Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2024 – 12:12 pm GMT

PDB ID	:	8CO4
Title	:	Crystal structure of apo S-nitrosoglutathione reductase from Arabidopsis thalina
Authors	:	Fermani, S.; Fanti, S.; Carloni, G.; Rossi, J.; Falini, G.; Zaffagnini, M.
Deposited on	:	2023-02-27
Resolution	:	1.90 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

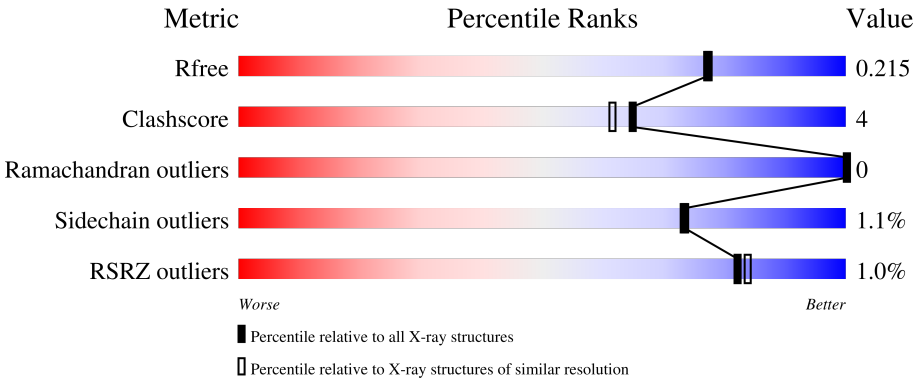
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	379	94% 6%
1	B	379	% 94% 5%
1	C	379	% 93% 6%
1	D	379	2% 90% 9%

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
4	PEG	A	406	-	-	X	-

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 12745 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

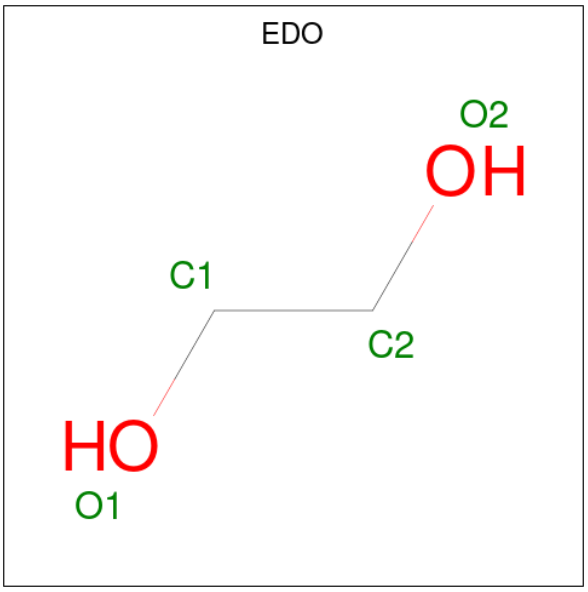
- Molecule 1 is a protein called Alcohol dehydrogenase class-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	378	Total	C	N	O	S	0	5	0
			2868	1814	489	544	21			
1	B	378	Total	C	N	O	S	0	10	0
			2905	1841	496	547	21			
1	C	379	Total	C	N	O	S	0	9	0
			2895	1832	490	551	22			
1	D	379	Total	C	N	O	S	0	6	0
			2882	1823	490	546	23			

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

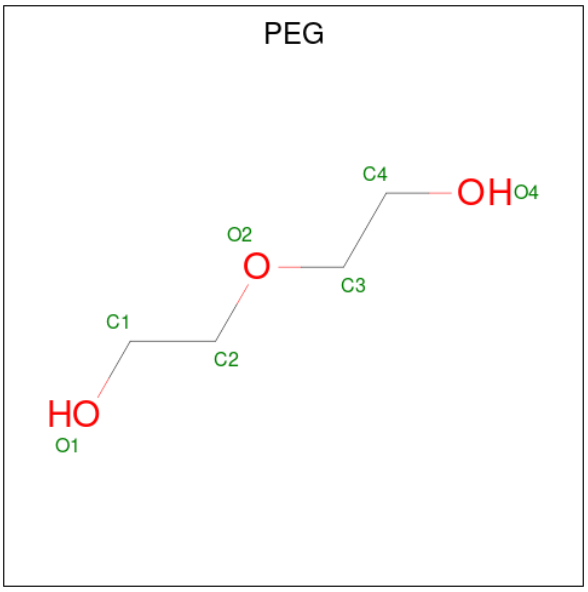
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Zn	0	0
			2	2		
2	B	2	Total	Zn	0	0
			2	2		
2	C	2	Total	Zn	0	0
			2	2		
2	D	2	Total	Zn	0	0
			2	2		

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 4 2 2	0	0
3	C	1	Total C O 4 2 2	0	0

- Molecule 4 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 7 4 3	0	0

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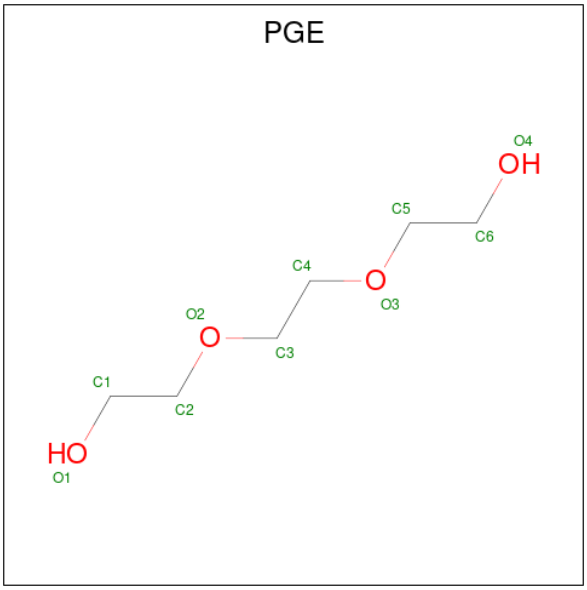
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 7 4 3	0	0
4	A	1	Total C O 7 4 3	0	0
4	A	1	Total C O 7 4 3	0	0
4	B	1	Total C O 7 4 3	0	0
4	B	1	Total C O 7 4 3	0	0
4	C	1	Total C O 7 4 3	0	0
4	C	1	Total C O 7 4 3	0	0

- Molecule 5 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: $C_6H_{14}O_4$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 10 6 4	0	0
5	A	1	Total C O 10 6 4	0	0
5	A	1	Total C O 10 6 4	0	0
5	B	1	Total C O 10 6 4	0	0

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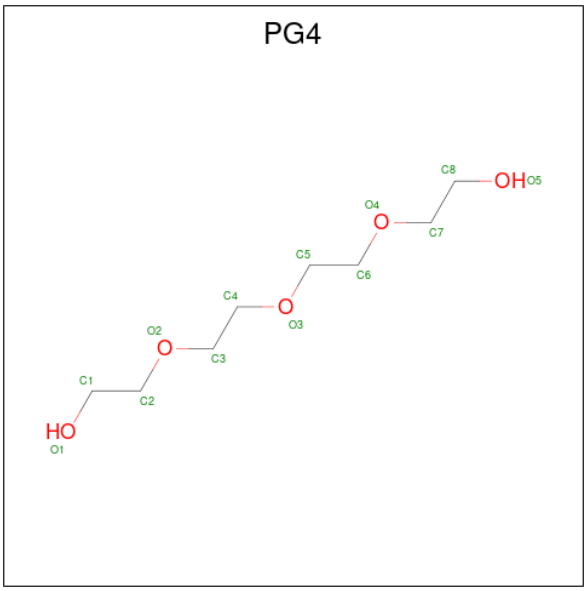
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total C O 10 6 4	0	0
5	C	1	Total C O 10 6 4	0	0
5	D	1	Total C O 10 6 4	0	0

- Molecule 6 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 13 8 5	0	0

- Molecule 7 is water.

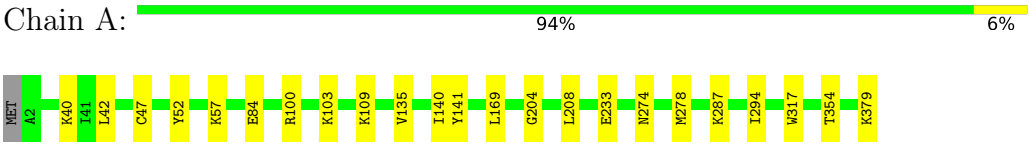
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	275	Total O 275 275	0	0
7	B	259	Total O 259 259	0	0
7	C	274	Total O 274 274	0	0
7	D	232	Total O 232 232	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron 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 dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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.

