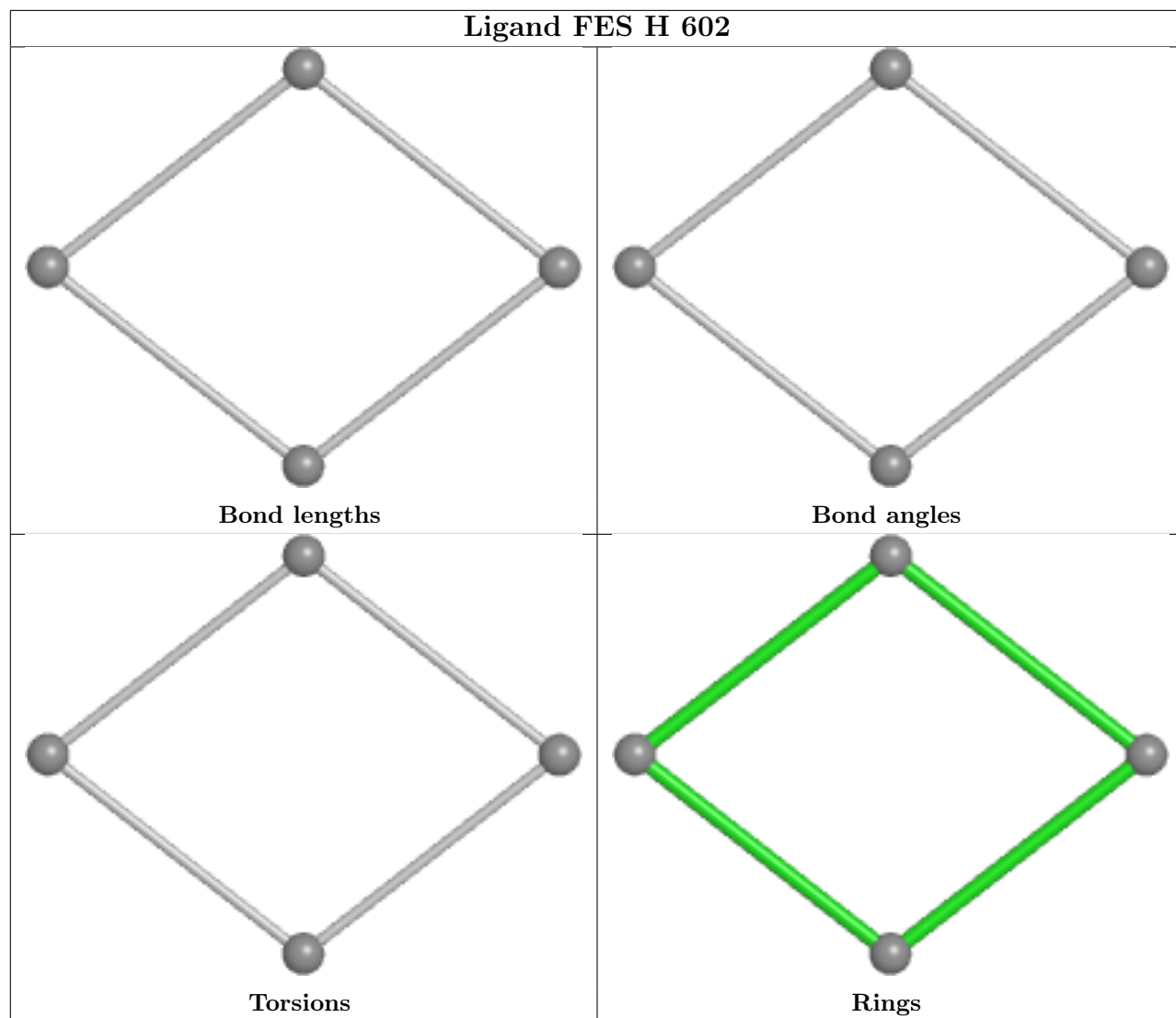


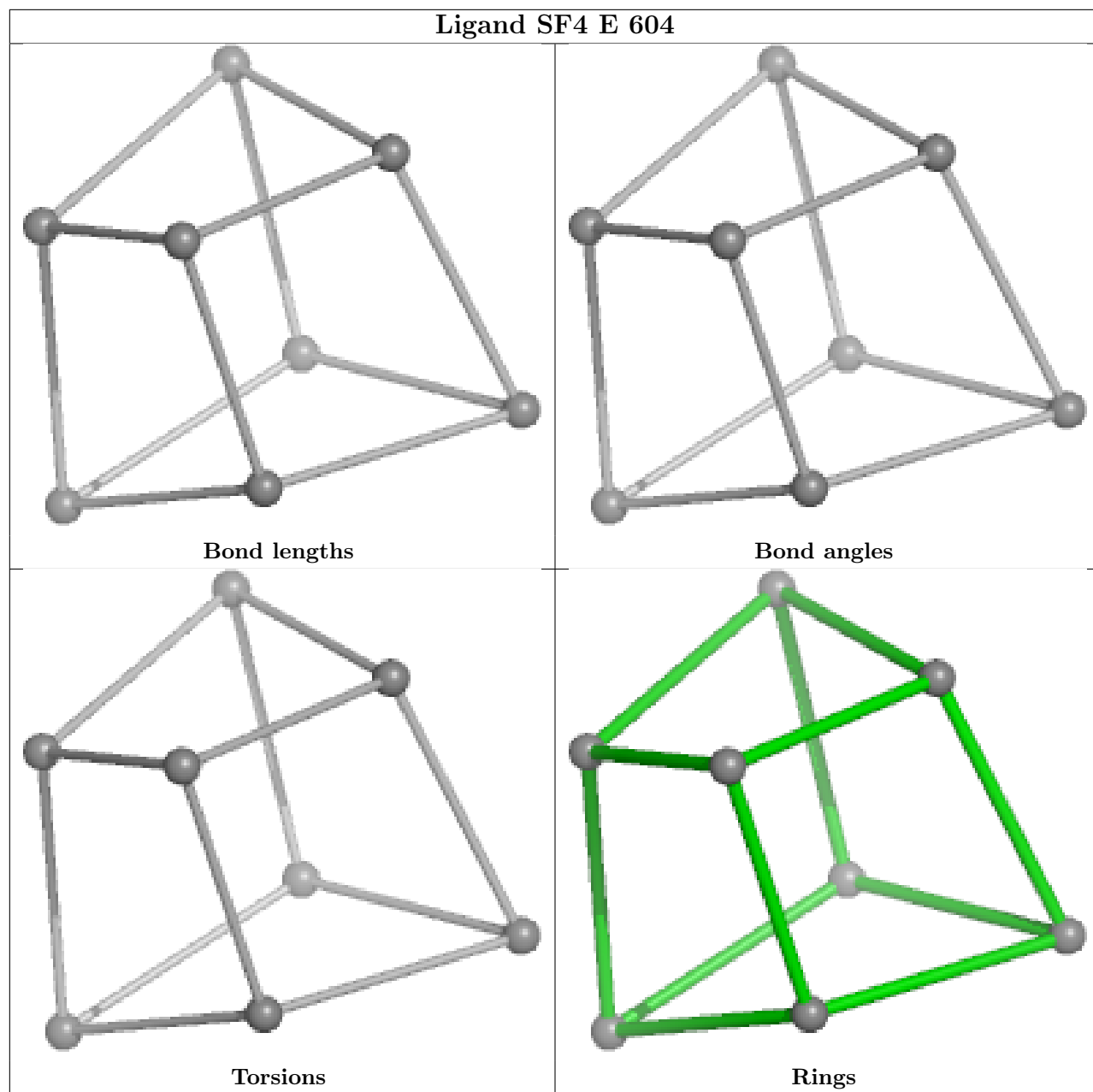


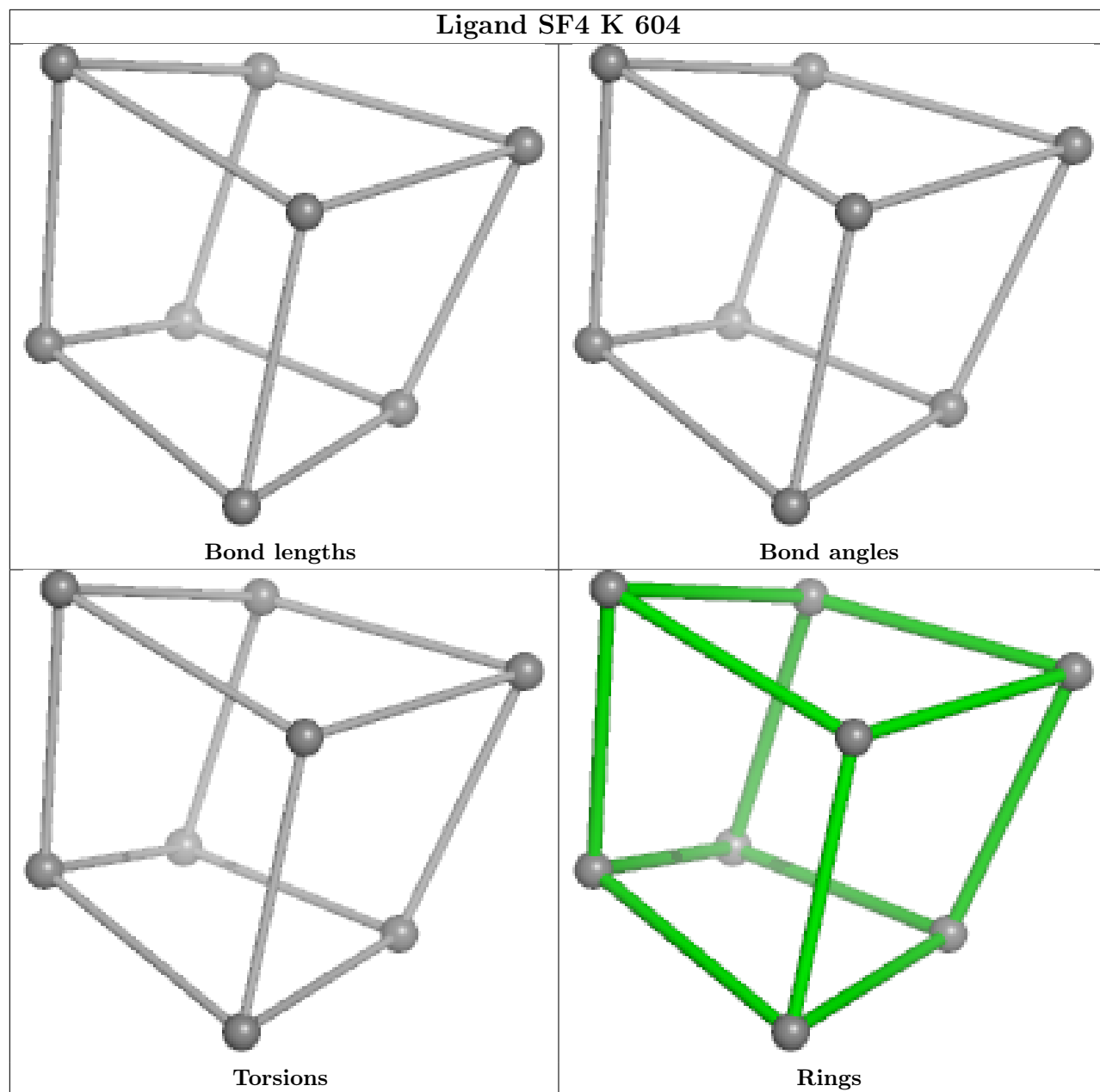
## Ligand SF4 B 607



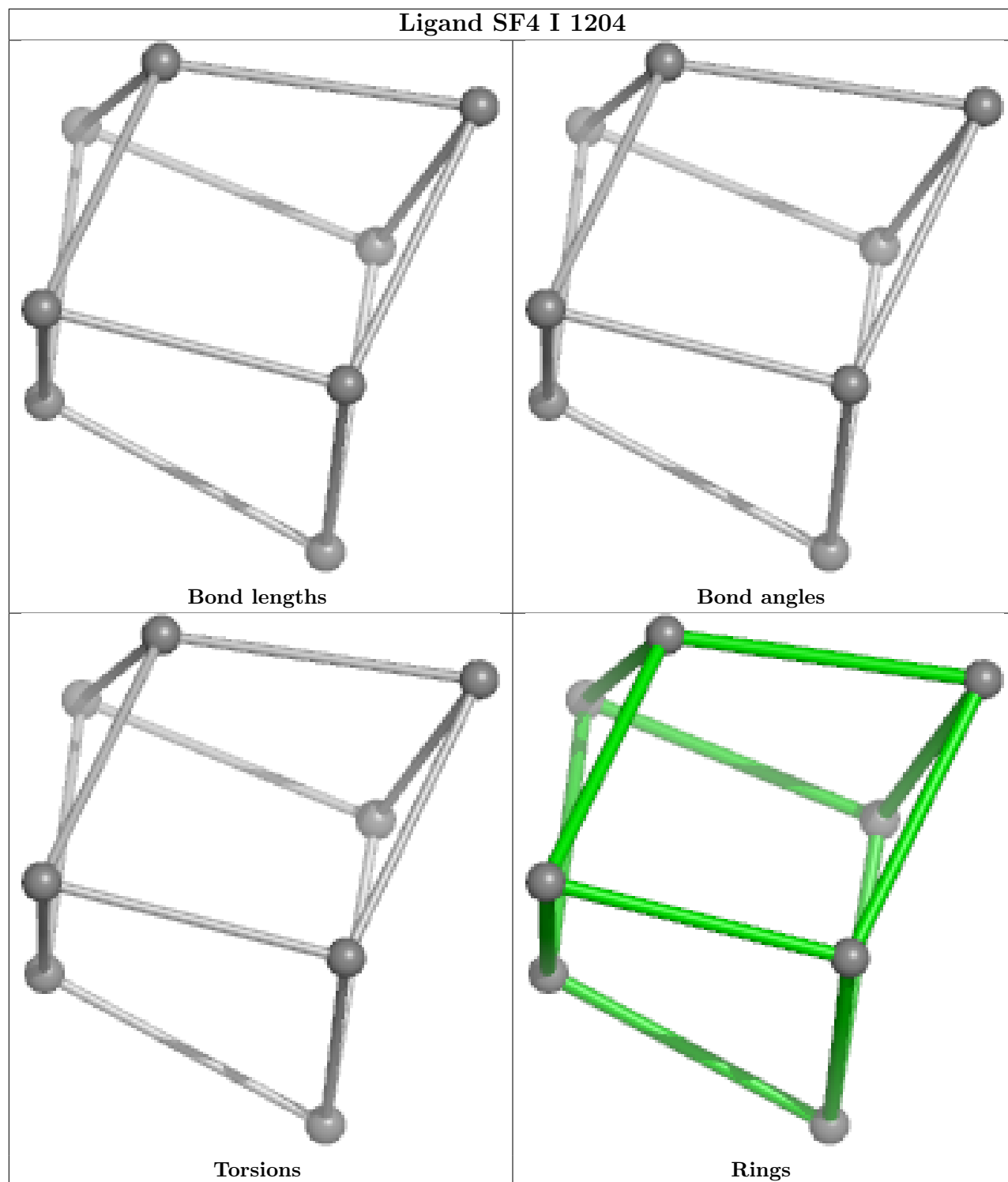


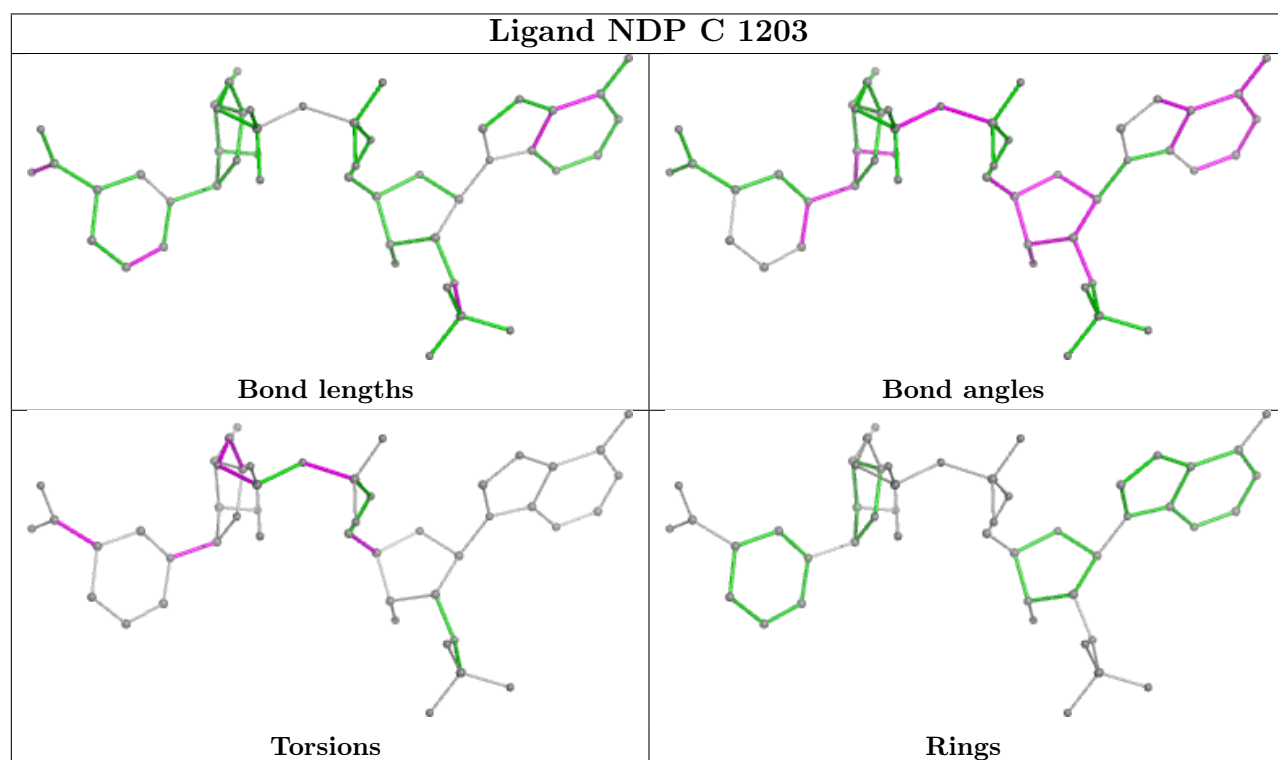
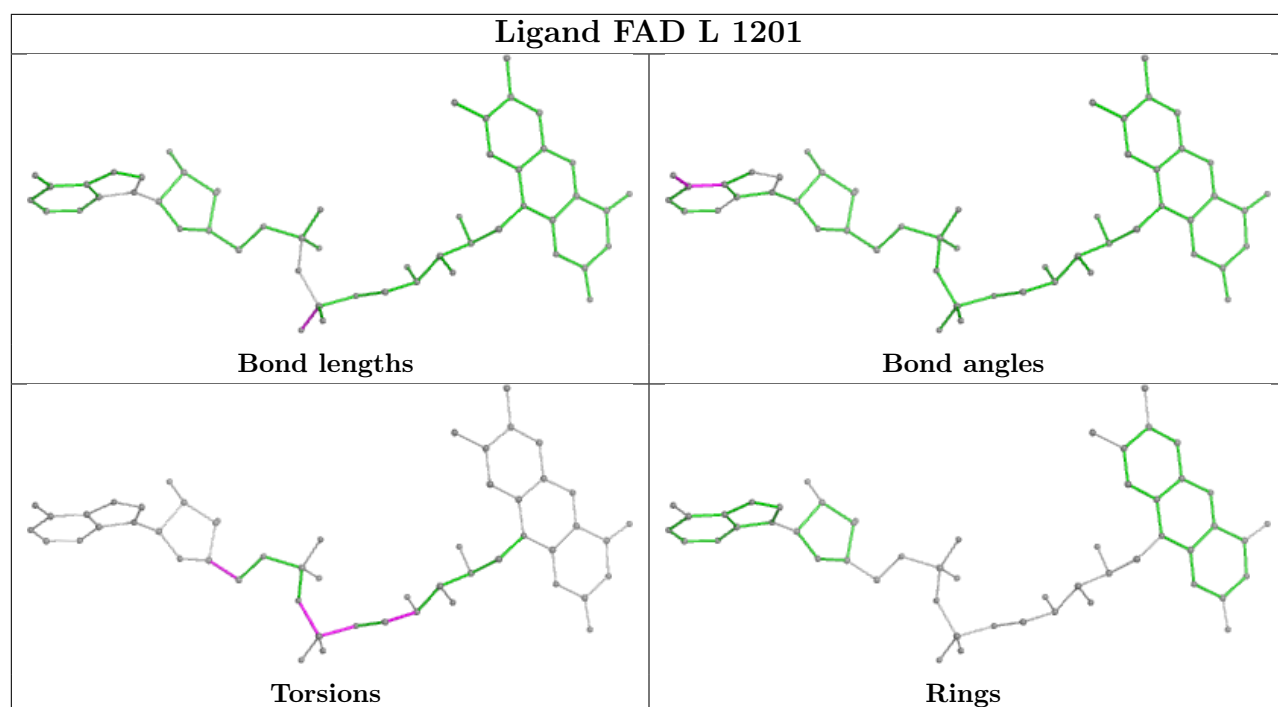