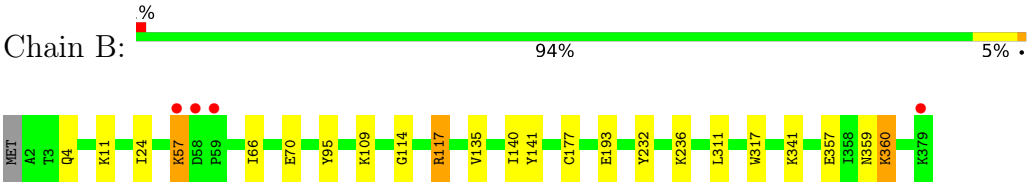
• Molecule 1: Alcohol dehydrogenase class-3

Chain A:



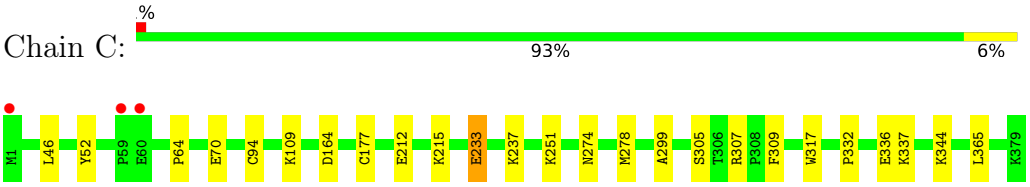
• Molecule 1: Alcohol dehydrogenase class-3

Chain B:



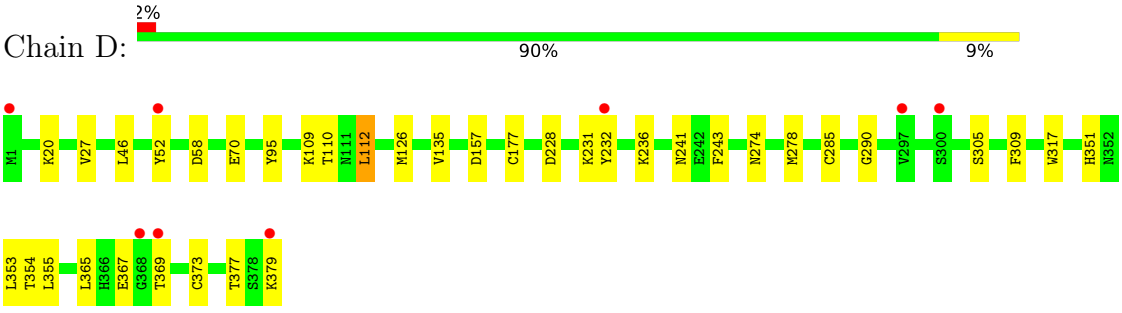
• Molecule 1: Alcohol dehydrogenase class-3

Chain C:



• Molecule 1: Alcohol dehydrogenase class-3

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	88.60Å 93.93Å 167.48Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	81.92 – 1.90 81.92 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.8 (81.92-1.90) 99.8 (81.92-1.90)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.77 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.8.0238, PHENIX 1.19rc7_4070	Depositor
R, R_{free}	0.161 , 0.210 0.168 , 0.215	Depositor DCC
R_{free} test set	5383 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å^2)	22.2	Xtriage
Anisotropy	0.697	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 48.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	12745	wwPDB-VP
Average B, all atoms (Å^2)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.30% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PEG, ZN, PGE, EDO, PG4

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	0.51	0/2931	0.64	0/3972
1	B	0.50	0/2983	0.66	0/4040
1	C	0.52	0/2970	0.68	1/4025 (0.0%)
1	D	0.49	0/2951	0.64	2/3998 (0.1%)
All	All	0.50	0/11835	0.66	3/16035 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	164	ASP	CB-CG-OD1	5.72	123.45	118.30
1	D	112	LEU	CB-CG-CD2	5.62	120.56	111.00
1	D	126	MET	CA-CB-CG	5.13	122.01	113.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2868	0	2867	23	0
1	B	2905	0	2925	21	0
1	C	2895	0	2900	21	0
1	D	2882	0	2889	29	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
3	A	4	0	6	0	0
3	C	4	0	6	0	0
4	A	28	0	40	10	0
4	B	14	0	18	0	0
4	C	14	0	20	2	0
5	A	30	0	42	4	0
5	B	20	0	25	2	0
5	C	10	0	14	3	0
5	D	10	0	14	5	0
6	A	13	0	18	3	0
7	A	275	0	0	4	0
7	B	259	0	0	5	0
7	C	274	0	0	6	0
7	D	232	0	0	2	0
All	All	12745	0	11784	96	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 4.

All (96) 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)
1:B:11[B]:LYS:HD2	1:B:24:ILE:HG23	1.51	0.92
1:B:11[B]:LYS:HD2	1:B:24:ILE:CG2	2.08	0.82
1:A:354:THR:HG21	1:A:379:LYS:HD3	1.65	0.79
1:D:27:VAL:HG12	1:D:135:VAL:HG22	1.64	0.78
1:D:157:ASP:OD2	7:D:501:HOH:O	2.06	0.73
1:D:236[B]:LYS:NZ	1:D:241:ASN:HA	2.05	0.72
1:D:232:TYR:CE1	1:D:243:PHE:HB2	2.24	0.71
4:A:405:PEG:H31	1:B:109:LYS:HE2	1.74	0.69
1:A:287:LYS:HZ2	4:A:406:PEG:H11	1.58	0.69
1:C:109:LYS:HD3	4:C:405:PEG:H11	1.78	0.65
1:C:64:PRO:HD2	5:C:406:PGE:H42	1.78	0.64
1:D:70:GLU:OE2	1:D:177:CYS:HB3	2.00	0.61
1:A:109:LYS:HG2	5:A:410:PGE:H22	1.83	0.61
1:A:52:TYR:CE1	1:A:57:LYS:HB3	2.36	0.59
1:B:11[B]:LYS:NZ	7:B:503:HOH:O	2.32	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:355:LEU:HB2	1:D:377:THR:HA	1.85	0.58
1:A:52:TYR:HE1	1:A:57:LYS:HB3	1.67	0.58
1:A:287:LYS:HZ3	4:A:406:PEG:H32	1.68	0.58
1:B:141:TYR:CE1	5:B:405:PGE:H4	2.39	0.57
1:D:109:LYS:HD3	5:D:403:PGE:H5	1.87	0.57
1:D:95:TYR:HD1	7:D:558:HOH:O	1.88	0.56
1:D:236[B]:LYS:HZ2	1:D:241:ASN:HA	1.68	0.56
1:B:135:VAL:HG12	1:B:140[B]:ILE:HD11	1.88	0.56
1:C:344:LYS:HG3	4:C:404:PEG:H32	1.88	0.55
4:A:406:PEG:H42	1:B:117:ARG:HH11	1.71	0.55
1:D:27:VAL:HG12	1:D:135:VAL:CG2	2.36	0.54
1:A:287:LYS:NZ	4:A:406:PEG:H32	2.23	0.54
5:C:406:PGE:H4	7:C:643:HOH:O	2.08	0.54
1:A:109:LYS:HZ1	5:A:410:PGE:H52	1.72	0.53
1:C:109:LYS:NZ	7:C:508:HOH:O	2.40	0.53
1:D:274:ASN:O	1:D:278:MET:HG3	2.08	0.52
1:A:42:LEU:HD22	1:A:169:LEU:HD12	1.92	0.52
1:C:215:LYS:HD3	7:C:501:HOH:O	2.09	0.52
1:B:359:ASN:ND2	7:B:504:HOH:O	2.32	0.51
1:C:94[B]:CYS:HA	7:C:503:HOH:O	2.10	0.50
1:C:52:TYR:HE1	1:C:299:ALA:HA	1.75	0.50
1:D:236[B]:LYS:HZ1	1:D:241:ASN:HA	1.75	0.50
1:D:52:TYR:CE2	1:D:58:ASP:HB2	2.47	0.49
1:A:84:GLU:OE2	1:A:100:ARG:NH2	2.46	0.49
1:C:332:PRO:O	1:C:336:GLU:HG3	2.13	0.49
1:D:109:LYS:HZ1	5:D:403:PGE:H3	1.77	0.49
1:A:103:LYS:NZ	7:A:514:HOH:O	2.45	0.48
1:C:46[B]:LEU:CD2	1:C:365:LEU:HD11	2.44	0.48
1:A:141:TYR:CZ	4:A:404:PEG:H22	2.49	0.48
4:A:407:PEG:H21	7:A:725:HOH:O	2.12	0.47
1:C:94[A]:CYS:HA	7:C:503:HOH:O	2.14	0.47
1:D:232:TYR:CD1	1:D:243:PHE:HB2	2.49	0.47
1:A:204:GLY:O	1:A:208:LEU:HG	2.14	0.47
1:A:274:ASN:O	1:A:278:MET:HG3	2.13	0.47
1:B:359:ASN:HB2	7:B:710:HOH:O	2.15	0.47
1:A:47:CYS:CB	7:A:504:HOH:O	2.62	0.47
1:A:40:LYS:HZ2	6:A:411:PG4:H32	1.80	0.47
1:B:57:LYS:N	1:B:57:LYS:HD3	2.30	0.47
1:D:109:LYS:HZ2	5:D:403:PGE:H52	1.79	0.47
1:A:141:TYR:CE2	4:A:404:PEG:H22	2.51	0.46
1:C:337:LYS:HE2	1:C:337:LYS:HA	1.95	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:40:LYS:NZ	6:A:411:PG4:H32	2.31	0.46
1:D:232:TYR:CE2	1:D:236[A]:LYS:HE3	2.51	0.46
1:B:70:GLU:OE2	1:B:177:CYS:HB3	2.16	0.46
1:A:109:LYS:HZ2	5:A:410:PGE:H32	1.81	0.46
1:D:354:THR:HG21	1:D:379:LYS:HG3	1.99	0.45
5:D:403:PGE:H3	5:D:403:PGE:H52	1.71	0.45
1:C:307:ARG:HG3	1:C:307:ARG:NH1	2.31	0.45
1:A:135:VAL:HG12	1:A:140:ILE:HD11	1.99	0.45
1:B:11[B]:LYS:HD2	1:B:24:ILE:HG22	1.98	0.44
1:D:20:LYS:HA	1:D:20:LYS:HD3	1.83	0.44
1:C:64:PRO:CD	5:C:406:PGE:H42	2.44	0.44
1:D:232:TYR:CZ	1:D:236[B]:LYS:HD3	2.53	0.44
1:A:40:LYS:HZ3	6:A:411:PG4:H21	1.83	0.44
1:C:212:GLU:OE2	7:C:501:HOH:O	2.20	0.44
4:A:405:PEG:O1	7:A:501:HOH:O	2.21	0.44
1:A:294:ILE:HD12	1:B:311:LEU:HD12	2.00	0.43
1:D:110:THR:OG1	1:D:112:LEU:HD22	2.18	0.43
1:D:285:CYS:HB3	1:D:290:GLY:HA3	2.00	0.43
1:C:274:ASN:O	1:C:278:MET:HG3	2.18	0.43
1:D:46:LEU:HD21	1:D:365:LEU:HD11	2.00	0.43
1:C:46[B]:LEU:HD22	1:C:365:LEU:HD11	2.00	0.43
1:C:305:SER:OG	1:D:305:SER:OG	2.30	0.43
1:C:70:GLU:OE1	1:C:177:CYS:HB3	2.19	0.42
1:B:341:LYS:NZ	5:B:406:PGE:H32	2.35	0.42
1:A:109:LYS:NZ	5:A:410:PGE:H52	2.33	0.42
1:B:360:LYS:HE2	7:B:710:HOH:O	2.19	0.42
1:C:70:GLU:CG	1:C:177:CYS:HB3	2.49	0.42
1:D:367:GLU:HG3	1:D:369:THR:HG22	2.01	0.42
1:B:95:TYR:HD2	7:B:581:HOH:O	2.01	0.41
1:B:193:GLU:OE1	1:B:193:GLU:N	2.53	0.41
1:D:351:HIS:HB2	1:D:373[B]:CYS:SG	2.60	0.41
1:B:66:ILE:HG13	1:B:140[B]:ILE:HG21	2.02	0.41
1:D:109:LYS:NZ	5:D:403:PGE:H3	2.35	0.41
1:D:228:ASP:HB3	1:D:231:LYS:HD2	2.02	0.41
4:A:406:PEG:H22	1:B:114:GLY:HA2	2.02	0.41
1:B:232:TYR:CZ	1:B:236:LYS:HE3	2.56	0.41
1:D:353:LEU:HD12	1:D:373[A]:CYS:SG	2.61	0.41
1:C:307:ARG:HG3	1:C:307:ARG:HH11	1.86	0.40
1:B:357:GLU:HB3	1:B:360:LYS:HE3	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	380/379 (100%)	370 (97%)	10 (3%)	0	100	100
1	B	386/379 (102%)	374 (97%)	12 (3%)	0	100	100
1	C	385/379 (102%)	374 (97%)	11 (3%)	0	100	100
1	D	383/379 (101%)	369 (96%)	14 (4%)	0	100	100
All	All	1534/1516 (101%)	1487 (97%)	47 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	312/309 (101%)	310 (99%)	2 (1%)	86	87
1	B	318/309 (103%)	313 (98%)	5 (2%)	62	60
1	C	317/309 (103%)	311 (98%)	6 (2%)	57	53
1	D	315/309 (102%)	313 (99%)	2 (1%)	86	87
All	All	1262/1236 (102%)	1247 (99%)	15 (1%)	73	70

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	233	GLU
1	A	317	TRP

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Mol	Chain	Res	Type
1	B	4	GLN
1	B	57	LYS
1	B	117	ARG
1	B	317	TRP
1	B	360	LYS
1	C	233[A]	GLU
1	C	233[B]	GLU
1	C	237	LYS
1	C	251	LYS
1	C	309	PHE
1	C	317	TRP
1	D	309	PHE
1	D	317	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	302	GLN

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

There are no monosaccharides in this entry.

5.6 Ligand geometry

Of 26 ligands modelled in this entry, 8 are monoatomic - leaving 18 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	$\#\|Z\| > 2$
5	PGE	A	408	-	9,9,9	0.35	0	8,8,8	0.39	0
5	PGE	A	409	-	9,9,9	0.47	0	8,8,8	0.63	0
4	PEG	A	406	-	6,6,6	0.17	0	5,5,5	0.06	0
4	PEG	B	403	1	6,6,6	0.17	0	5,5,5	0.19	0
4	PEG	B	404	-	6,6,6	0.15	0	5,5,5	0.08	0
4	PEG	C	405	-	6,6,6	0.17	0	5,5,5	0.11	0
5	PGE	A	410	-	9,9,9	0.36	0	8,8,8	0.37	0
4	PEG	A	405	-	6,6,6	0.14	0	5,5,5	0.11	0
4	PEG	C	404	-	6,6,6	0.18	0	5,5,5	0.21	0
5	PGE	B	406	1	9,9,9	0.43	0	8,8,8	0.46	0
4	PEG	A	407	-	6,6,6	0.10	0	5,5,5	0.13	0
5	PGE	C	406	-	9,9,9	0.23	0	8,8,8	0.64	0
4	PEG	A	404	-	6,6,6	0.14	0	5,5,5	0.13	0
5	PGE	D	403	-	9,9,9	0.34	0	8,8,8	0.51	0
6	PG4	A	411	-	12,12,12	0.19	0	11,11,11	0.58	0
5	PGE	B	405	1	9,9,9	0.29	0	8,8,8	0.68	0
3	EDO	A	403	-	3,3,3	0.56	0	2,2,2	0.53	0
3	EDO	C	403	-	3,3,3	0.65	0	2,2,2	0.33	0