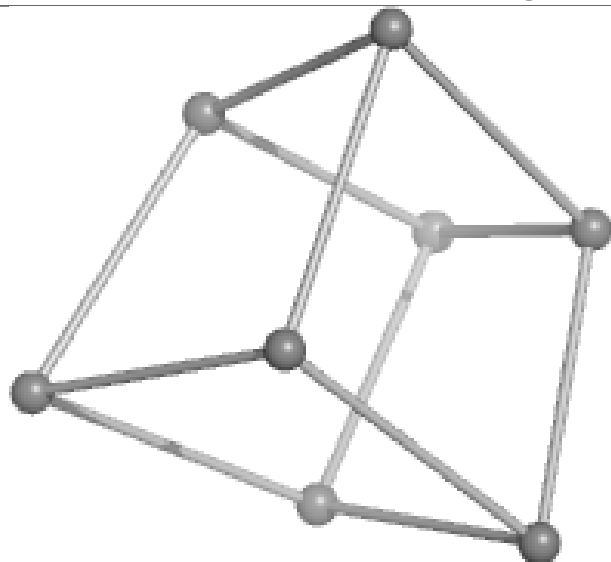


## Ligand SF4 I 1204

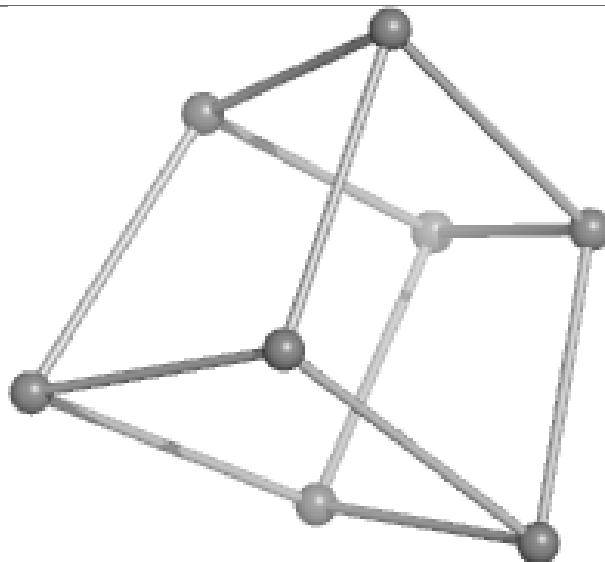




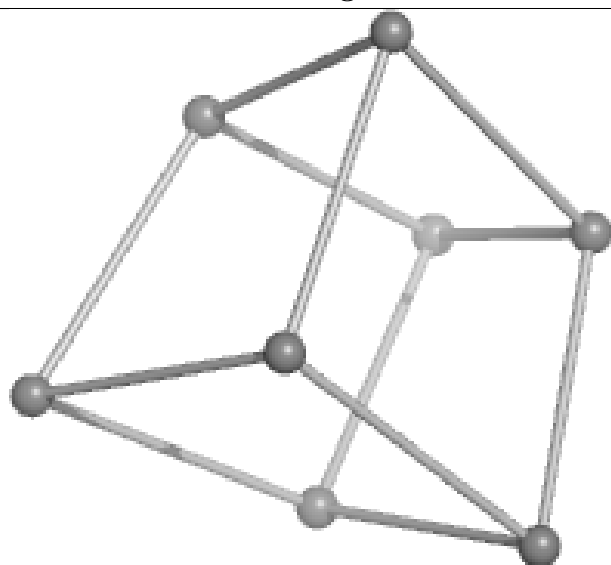
## Ligand SF4 H 604



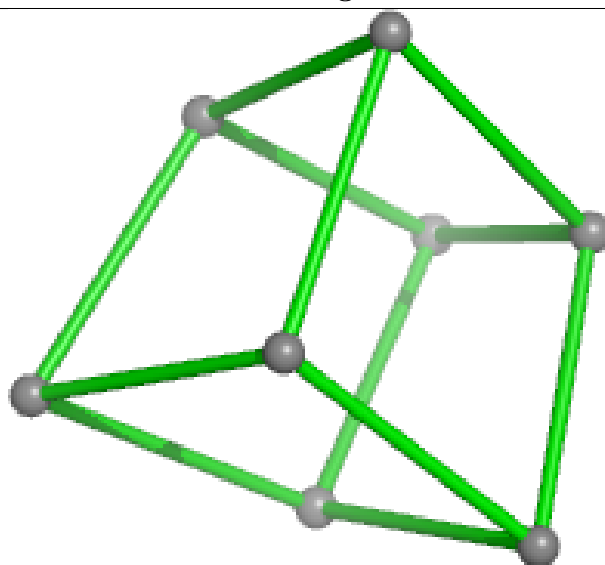
Bond lengths



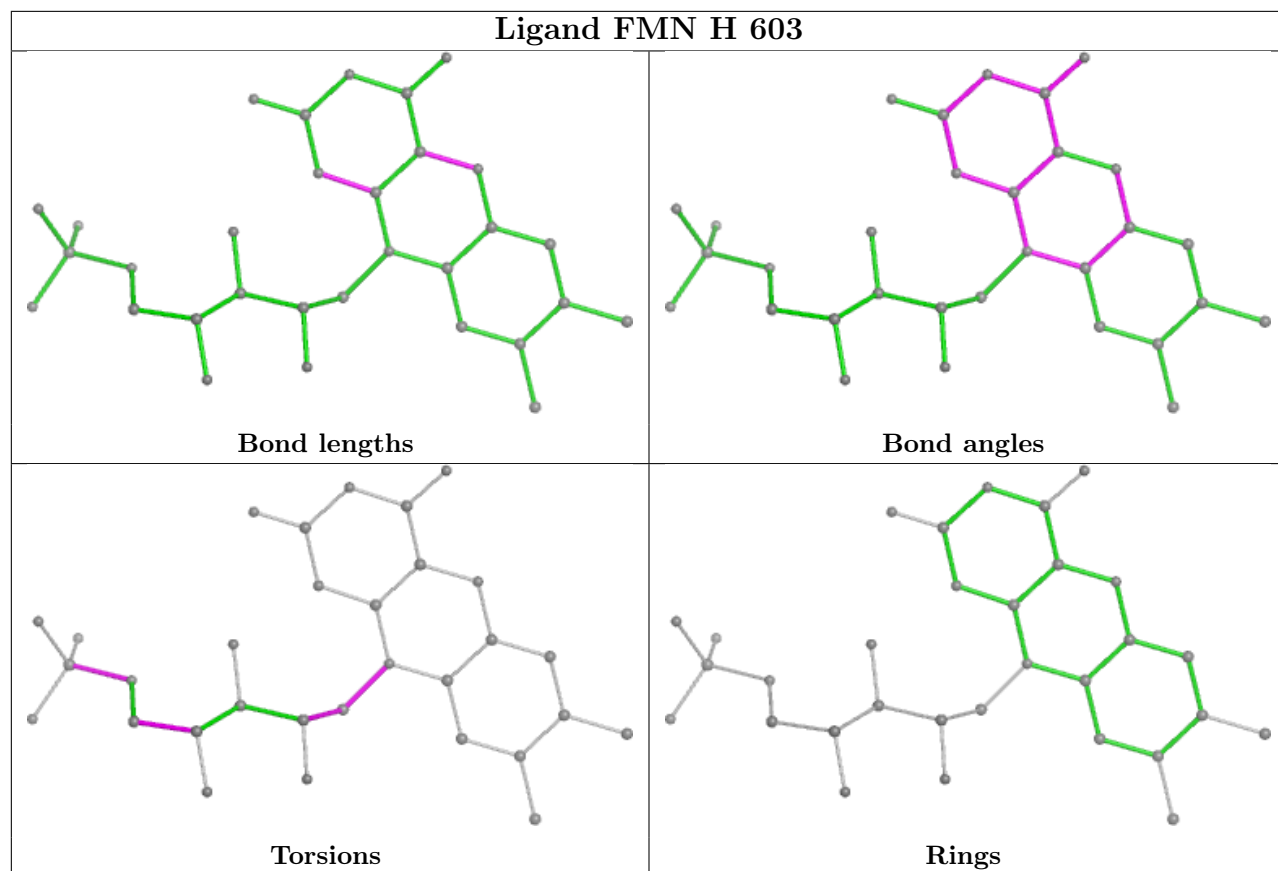
Bond angles

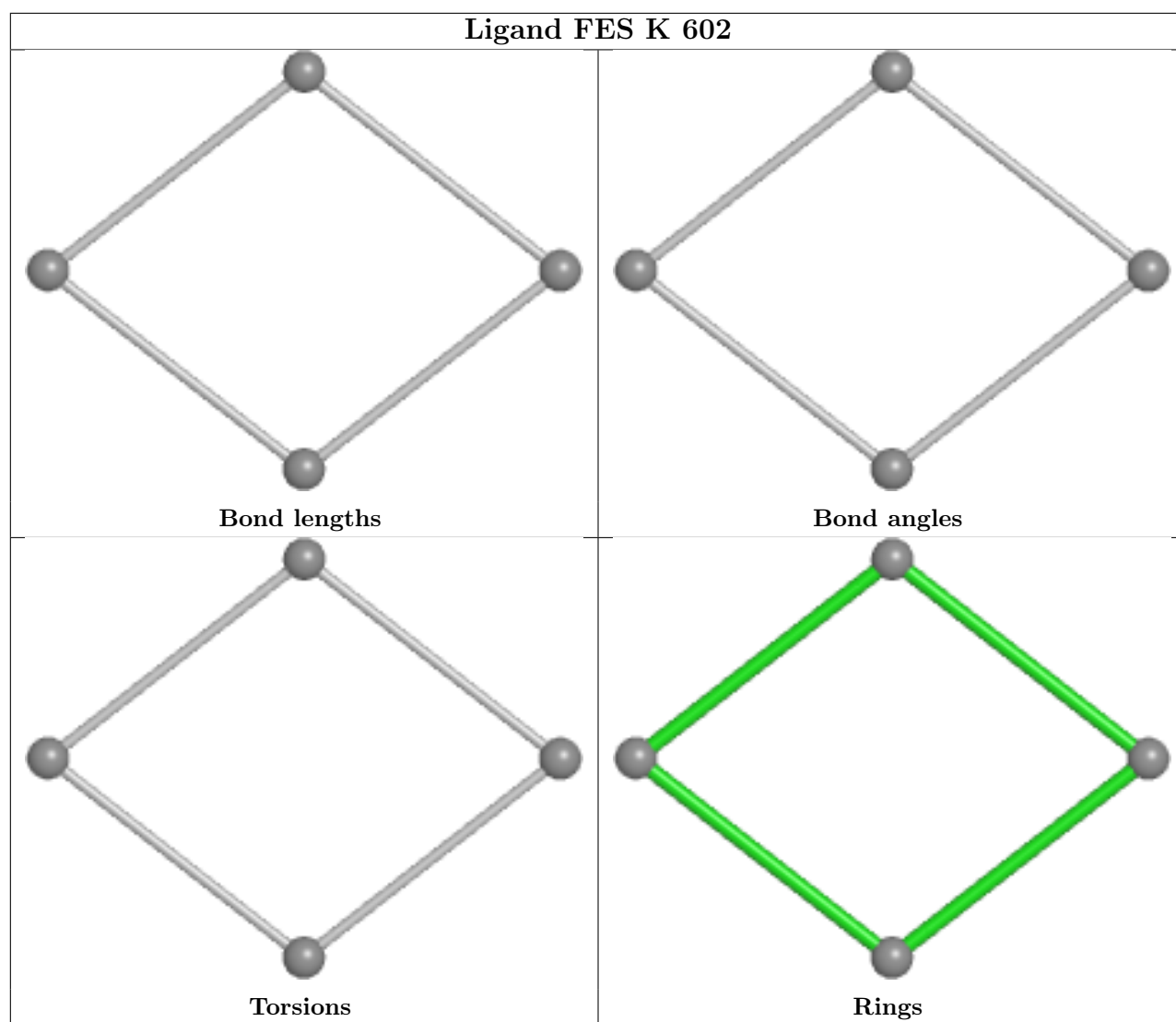


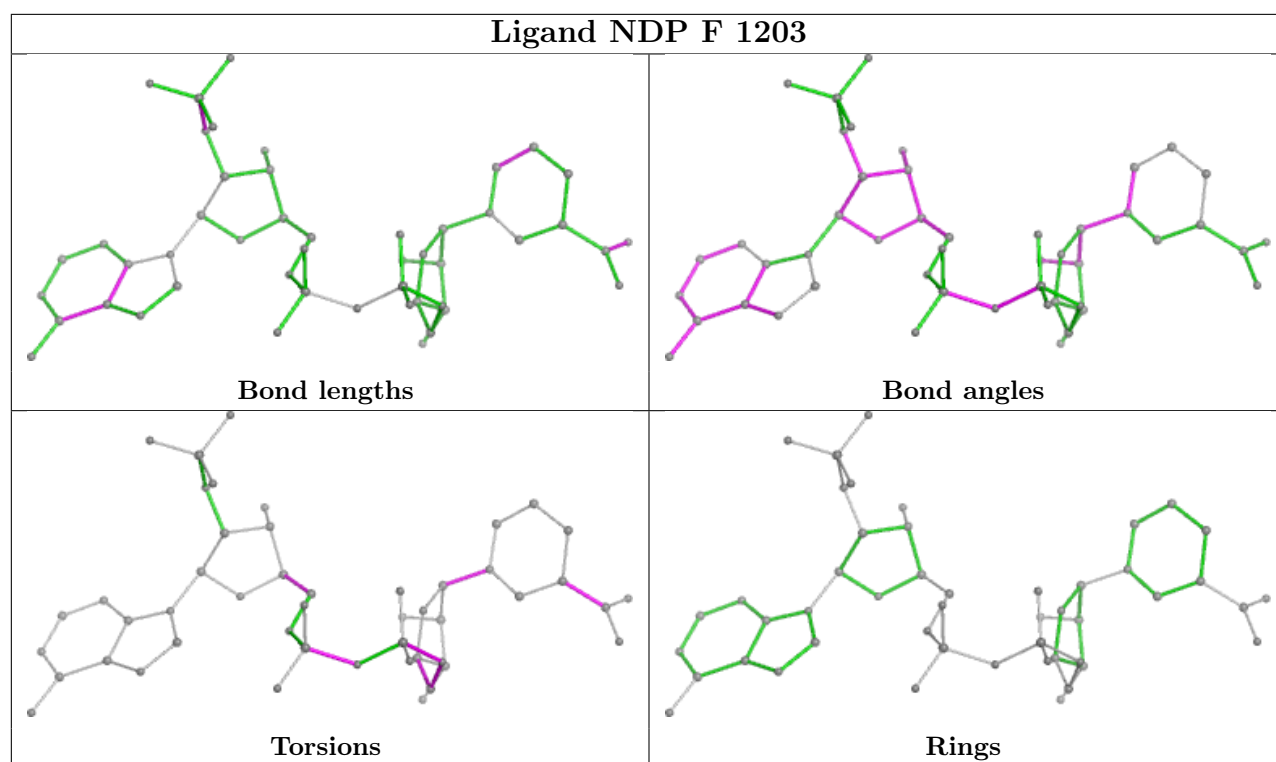
Torsions

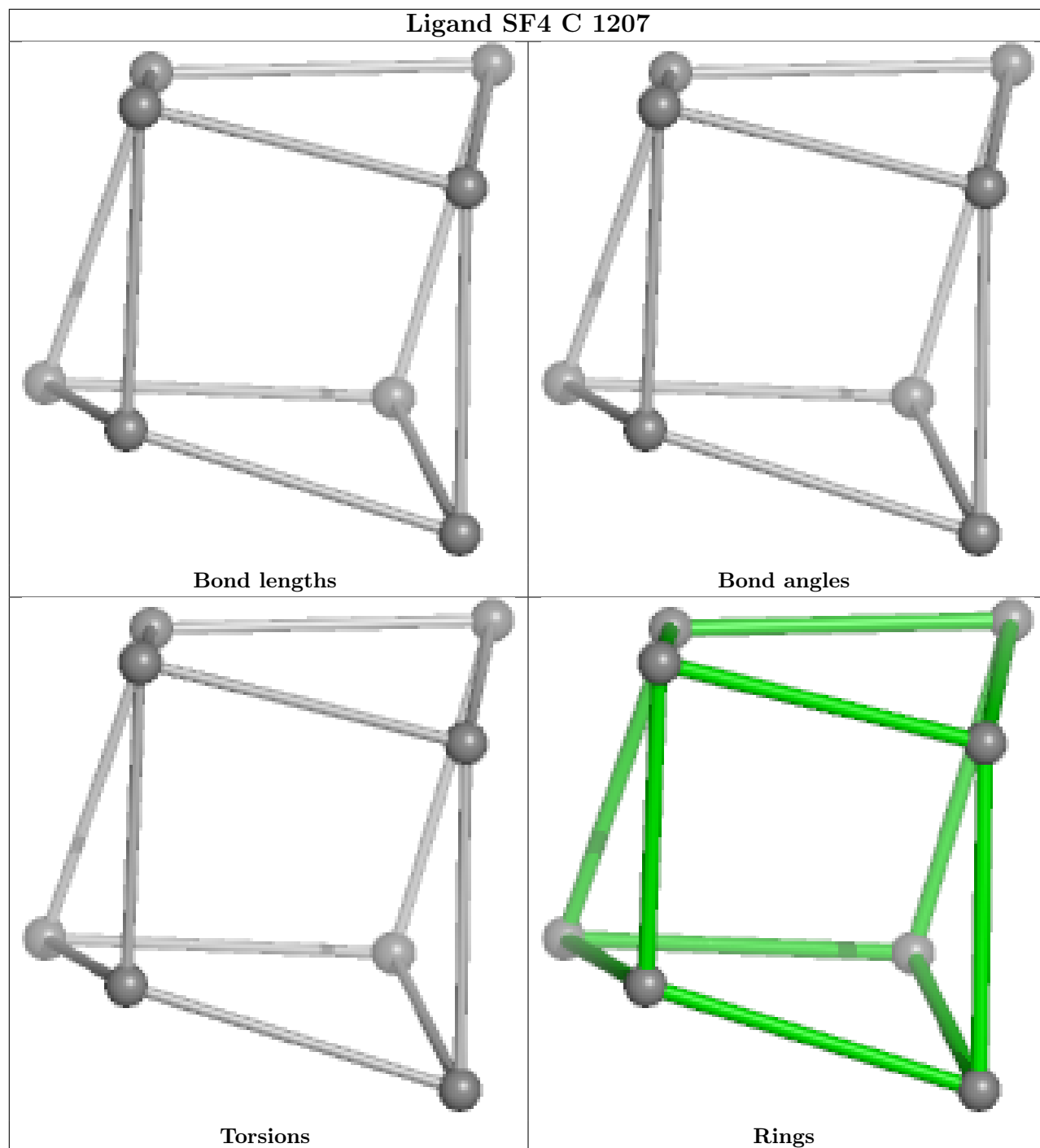


Rings

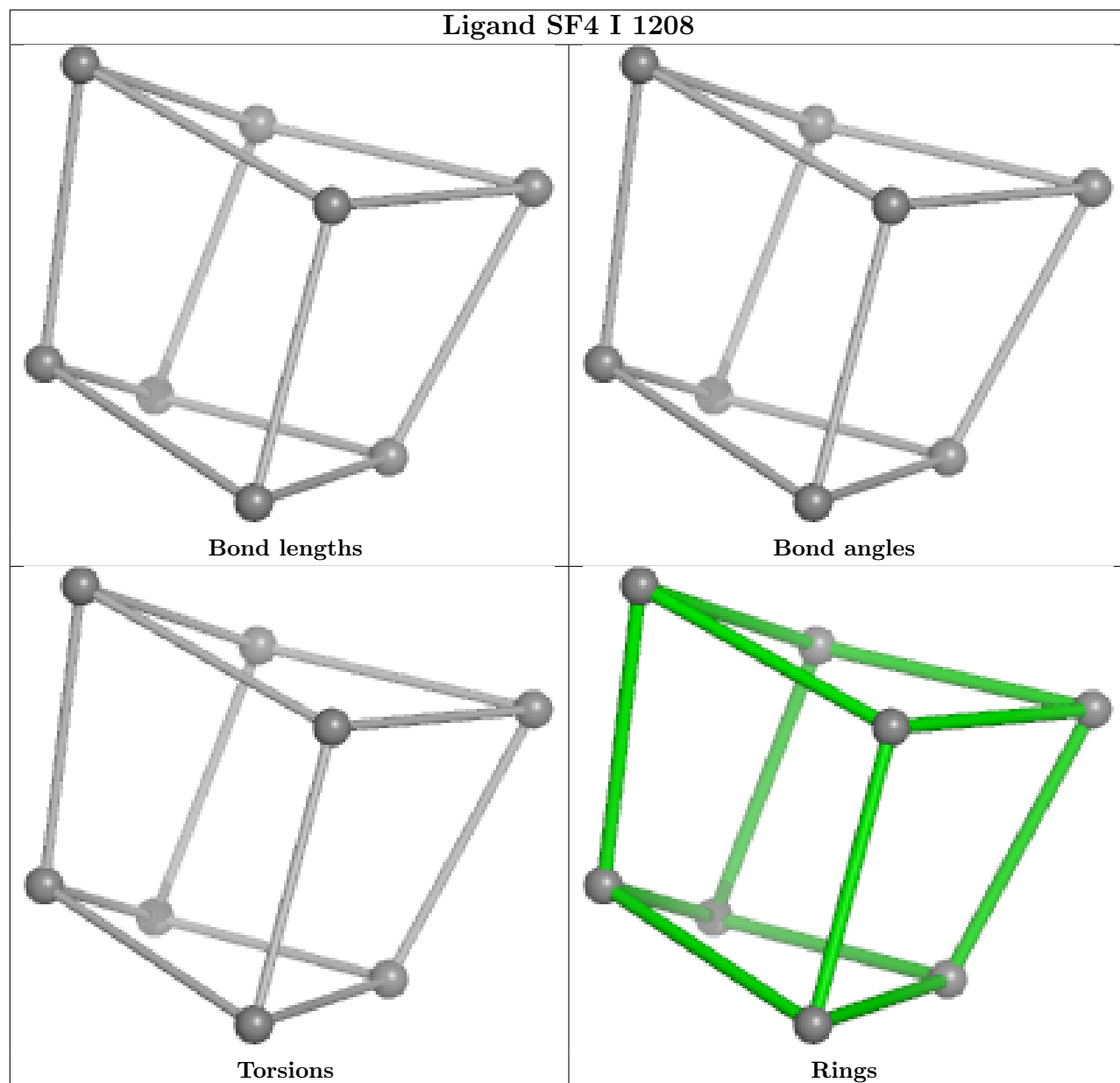


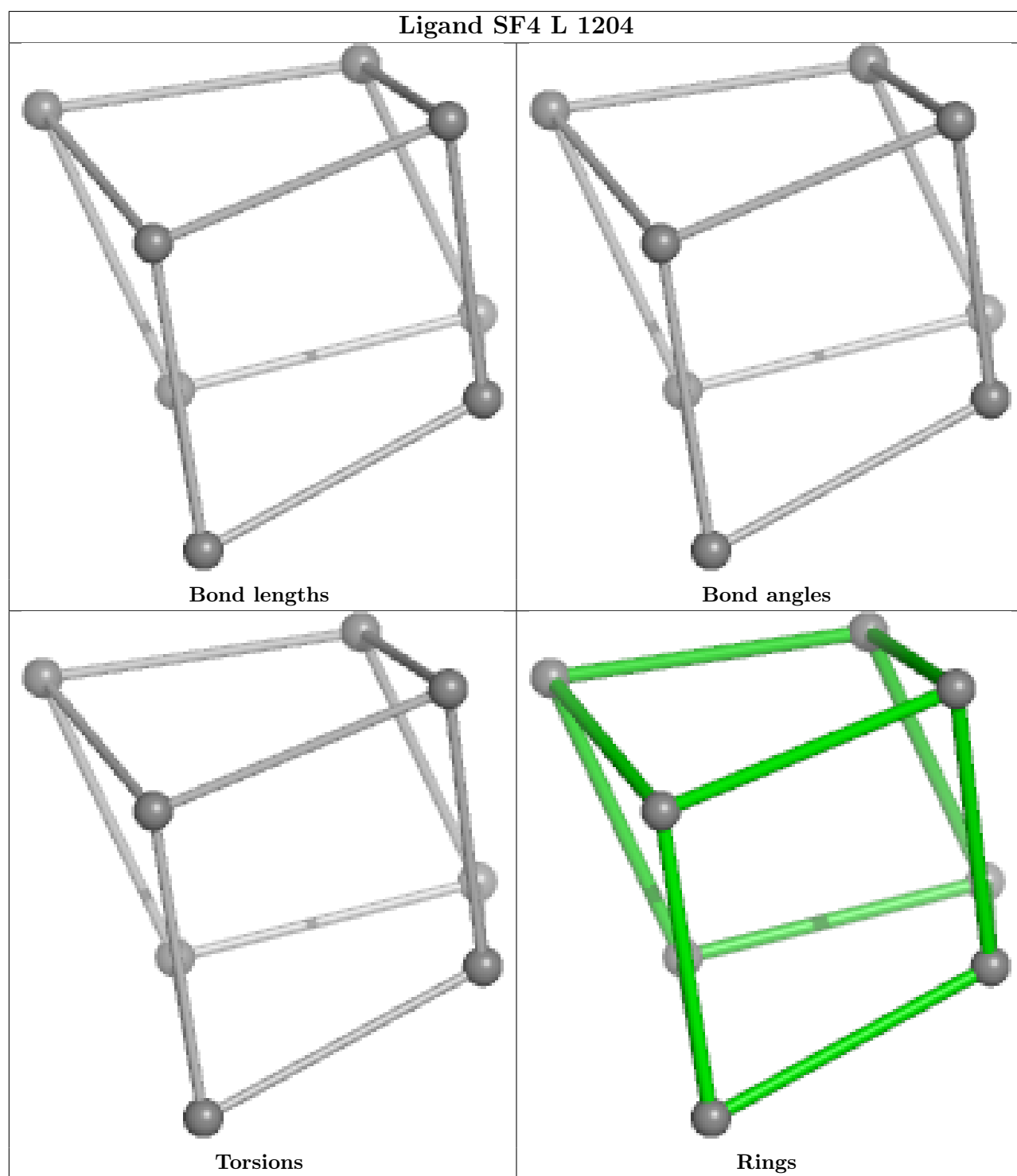