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
5	PGE	A	408	-	-	2/7/7/7	-
5	PGE	A	409	-	-	5/7/7/7	-
4	PEG	A	406	-	-	3/4/4/4	-
4	PEG	B	403	1	-	1/4/4/4	-
4	PEG	B	404	-	-	1/4/4/4	-
4	PEG	C	405	-	-	2/4/4/4	-
5	PGE	A	410	-	-	3/7/7/7	-
4	PEG	A	405	-	-	3/4/4/4	-
4	PEG	C	404	-	-	4/4/4/4	-
5	PGE	B	406	1	-	5/7/7/7	-
4	PEG	A	407	-	-	3/4/4/4	-
5	PGE	C	406	-	-	2/7/7/7	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	PEG	A	404	-	-	1/4/4/4	-
5	PGE	D	403	-	-	6/7/7/7	-
6	PG4	A	411	-	-	7/10/10/10	-
5	PGE	B	405	1	-	3/7/7/7	-
3	EDO	A	403	-	-	0/1/1/1	-
3	EDO	C	403	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (52) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	409	PGE	C6-C5-O3-C4
5	D	403	PGE	C3-C4-O3-C5
5	A	409	PGE	C4-C3-O2-C2
5	A	410	PGE	O2-C3-C4-O3
5	A	408	PGE	O2-C3-C4-O3
6	A	411	PG4	O2-C3-C4-O3
6	A	411	PG4	O3-C5-C6-O4
4	A	405	PEG	O2-C3-C4-O4
6	A	411	PG4	O4-C7-C8-O5
4	A	407	PEG	O2-C3-C4-O4
5	A	410	PGE	O1-C1-C2-O2
6	A	411	PG4	O1-C1-C2-O2
4	A	406	PEG	C1-C2-O2-C3
4	A	406	PEG	O1-C1-C2-O2
4	B	403	PEG	O2-C3-C4-O4
5	A	409	PGE	O1-C1-C2-O2
5	D	403	PGE	O1-C1-C2-O2
4	A	405	PEG	O1-C1-C2-O2
4	B	404	PEG	O1-C1-C2-O2
5	A	409	PGE	O2-C3-C4-O3
4	A	407	PEG	O1-C1-C2-O2
5	D	403	PGE	O3-C5-C6-O4
5	B	406	PGE	O1-C1-C2-O2
5	B	405	PGE	O2-C3-C4-O3
5	D	403	PGE	C6-C5-O3-C4
5	A	410	PGE	C1-C2-O2-C3
6	A	411	PG4	C1-C2-O2-C3

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Mol	Chain	Res	Type	Atoms
5	B	406	PGE	C6-C5-O3-C4
4	A	406	PEG	O2-C3-C4-O4
4	C	405	PEG	O1-C1-C2-O2
4	A	407	PEG	C4-C3-O2-C2
5	A	408	PGE	C4-C3-O2-C2
5	B	405	PGE	C1-C2-O2-C3
5	B	406	PGE	C1-C2-O2-C3
4	C	404	PEG	C4-C3-O2-C2
5	C	406	PGE	C4-C3-O2-C2
4	C	404	PEG	C1-C2-O2-C3
4	C	405	PEG	C1-C2-O2-C3
3	C	403	EDO	O1-C1-C2-O2
5	B	406	PGE	C3-C4-O3-C5
5	B	405	PGE	O1-C1-C2-O2
6	A	411	PG4	C4-C3-O2-C2
6	A	411	PG4	C3-C4-O3-C5
5	C	406	PGE	O2-C3-C4-O3
5	A	409	PGE	C3-C4-O3-C5
4	A	405	PEG	C1-C2-O2-C3
4	C	404	PEG	O2-C3-C4-O4
5	B	406	PGE	O2-C3-C4-O3
5	D	403	PGE	O2-C3-C4-O3
4	C	404	PEG	O1-C1-C2-O2
5	D	403	PGE	C1-C2-O2-C3
4	A	404	PEG	O1-C1-C2-O2

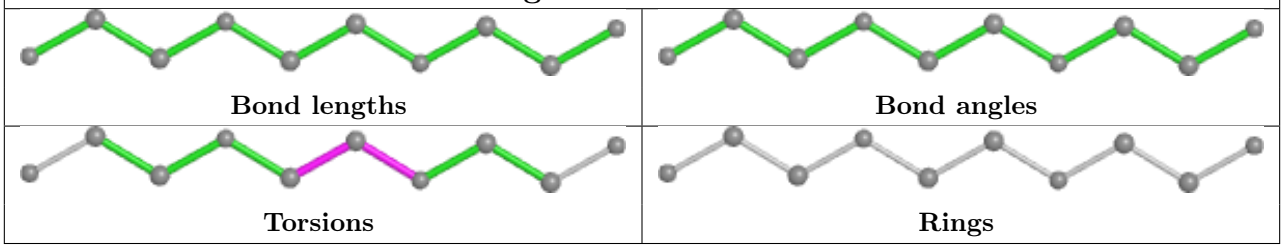
There are no ring outliers.

12 monomers are involved in 29 short contacts:

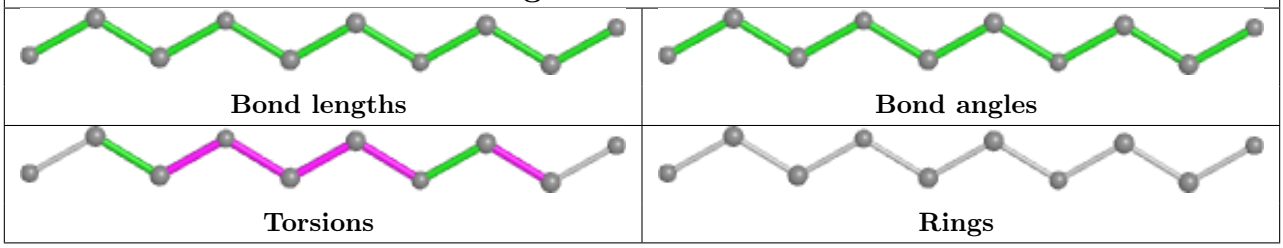
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	406	PEG	5	0
4	C	405	PEG	1	0
5	A	410	PGE	4	0
4	A	405	PEG	2	0
4	C	404	PEG	1	0
5	B	406	PGE	1	0
4	A	407	PEG	1	0
5	C	406	PGE	3	0
4	A	404	PEG	2	0
5	D	403	PGE	5	0
6	A	411	PG4	3	0
5	B	405	PGE	1	0

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 then 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 PGE A 408



Ligand PGE A 409



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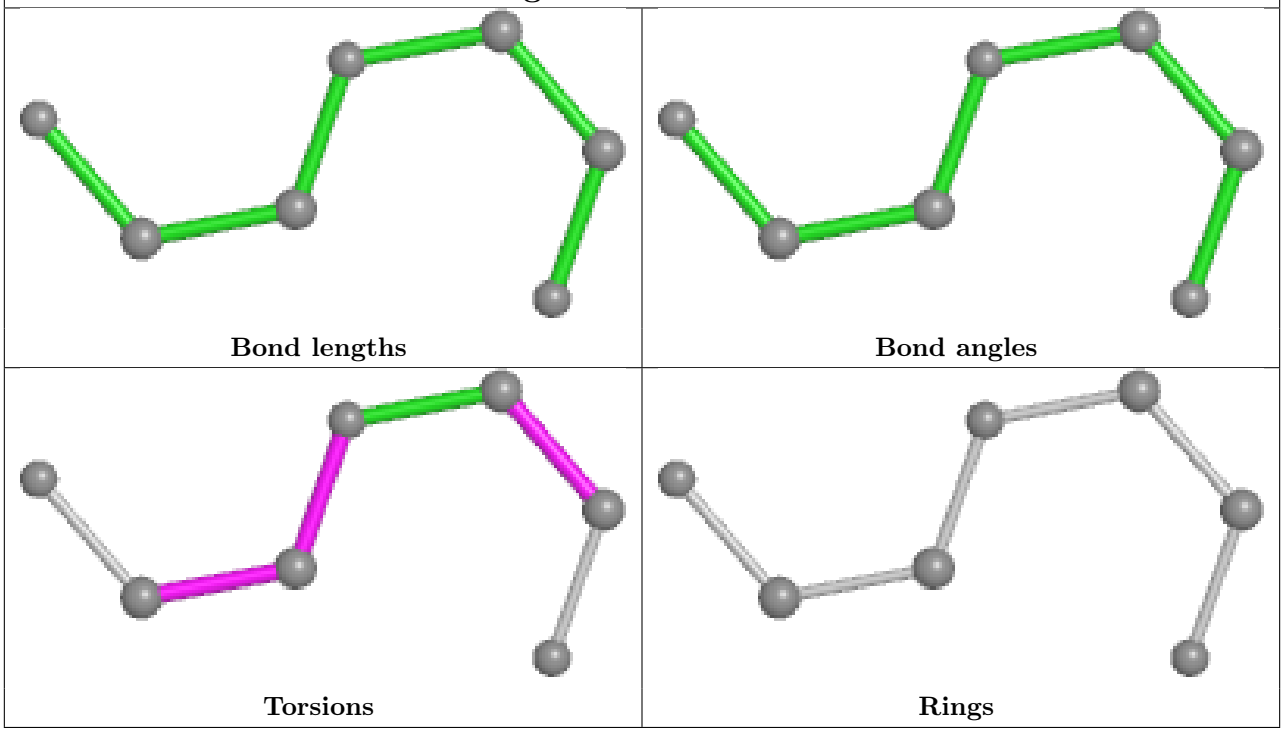