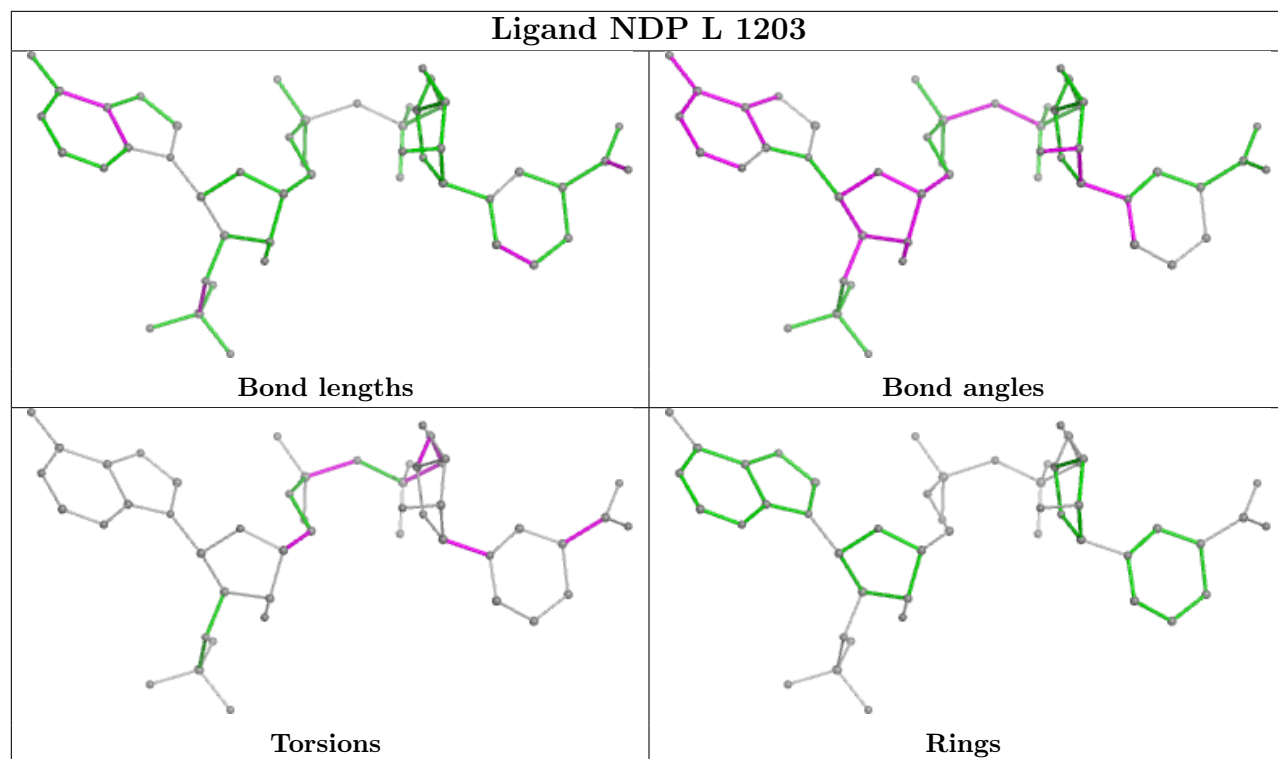


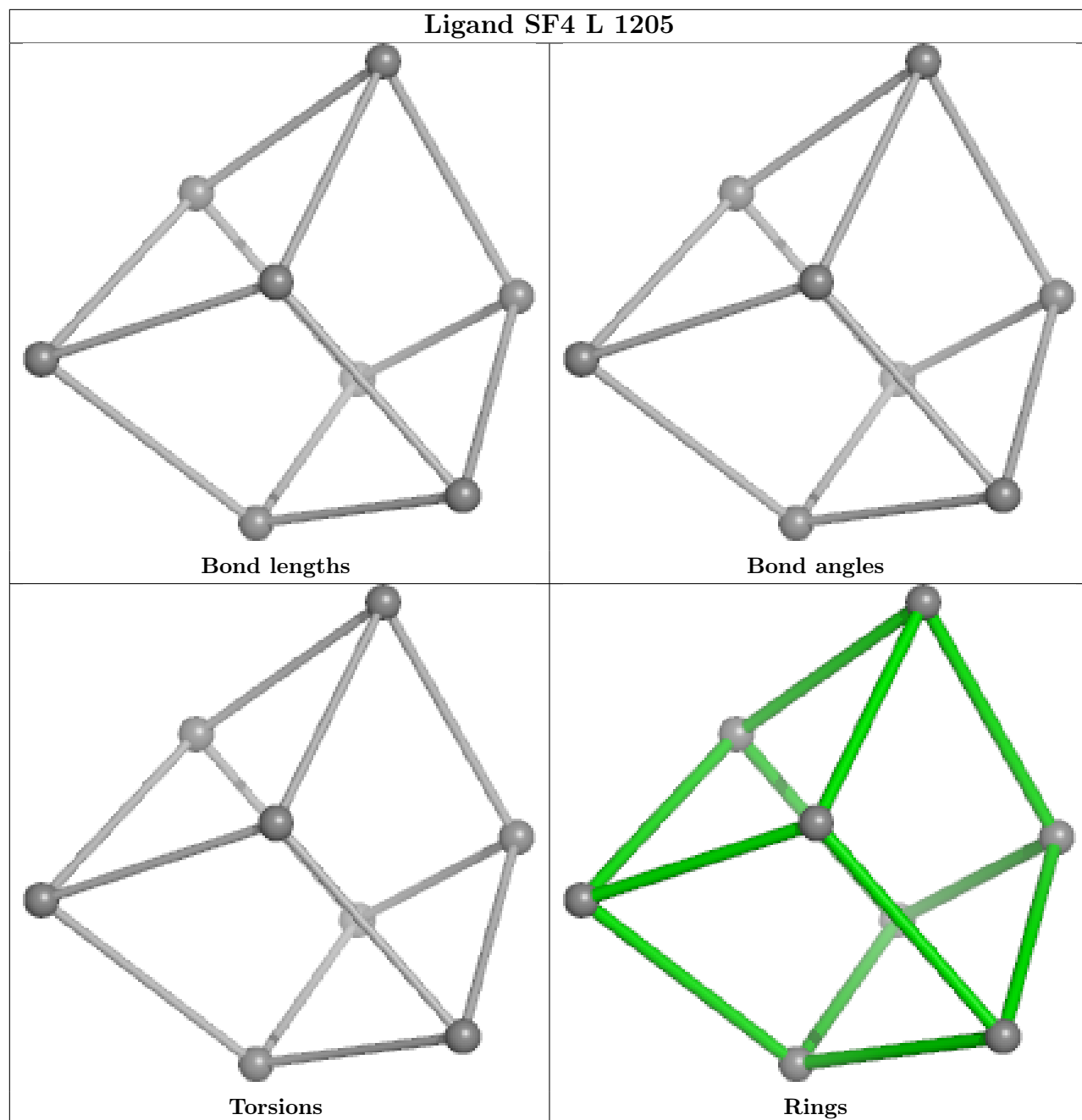


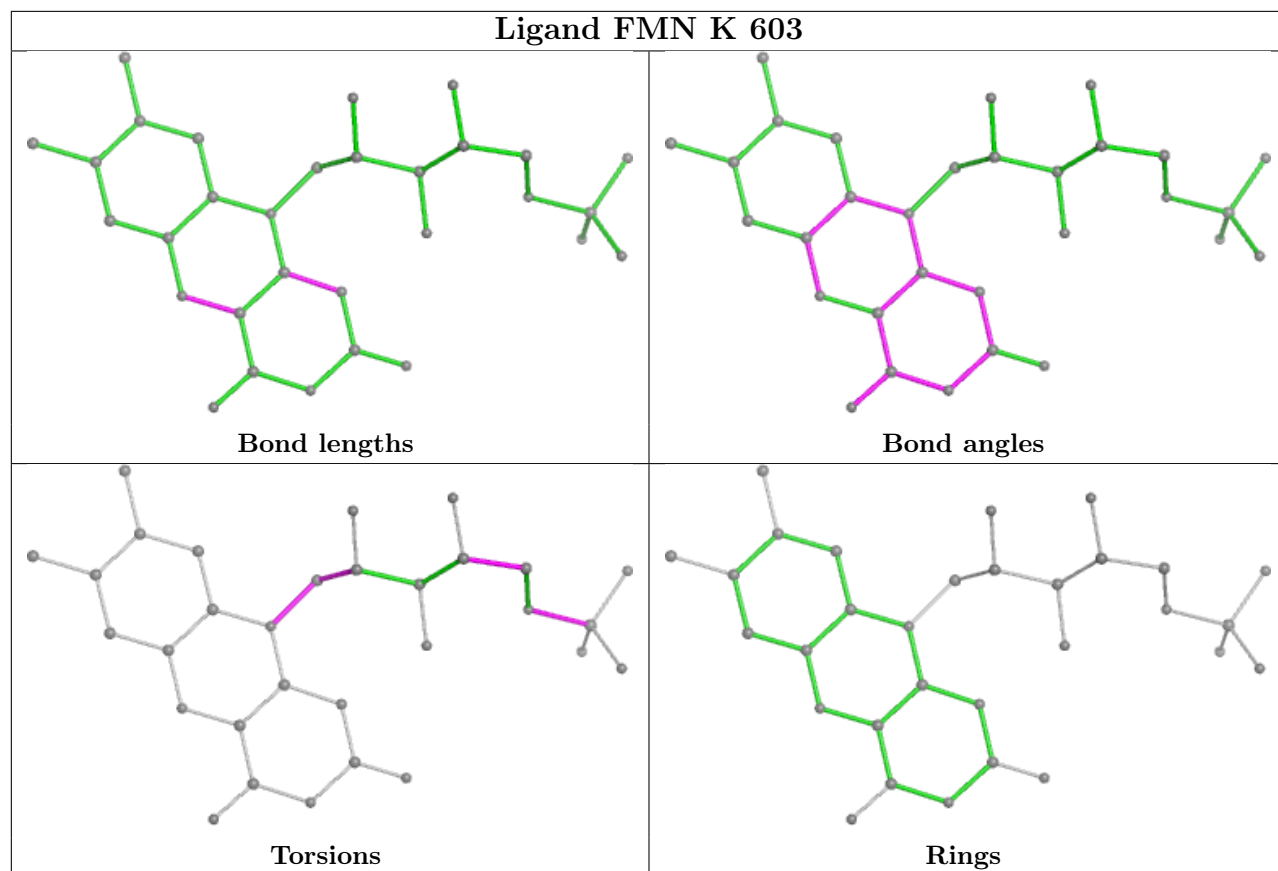
## Ligand SF4 I 1208

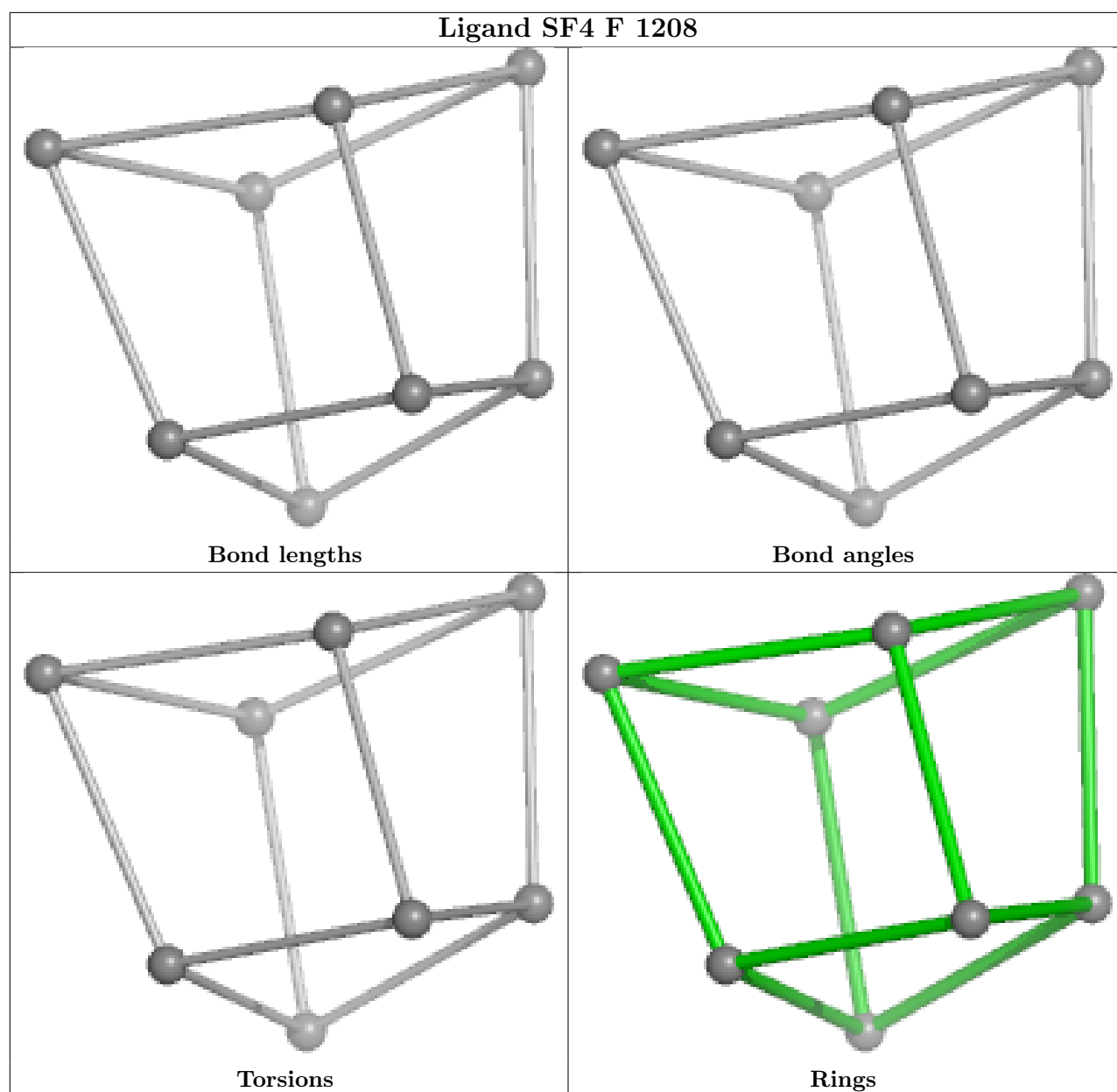


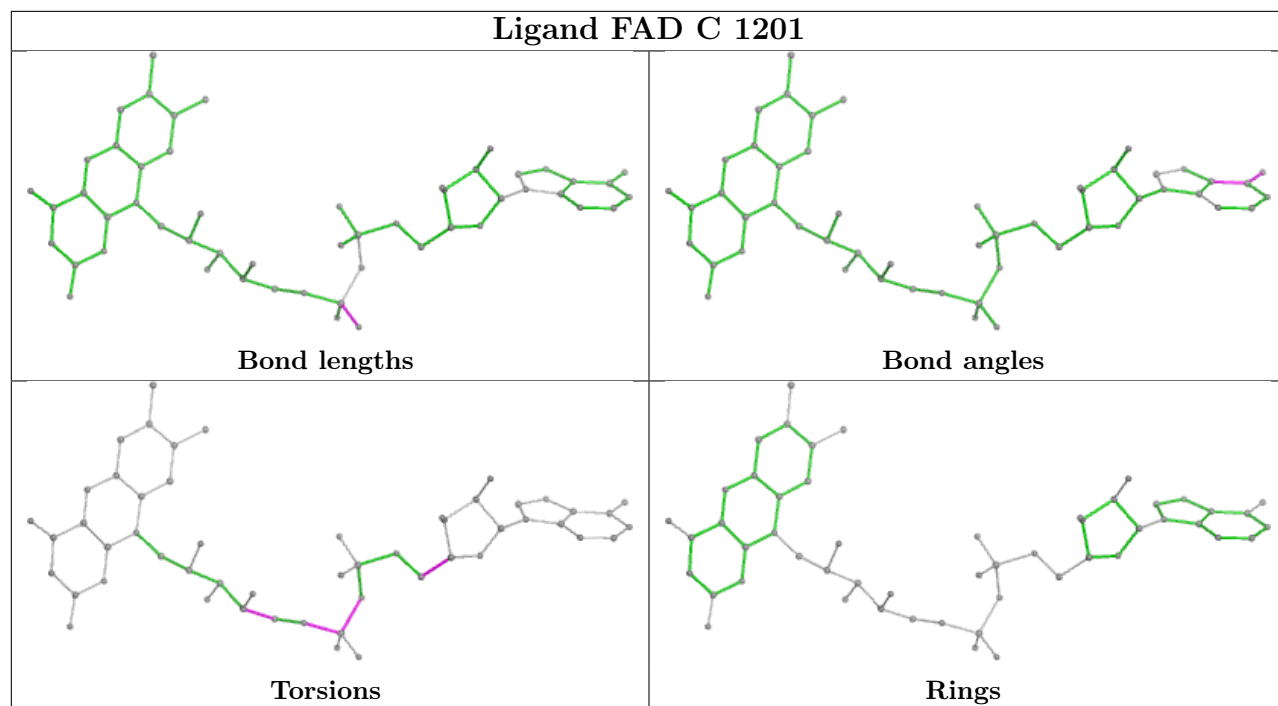