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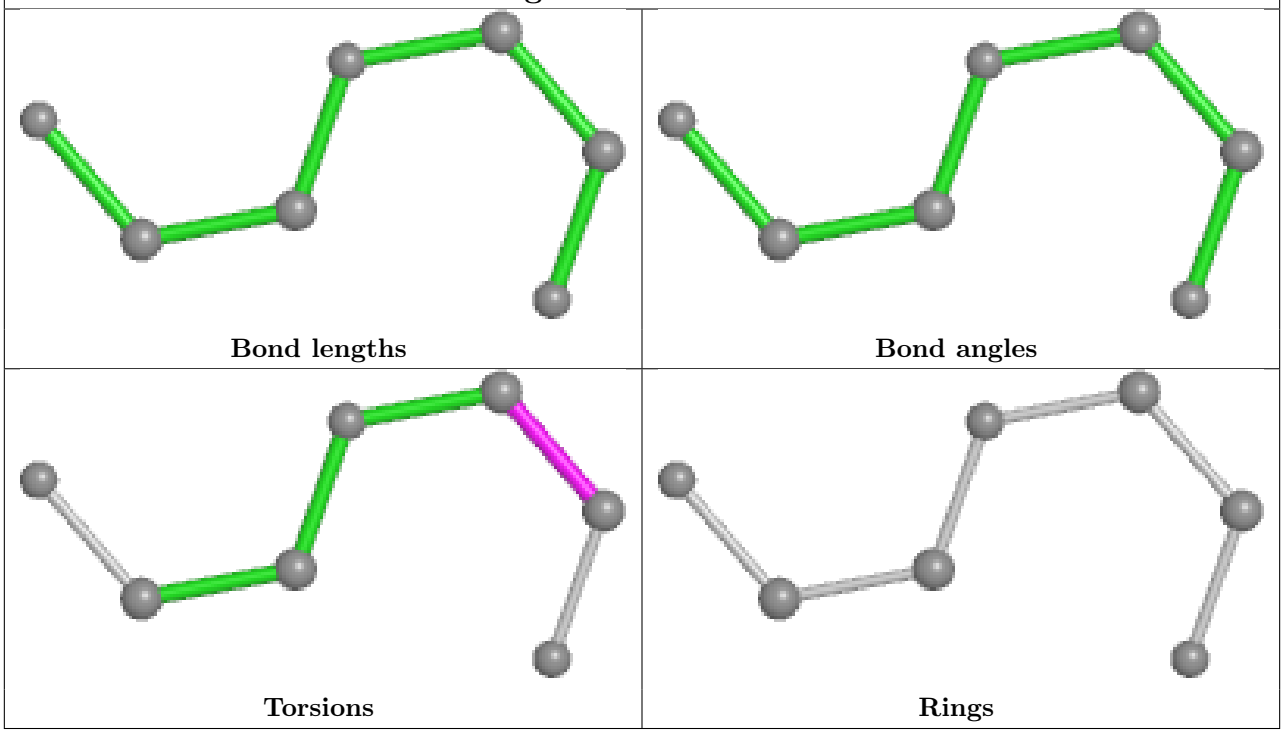

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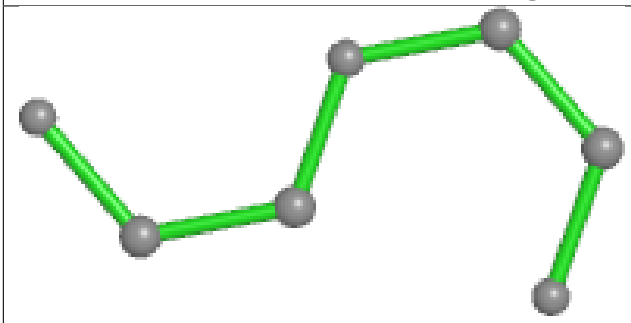
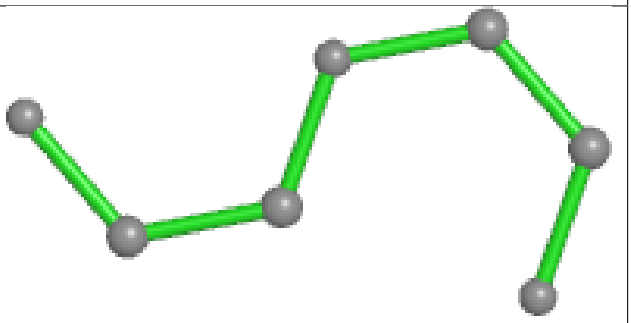
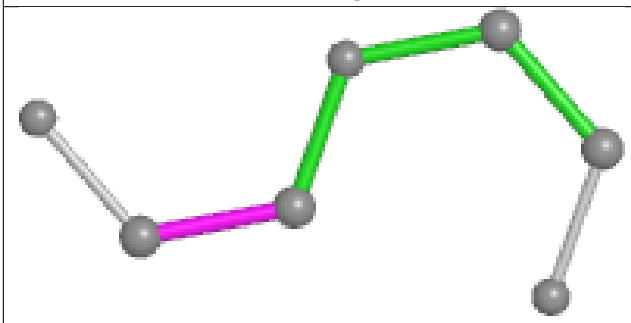
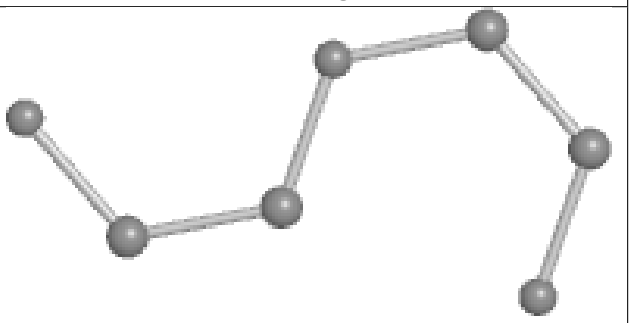
 Bond lengths	 Bond angles
 Torsions	 Rings

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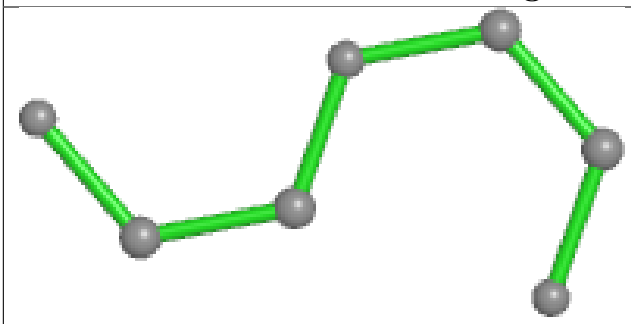
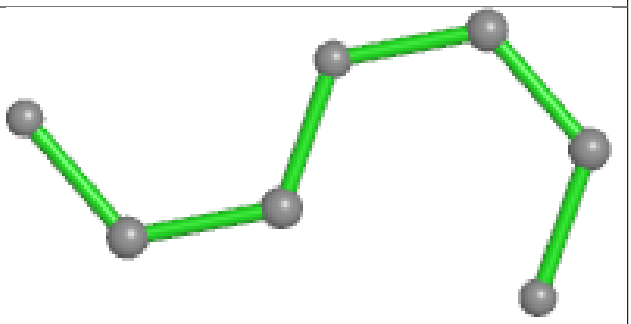
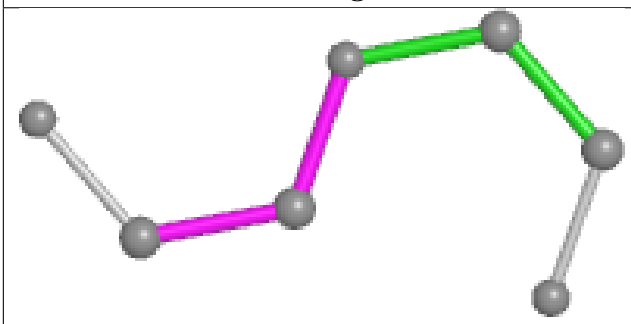
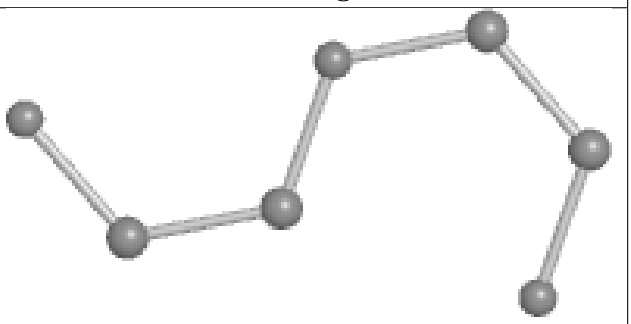
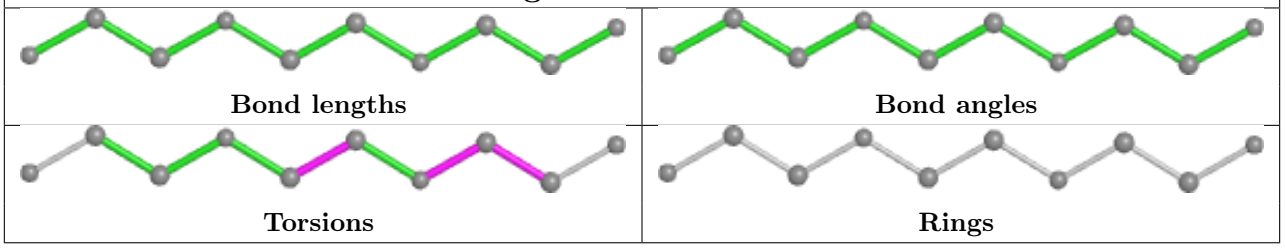
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand PGE A 410



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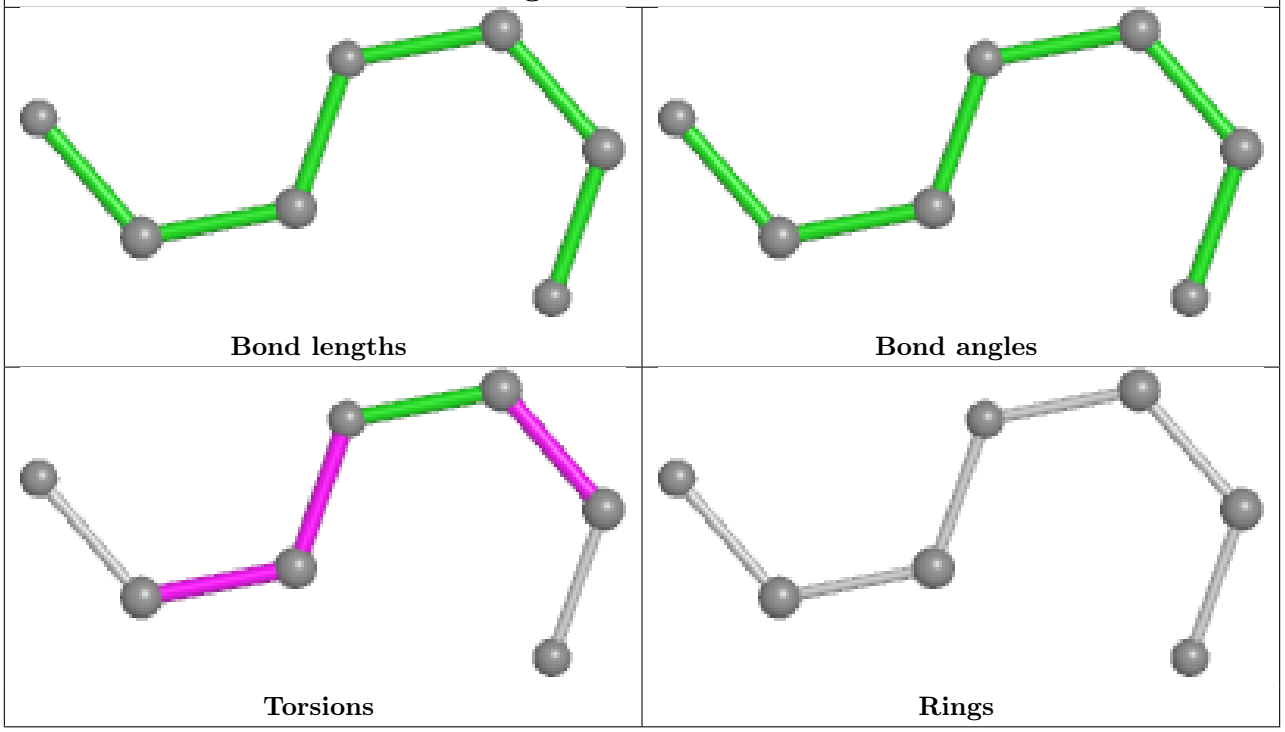

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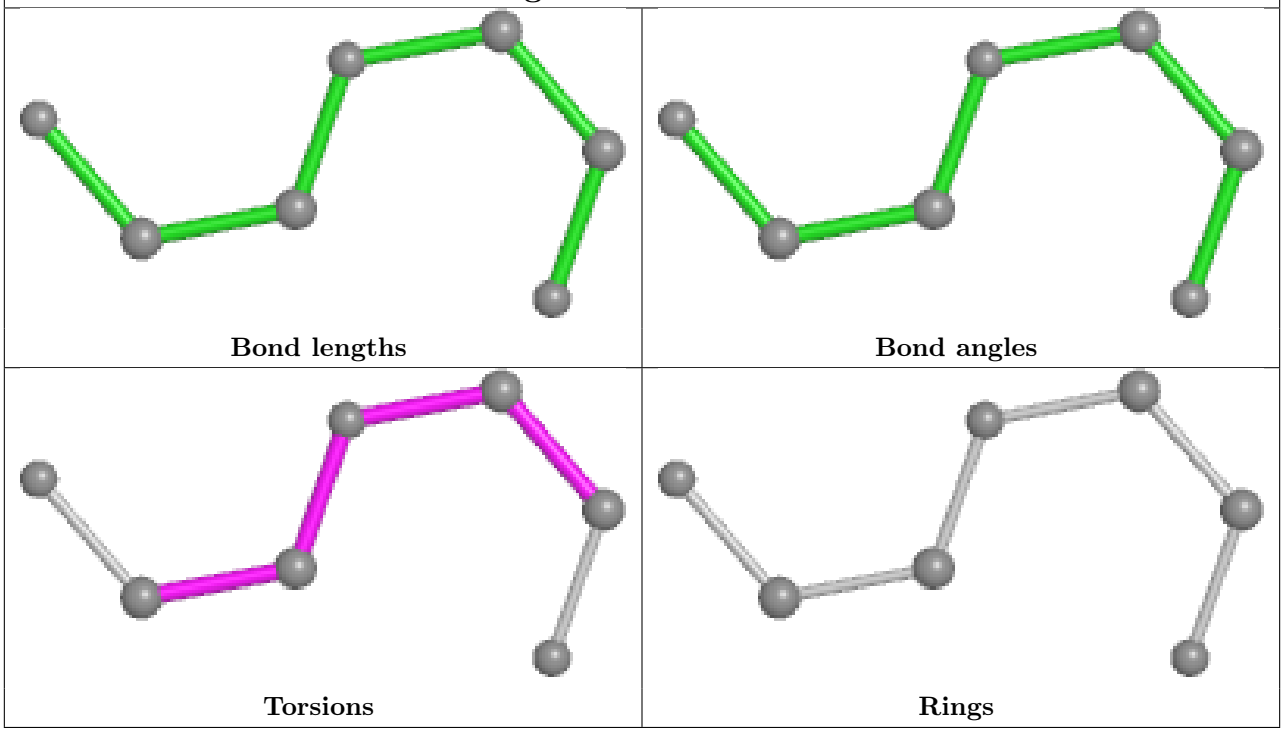
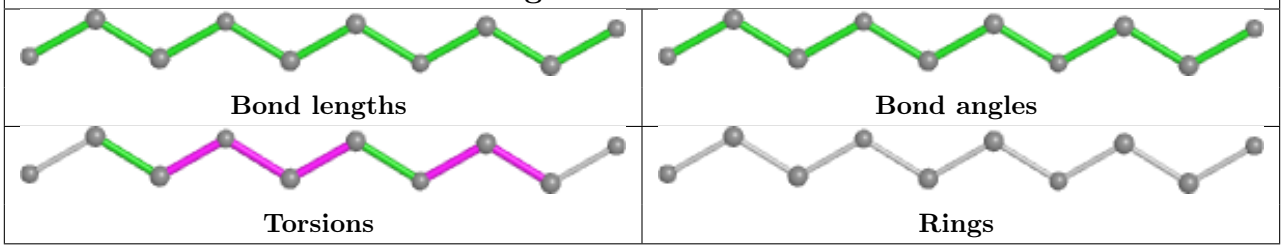