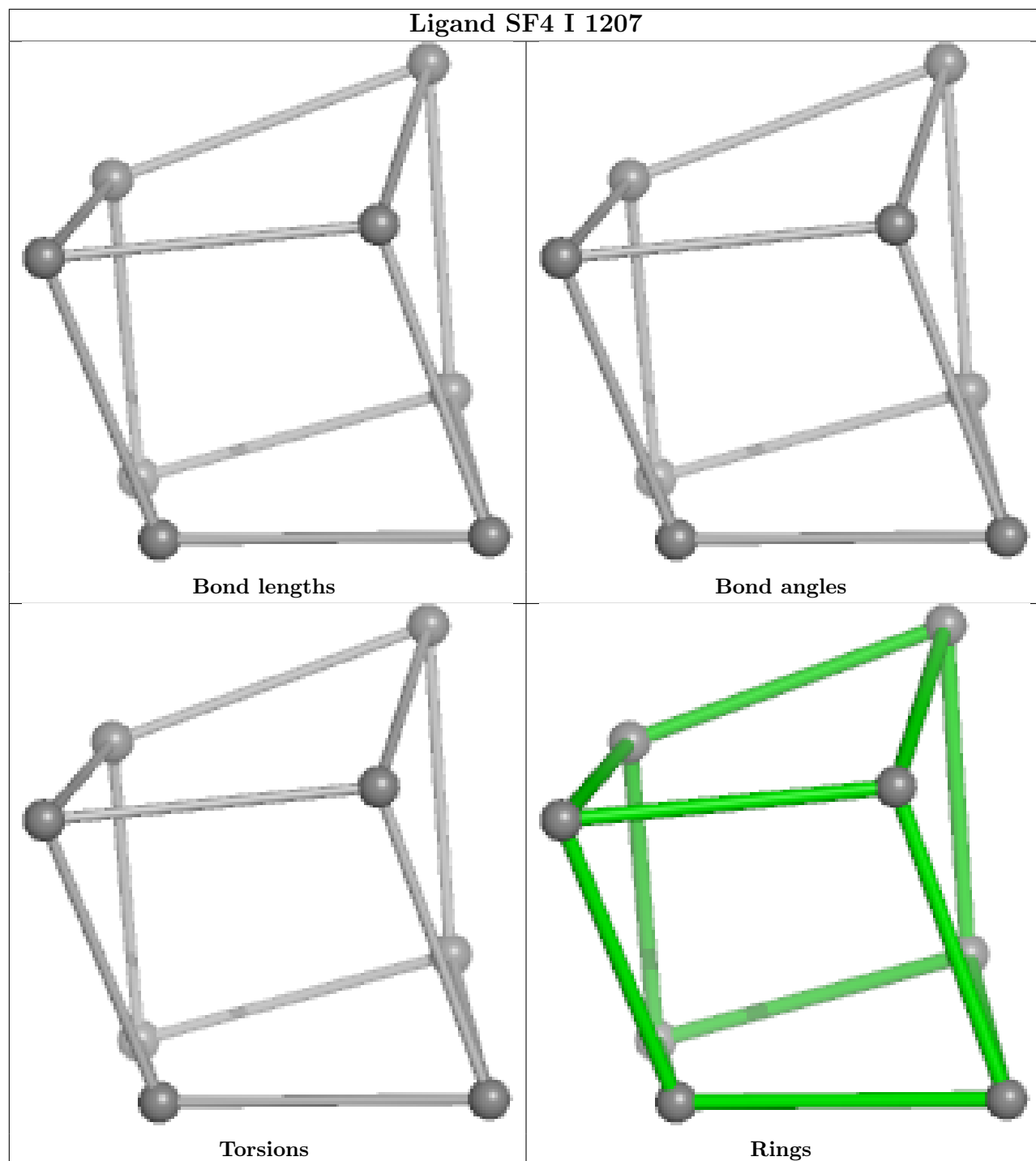


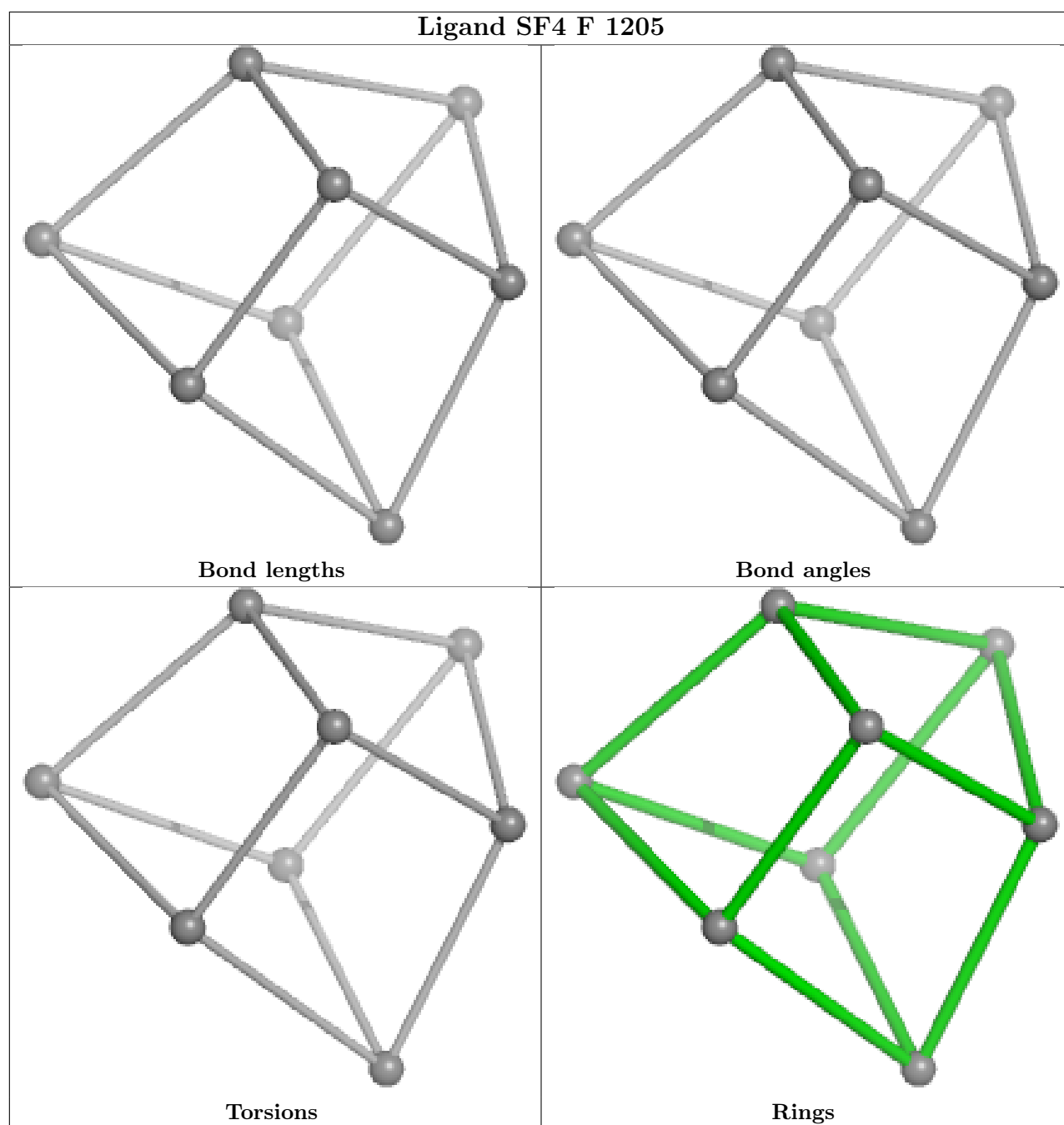


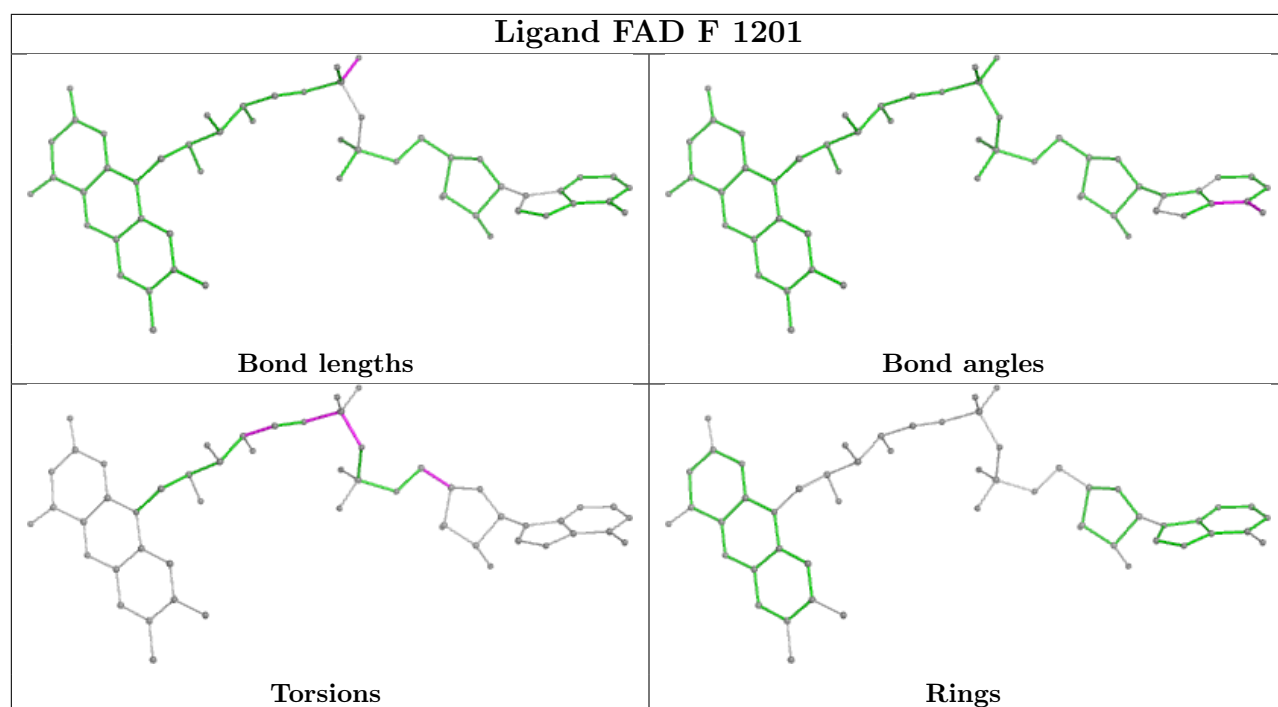


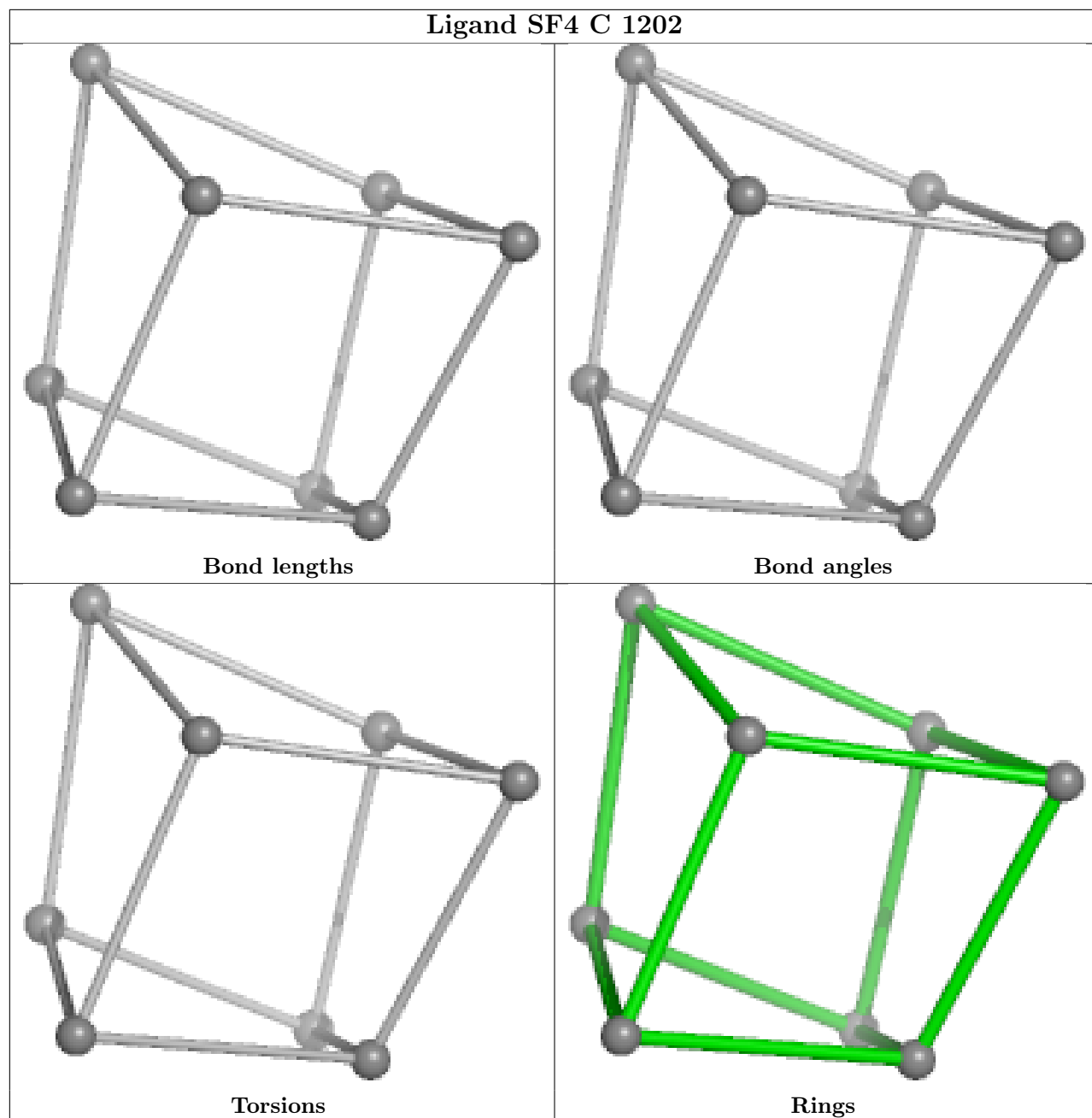


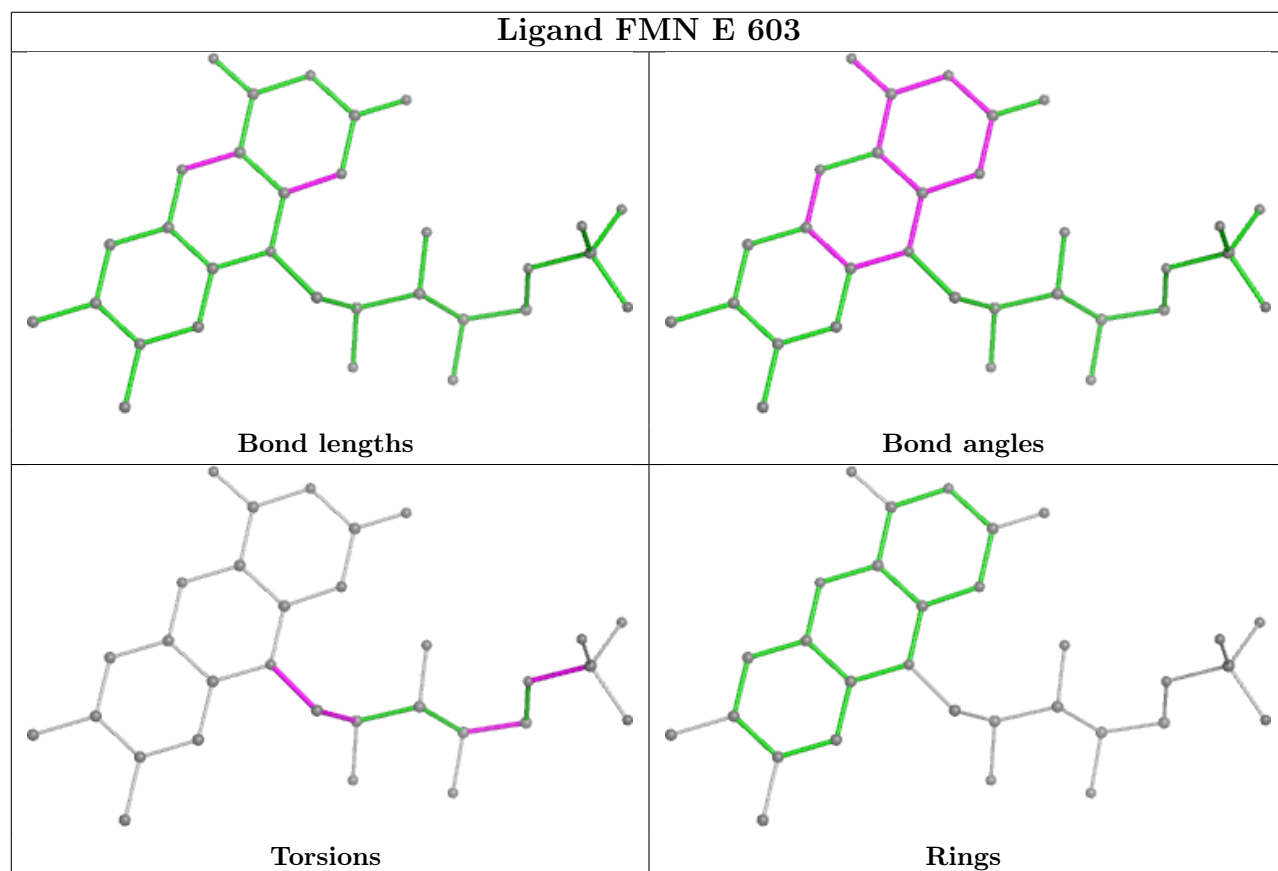
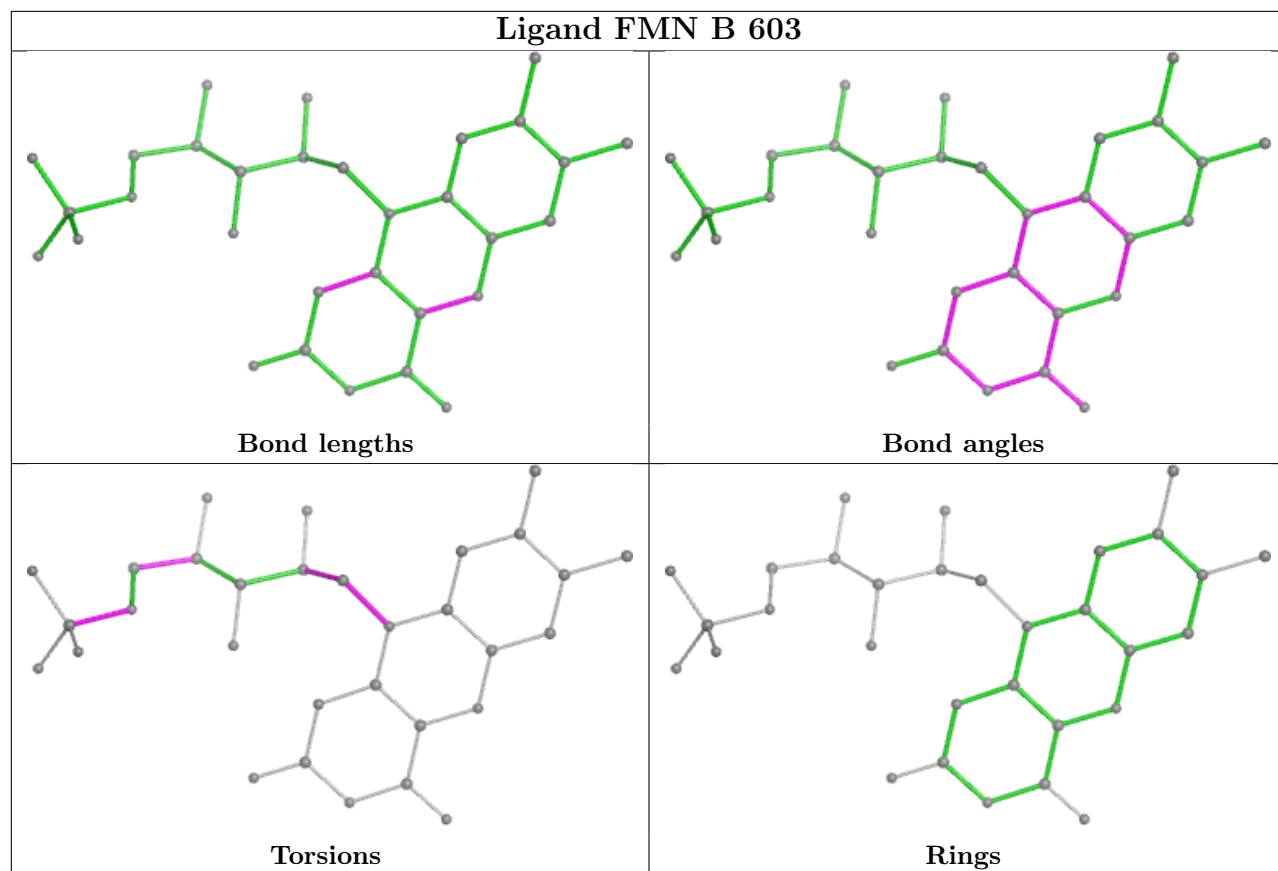