Ligand PGE B 406



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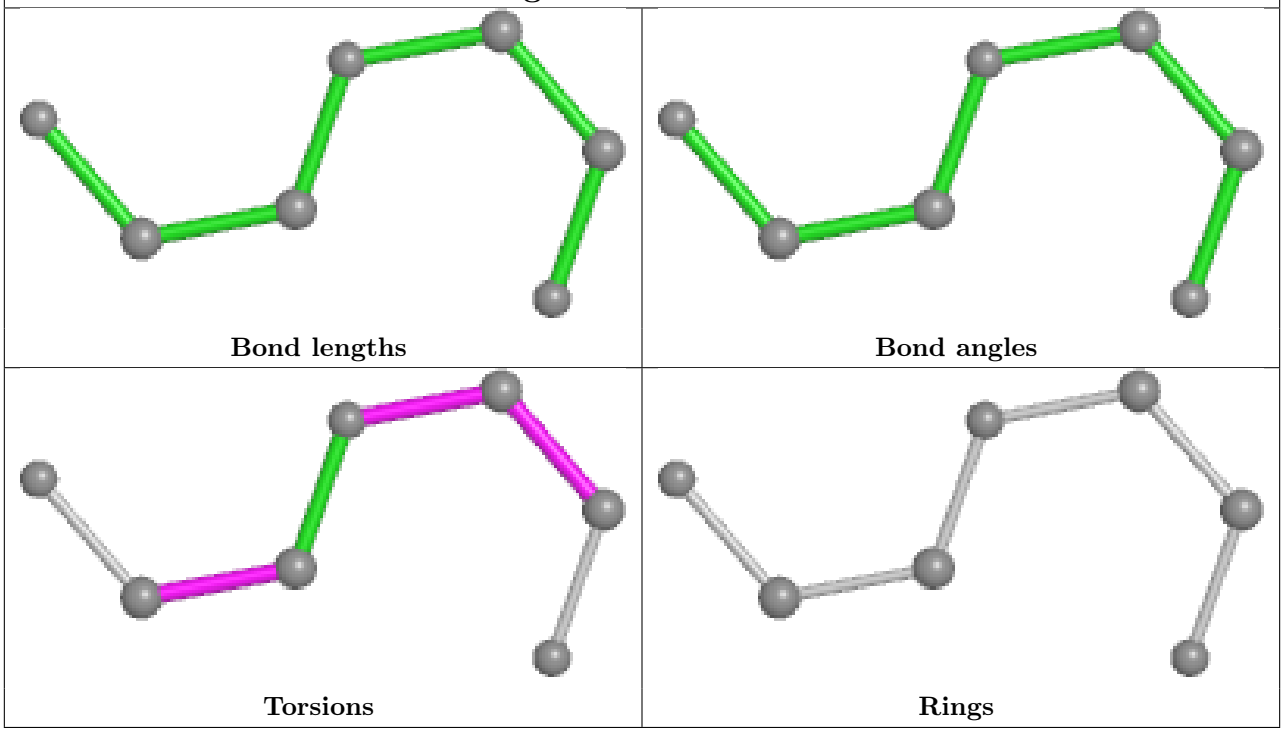

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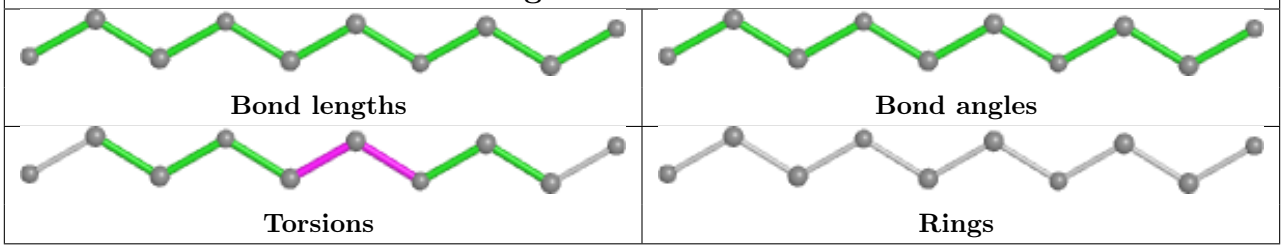

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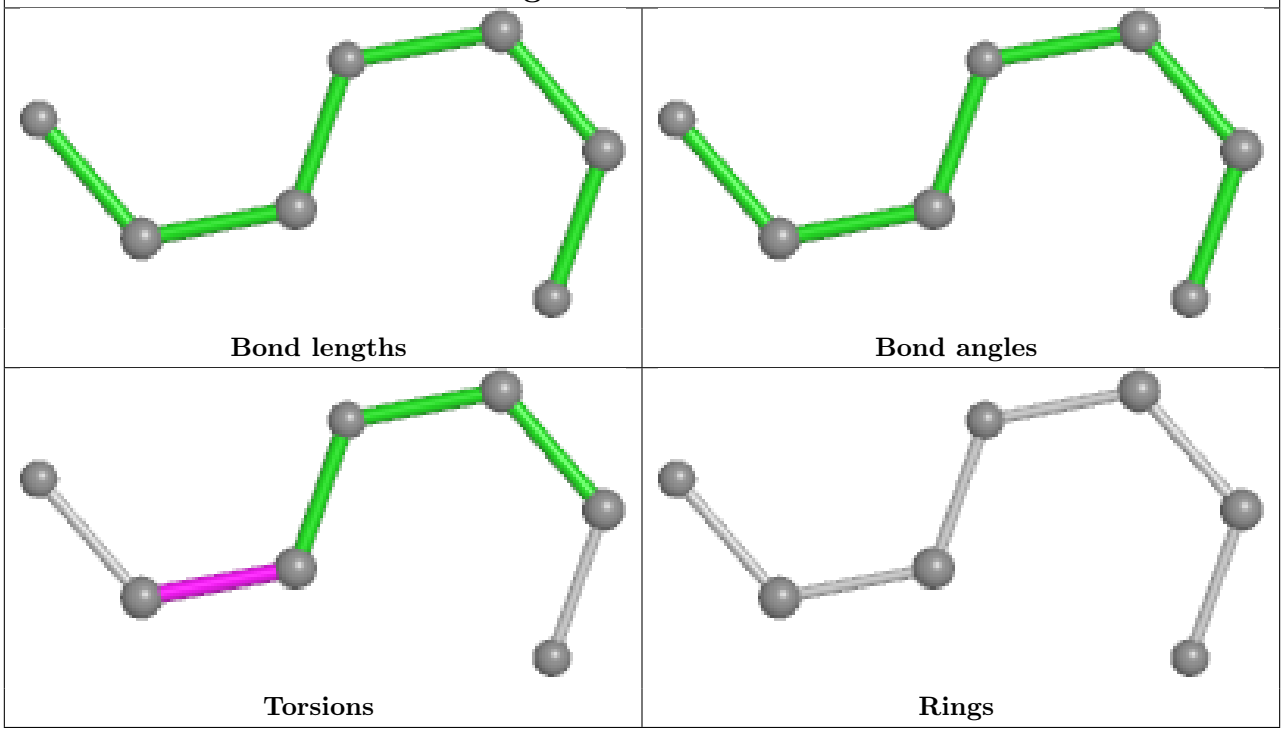