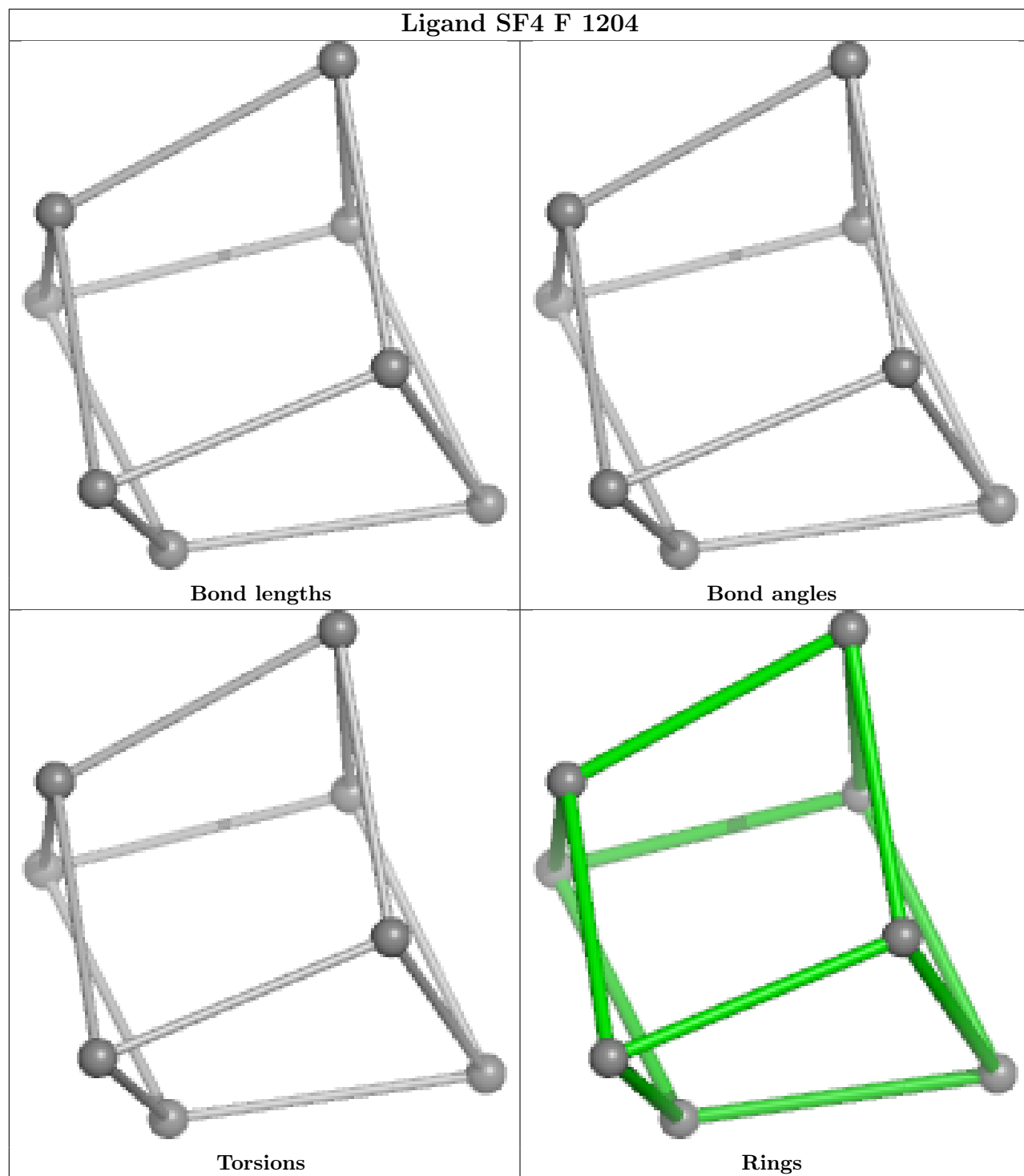


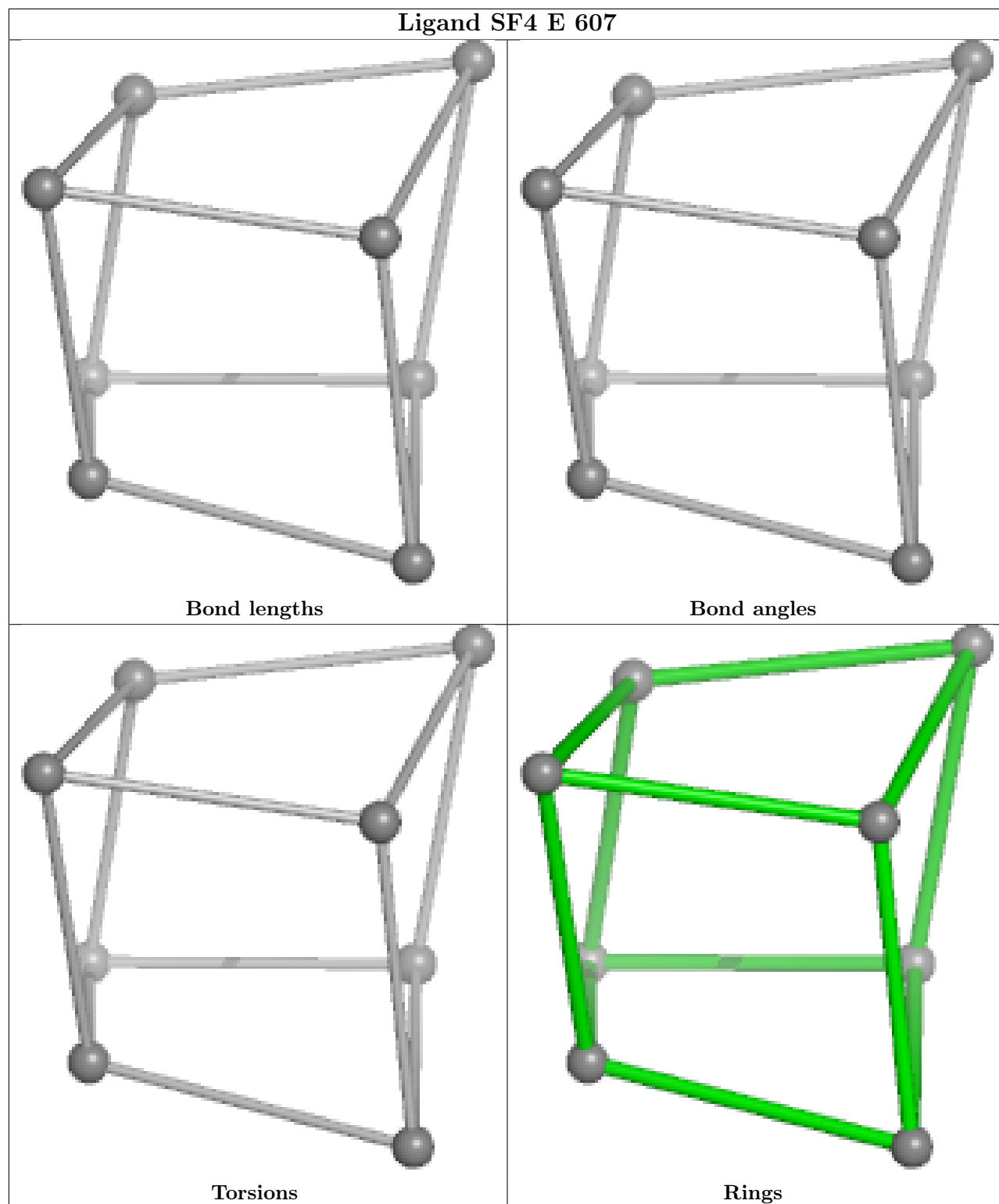




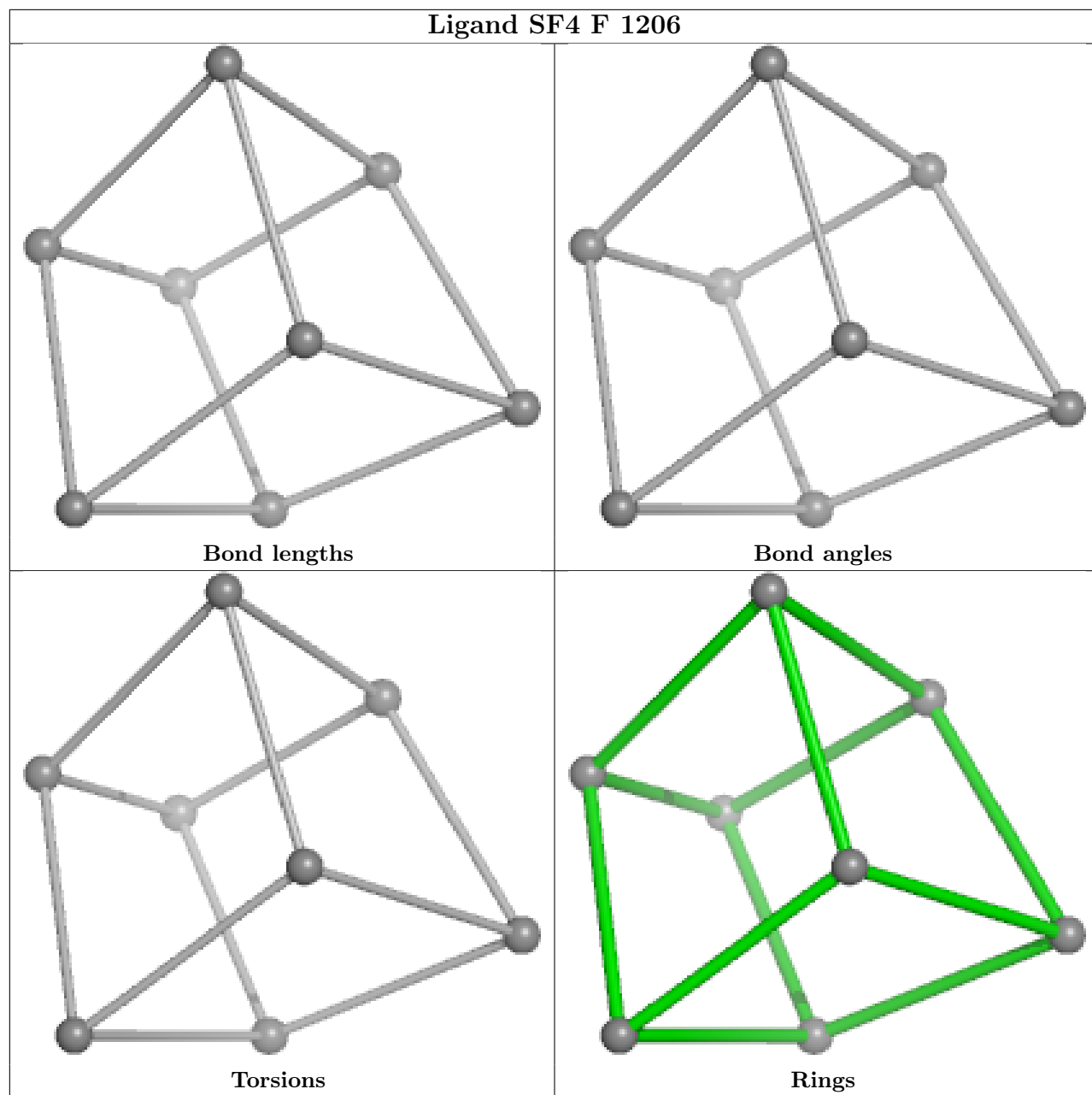


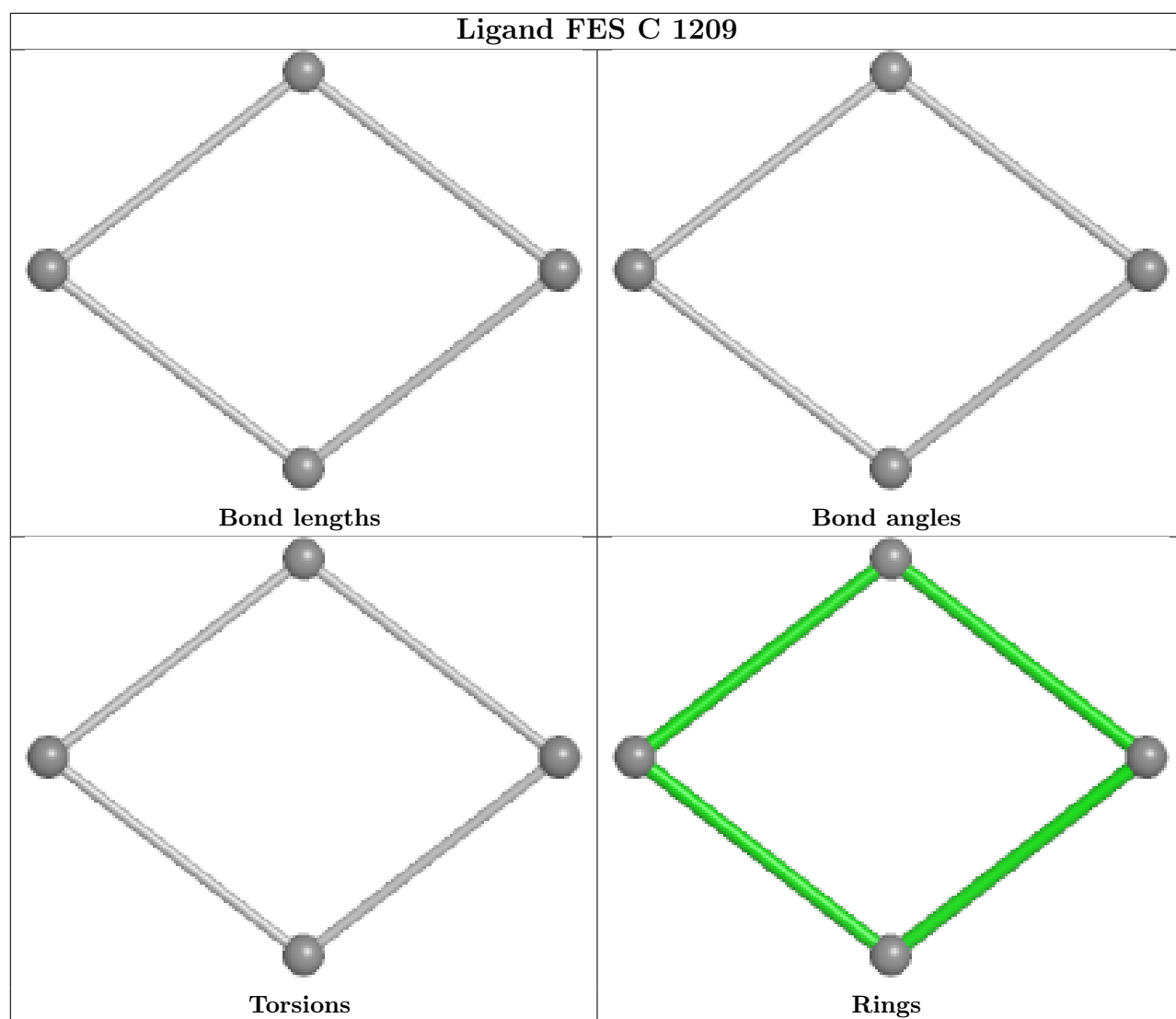






## Ligand SF4 F 1206





## 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.

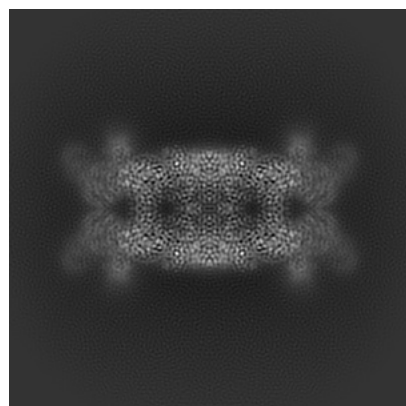
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-16878. These allow visual inspection of the internal detail of the map and identification of artifacts.

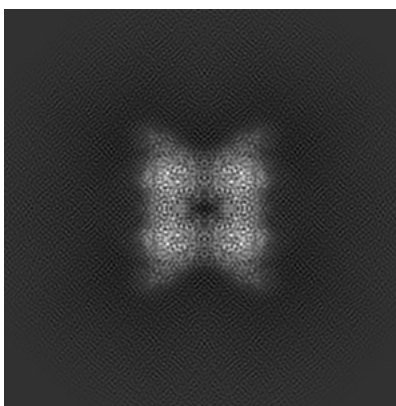
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

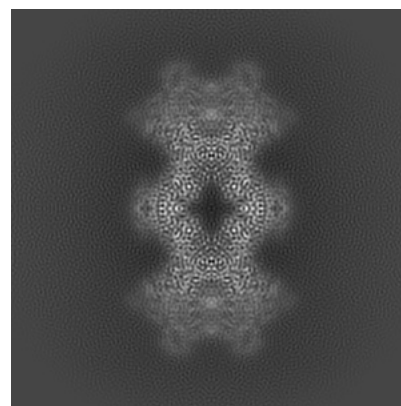
#### 6.1.1 Primary map



X

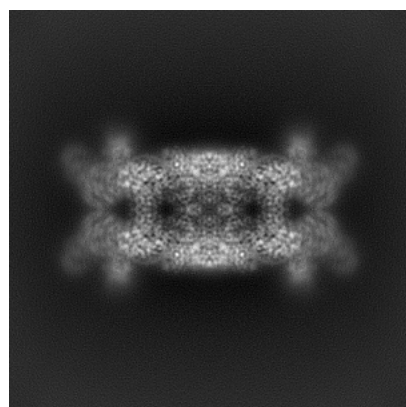


Y

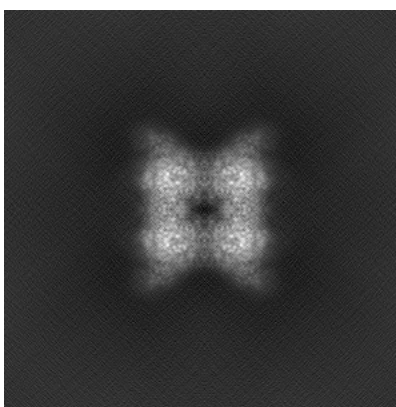


Z

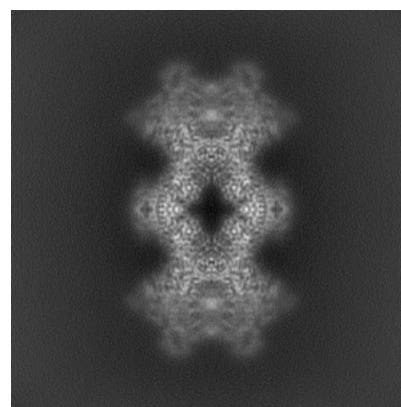
#### 6.1.2 Raw map



X



Y

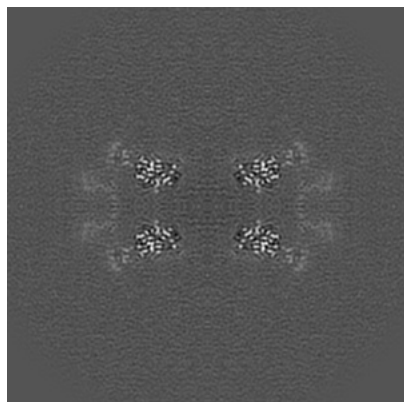


Z

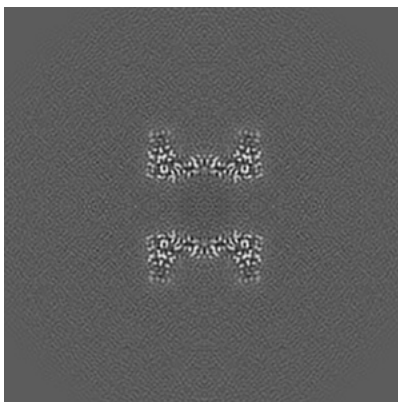
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

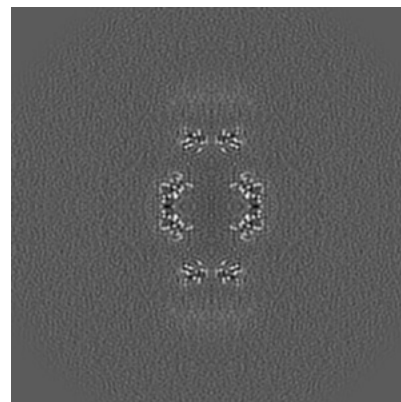
### 6.2.1 Primary map



X Index: 200

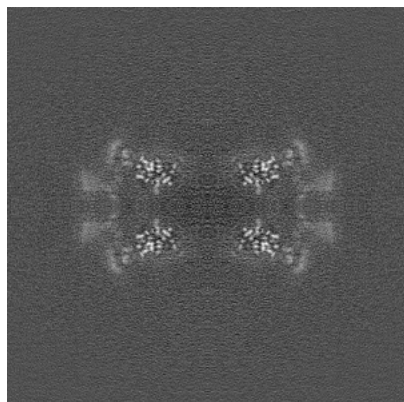


Y Index: 200

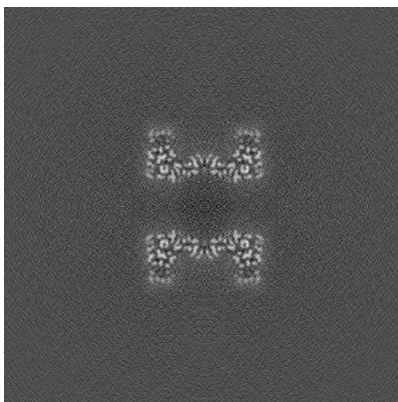


Z Index: 200

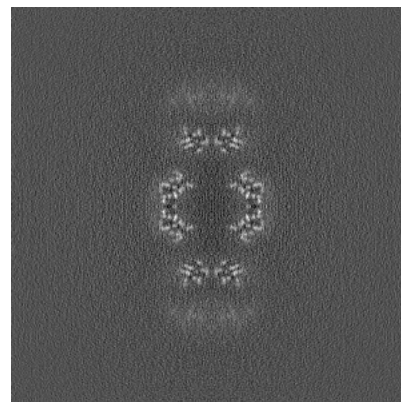
### 6.2.2 Raw map



X Index: 200



Y Index: 200

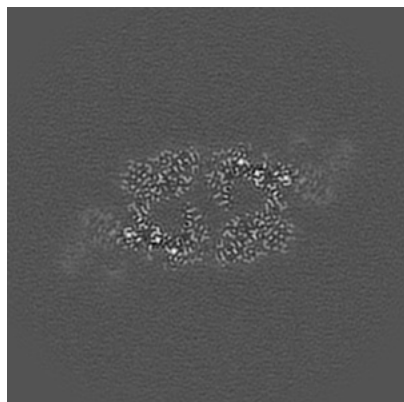


Z Index: 200

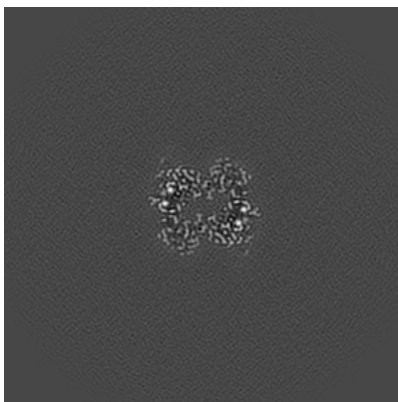
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

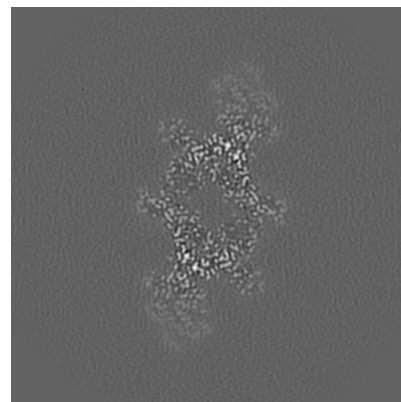
### 6.3.1 Primary map



X Index: 226

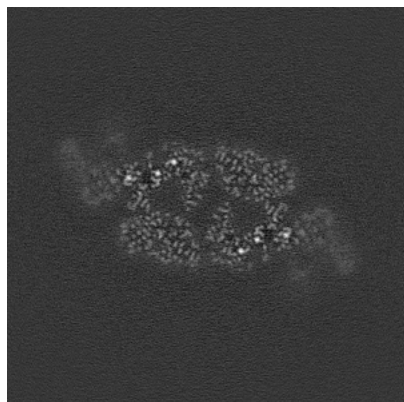


Y Index: 139

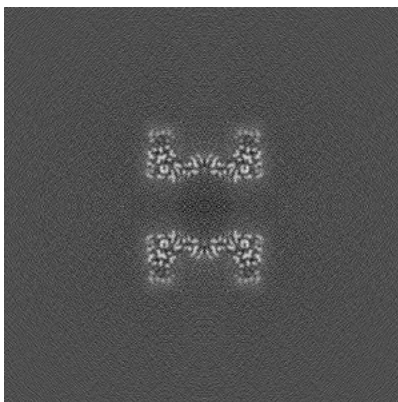


Z Index: 234

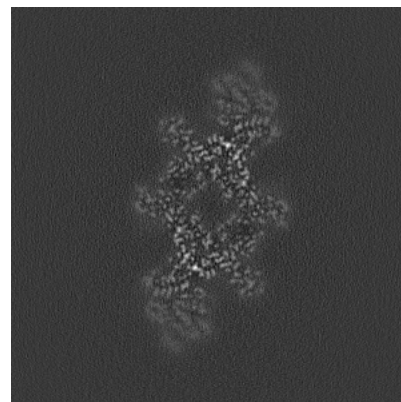
### 6.3.2 Raw map



X Index: 174



Y Index: 200

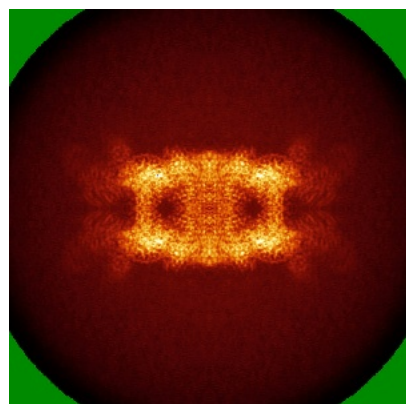


Z Index: 235

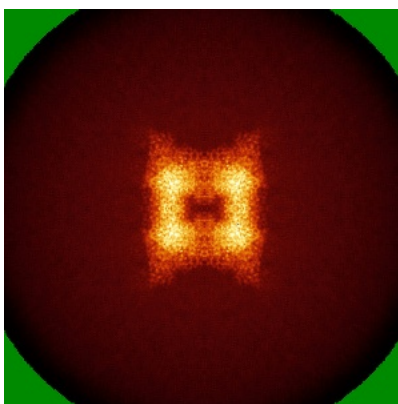
The images above show the largest variance slices of the map in three orthogonal directions.

## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

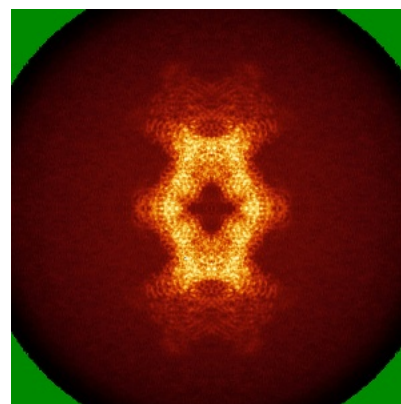
### 6.4.1 Primary map



X

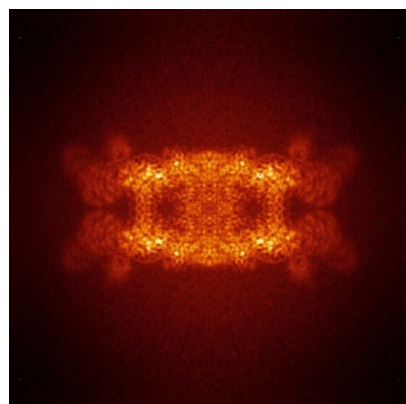


Y

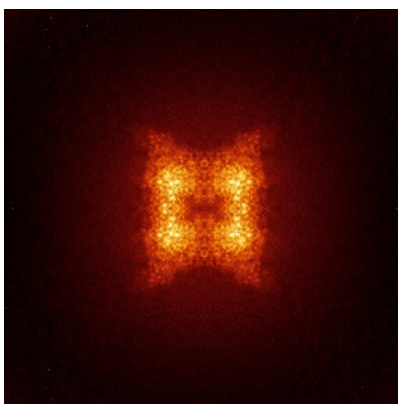


Z

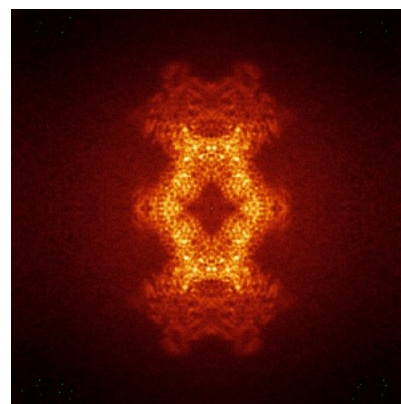
### 6.4.2 Raw map



X



Y

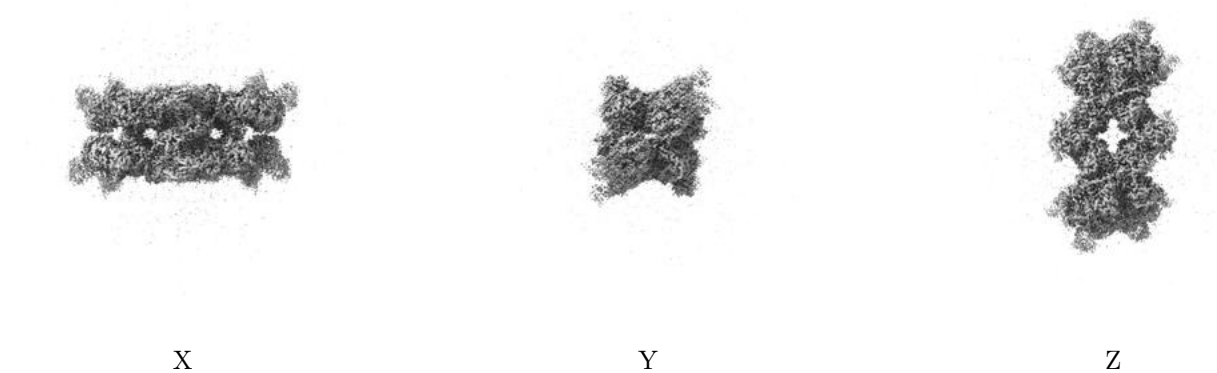


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

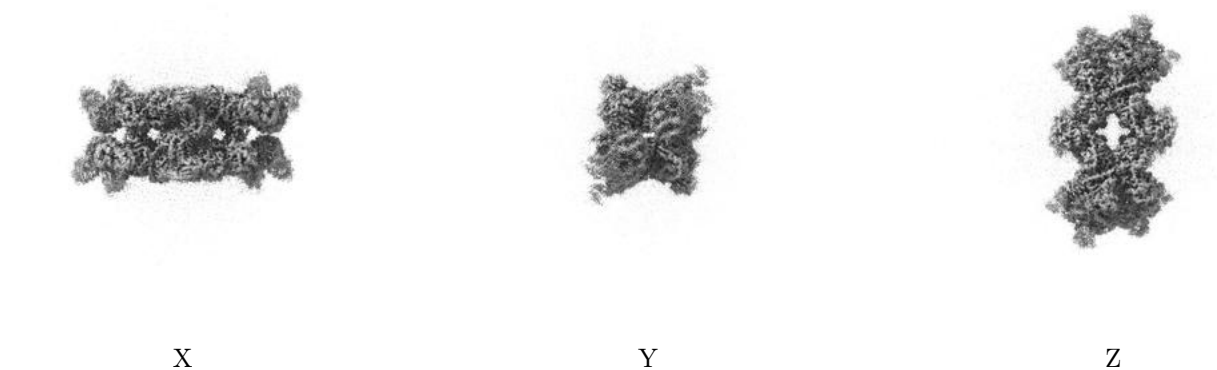
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.164. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

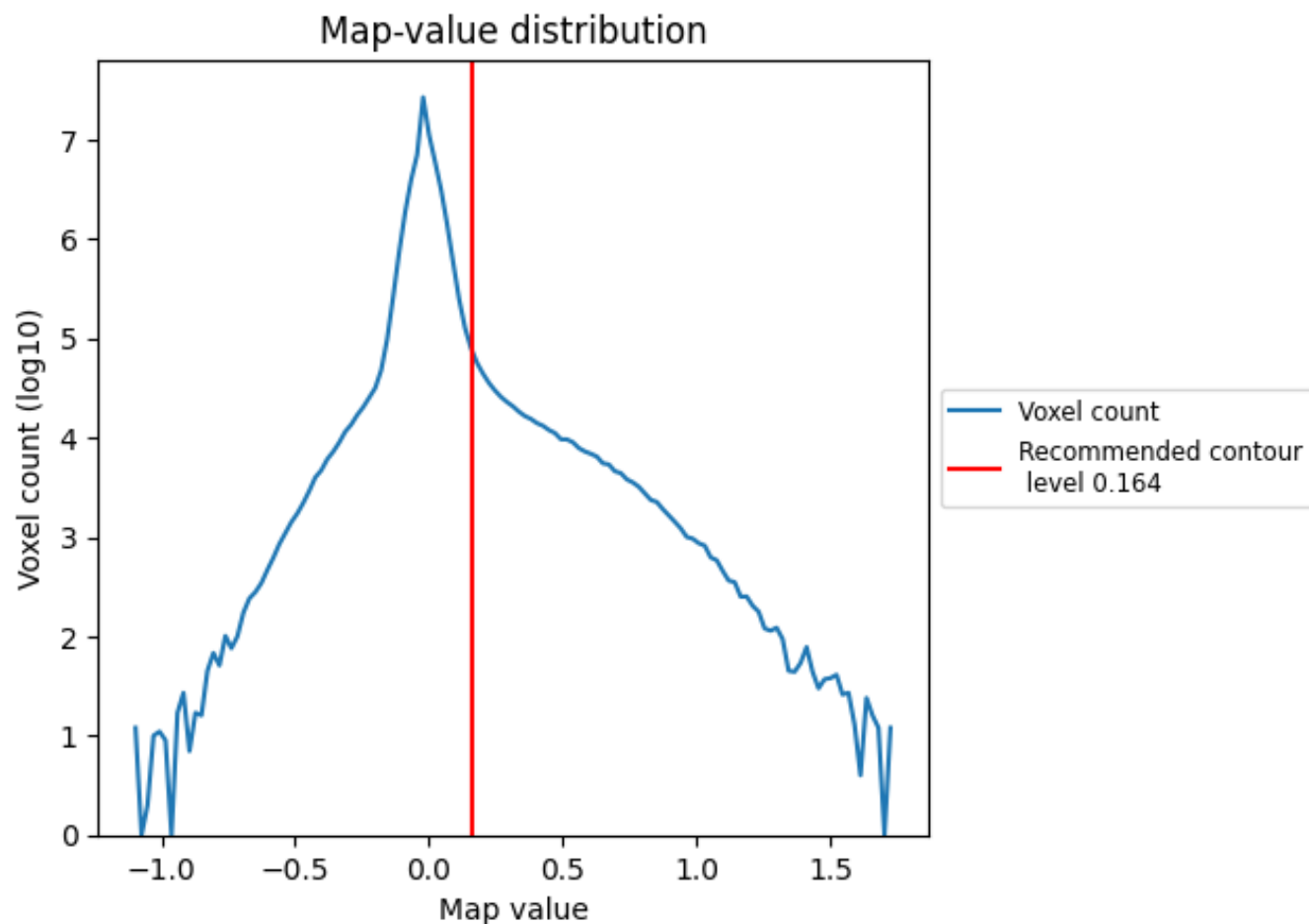
## 6.6 Mask visualisation [i](#)

This section was not generated. No masks/segmentation were deposited.

## 7 Map analysis [i](#)

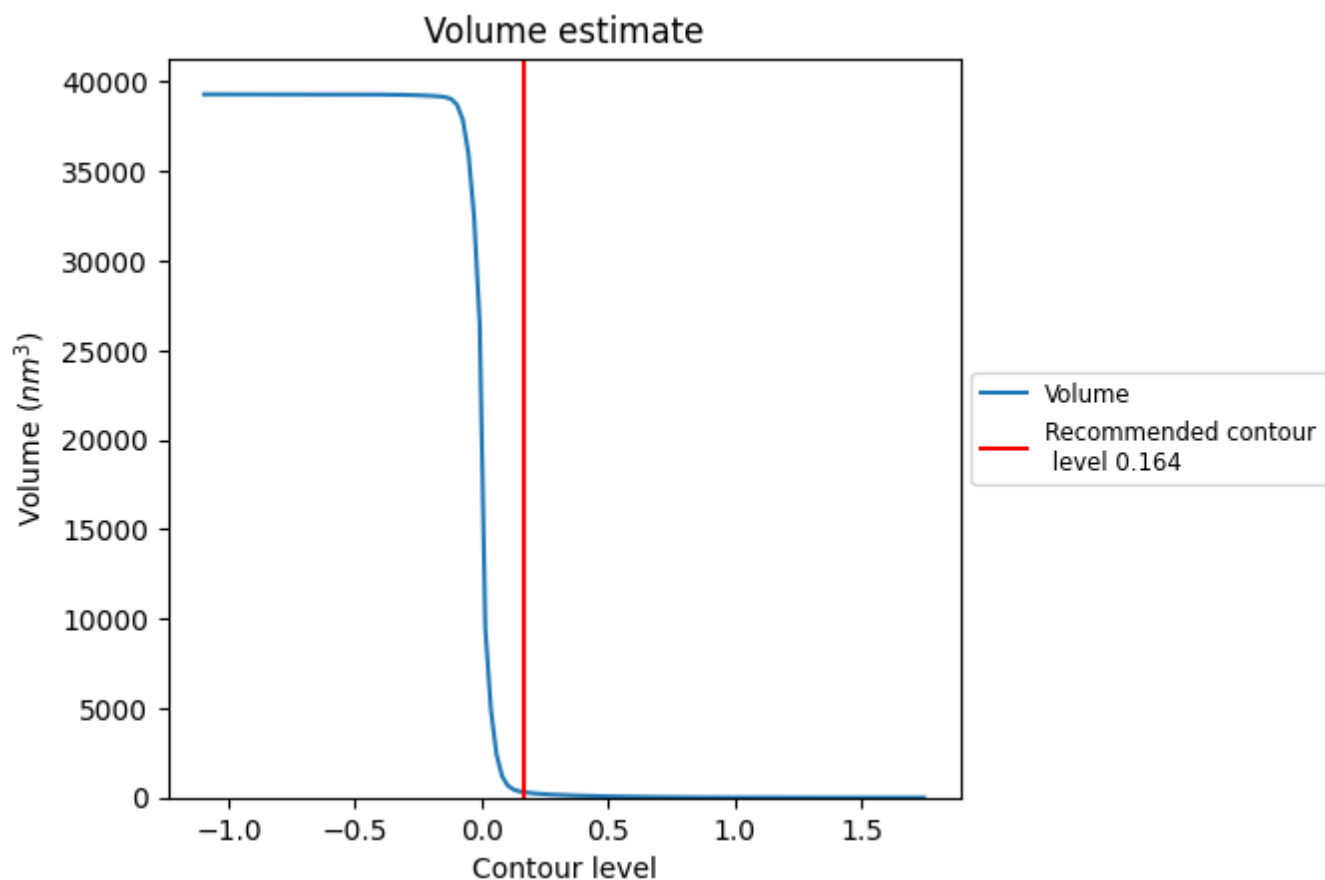
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

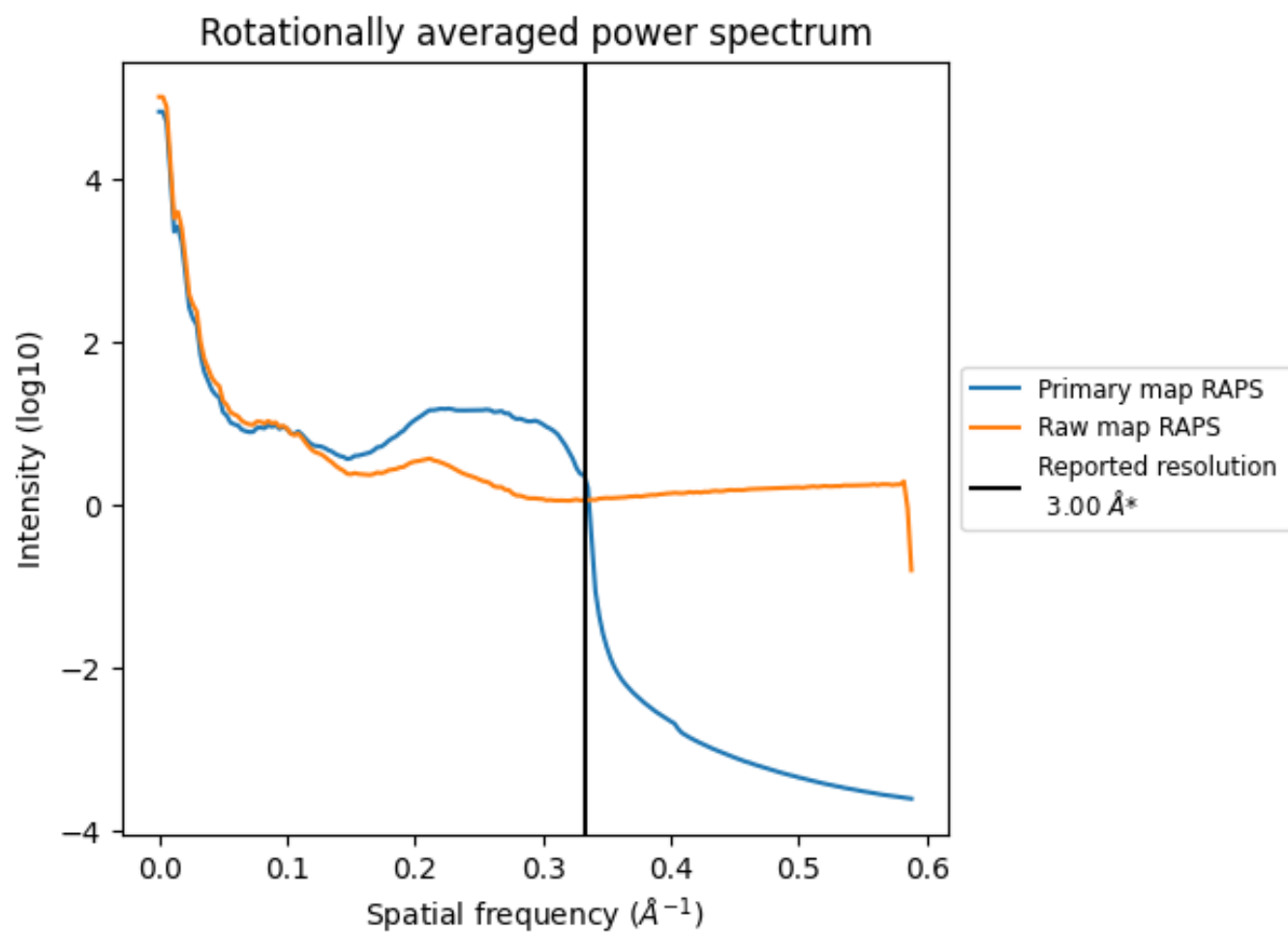
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 310  $\text{nm}^3$ ; this corresponds to an approximate mass of 280 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

### 7.3 Rotationally averaged power spectrum ⓘ

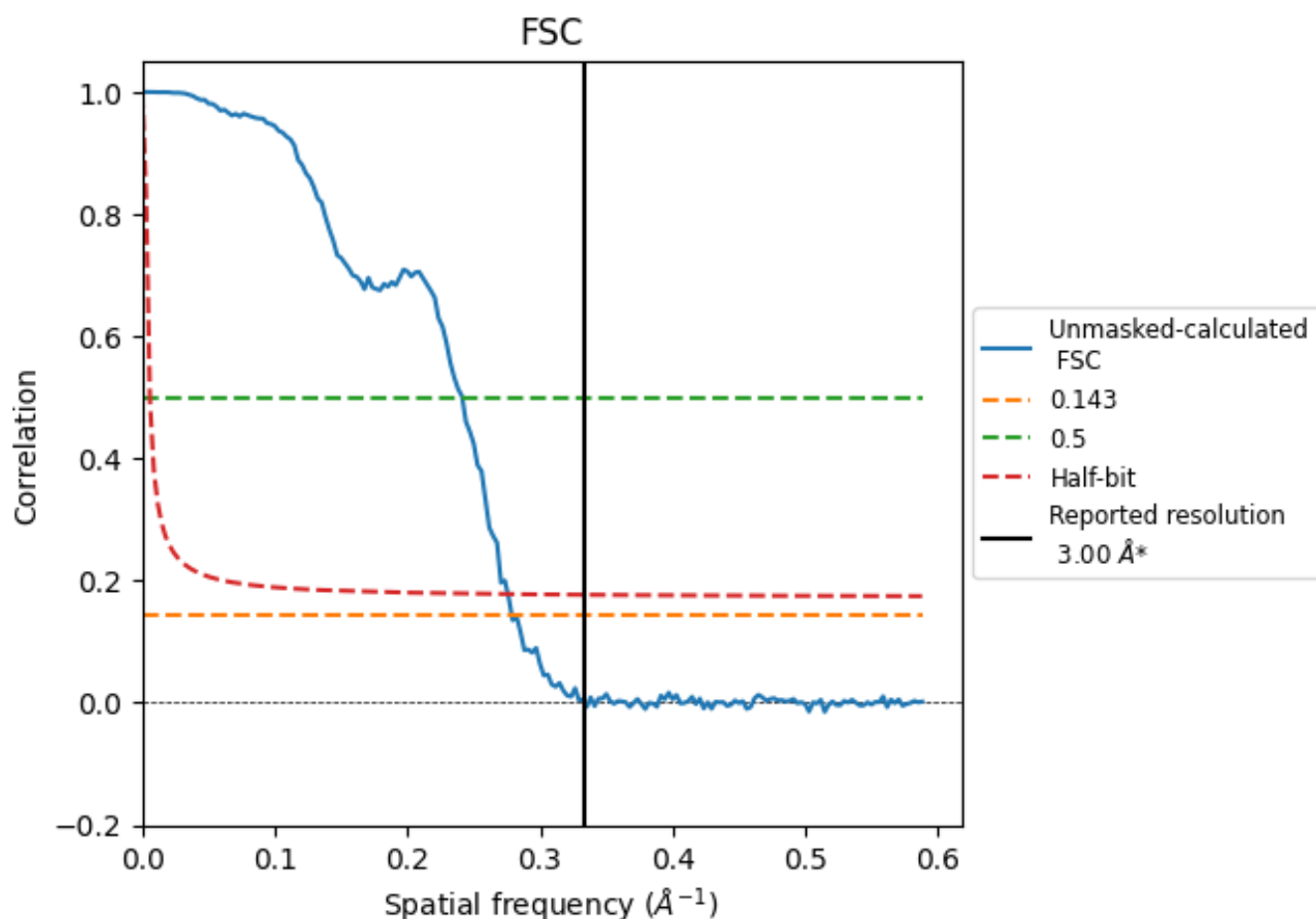


\*Reported resolution corresponds to spatial frequency of 0.333  $\text{\AA}^{-1}$

## 8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.333  $\text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

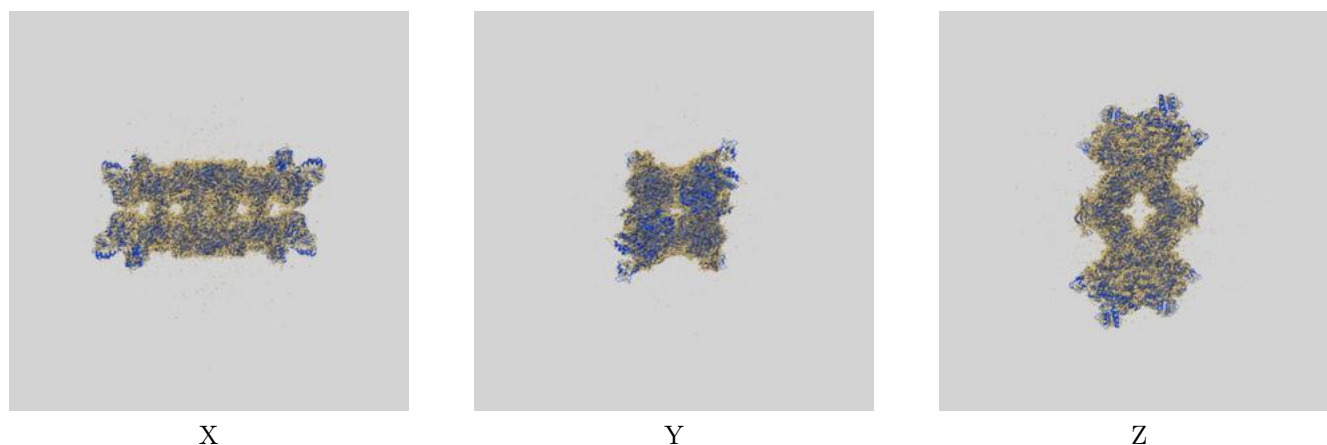
| Resolution estimate (Å)   | Estimation criterion (FSC cut-off) |      |          |
|---------------------------|------------------------------------|------|----------|
|                           | 0.143                              | 0.5  | Half-bit |
| Reported by author        | 3.00                               | -    | -        |
| Author-provided FSC curve | -                                  | -    | -        |
| Unmasked-calculated*      | 3.59                               | 4.14 | 3.63     |

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.59 differs from the reported value 3.0 by more than 10 %

## 9 Map-model fit [i](#)

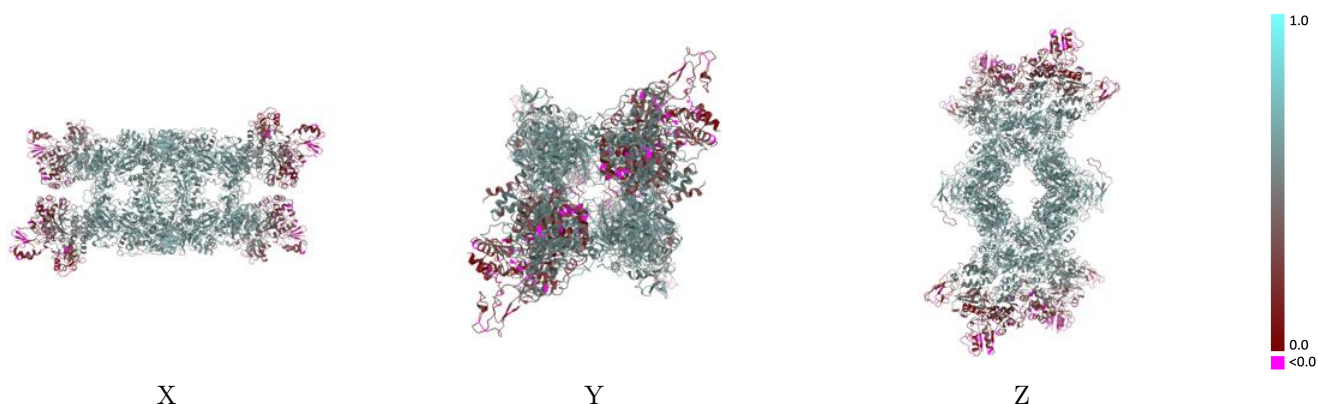
This section contains information regarding the fit between EMDB map EMD-16878 and PDB model 8OH5. Per-residue inclusion information can be found in section 3 on page 12.

### 9.1 Map-model overlay [i](#)



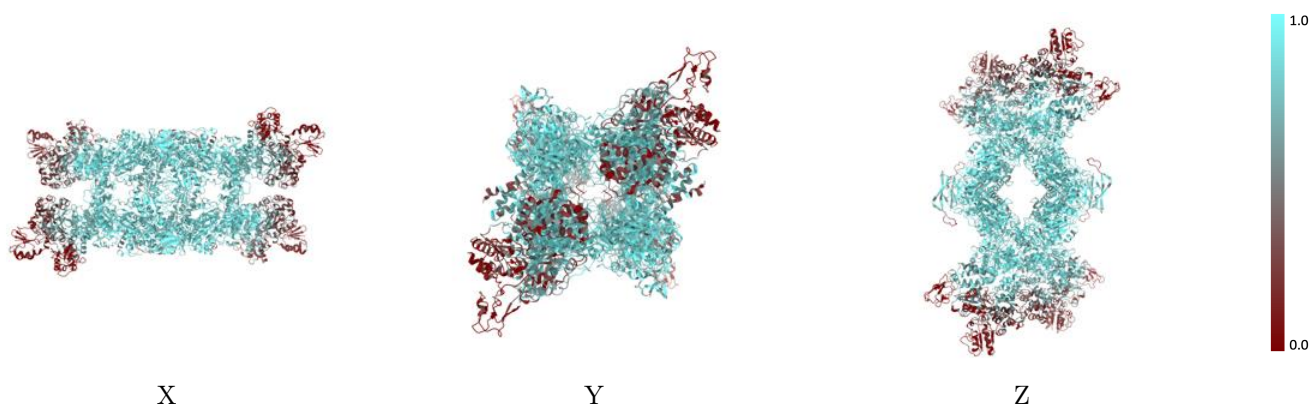
The images above show the 3D surface view of the map at the recommended contour level 0.164 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [i](#)



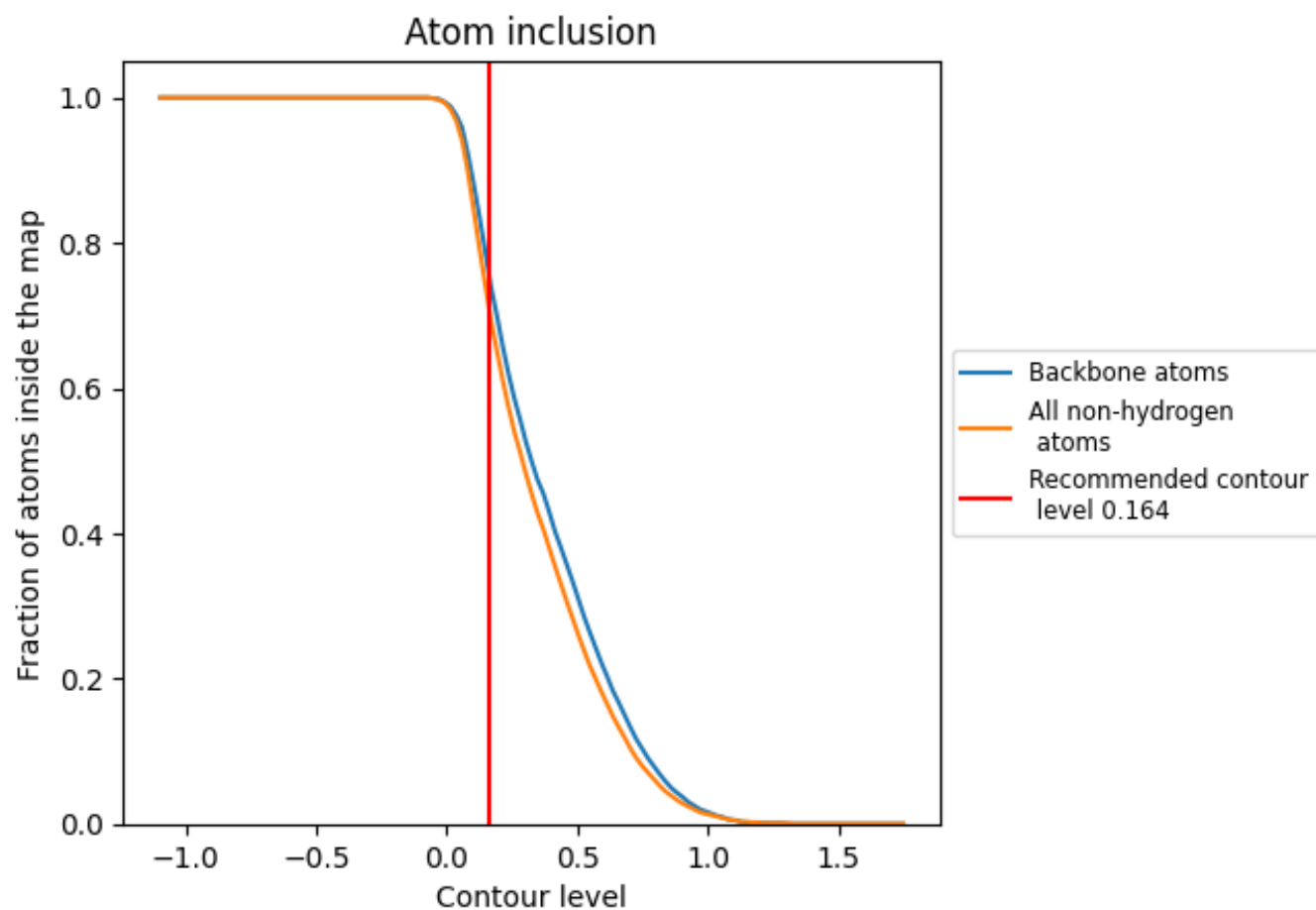
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

## 9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.164).

## 9.4 Atom inclusion [i](#)



At the recommended contour level, 75% of all backbone atoms, 71% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.164) and Q-score for the entire model and for each chain.

| Chain | Atom inclusion     | Q-score            |
|-------|--------------------|--------------------|
| All   | <div></div> 0.7060 | <div></div> 0.4910 |
| A     | <div></div> 0.4500 | <div></div> 0.3760 |
| B     | <div></div> 0.4340 | <div></div> 0.3390 |
| C     | <div></div> 0.8750 | <div></div> 0.5820 |
| D     | <div></div> 0.4510 | <div></div> 0.3770 |
| E     | <div></div> 0.4360 | <div></div> 0.3390 |
| F     | <div></div> 0.8750 | <div></div> 0.5810 |
| G     | <div></div> 0.4490 | <div></div> 0.3780 |
| H     | <div></div> 0.4360 | <div></div> 0.3390 |
| I     | <div></div> 0.8750 | <div></div> 0.5810 |
| J     | <div></div> 0.4510 | <div></div> 0.3790 |
| K     | <div></div> 0.4360 | <div></div> 0.3410 |
| L     | <div></div> 0.8750 | <div></div> 0.5810 |