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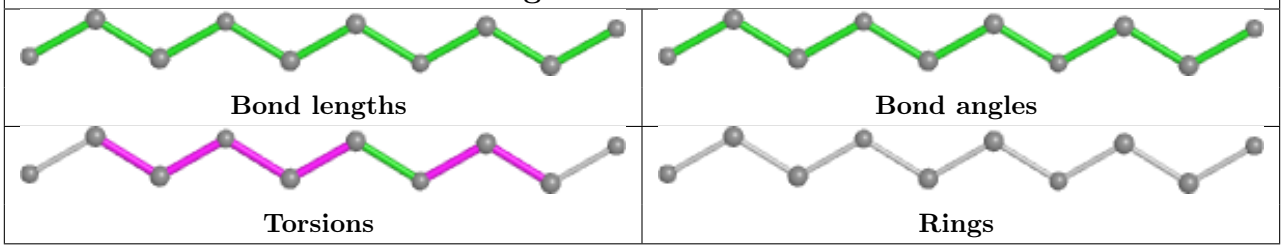
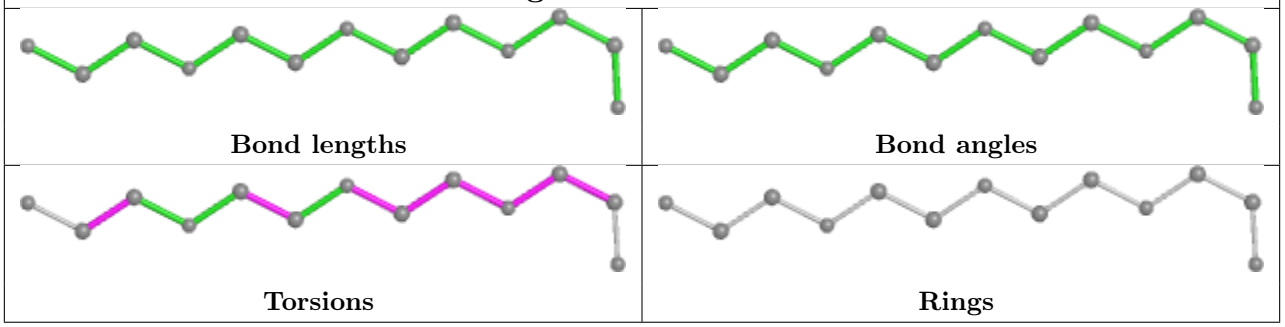


Ligand PG4 A 411



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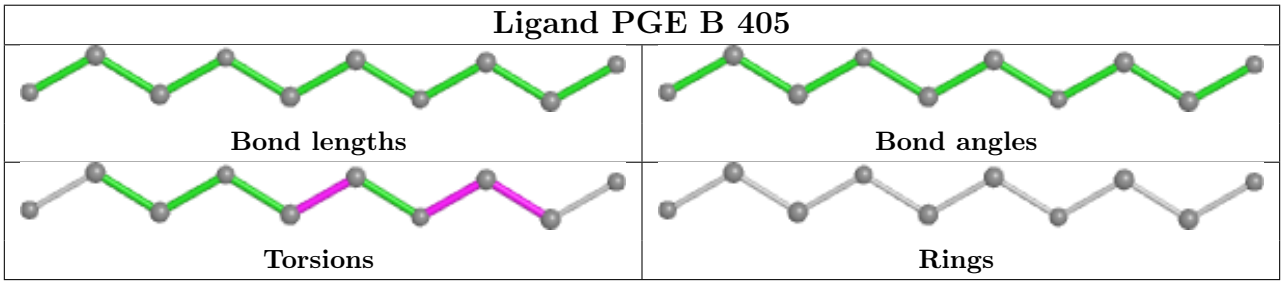
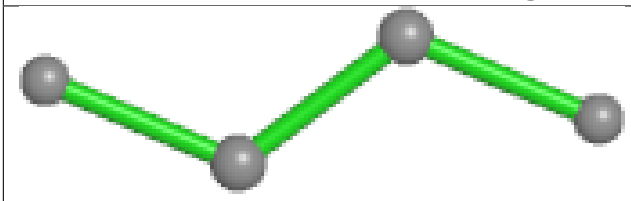
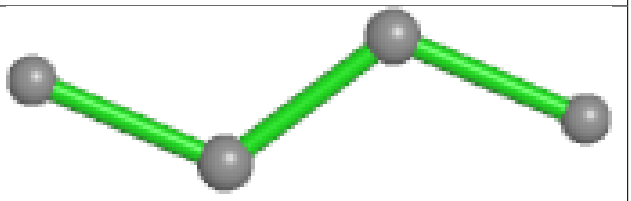
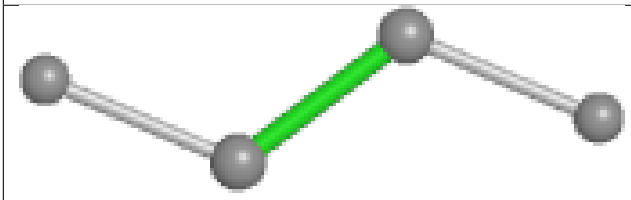
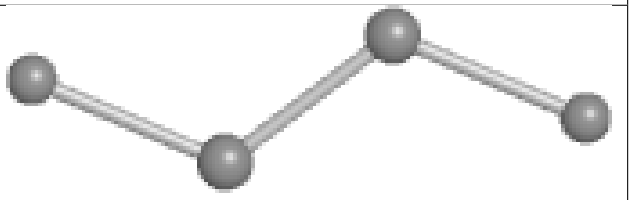
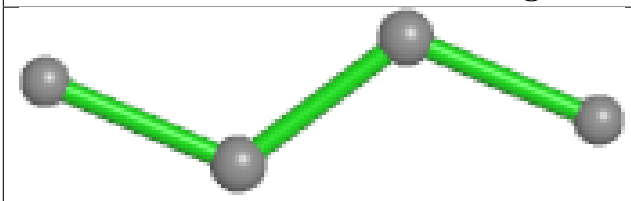
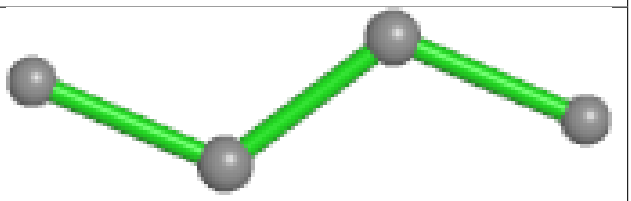
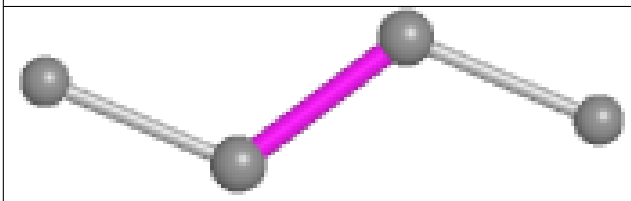
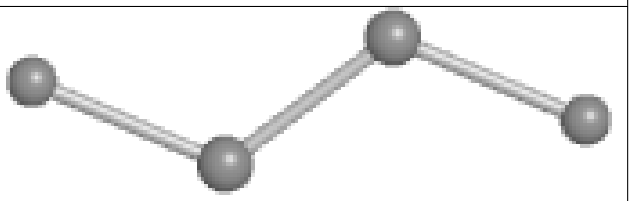


Ligand EDO A 403	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand EDO C 403	
 Bond lengths	 Bond angles
 Torsions	 Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	378/379 (99%)	-0.41	0 100 100	11, 23, 40, 66	0
1	B	378/379 (99%)	-0.36	4 (1%) 80 82	12, 23, 44, 70	0
1	C	379/379 (100%)	-0.39	3 (0%) 86 87	13, 21, 39, 73	0
1	D	379/379 (100%)	-0.27	8 (2%) 63 66	15, 24, 50, 77	0
All	All	1514/1516 (99%)	-0.36	15 (0%) 82 84	11, 23, 44, 77	0

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	1	MET	3.4
1	D	52	TYR	3.2
1	B	379	LYS	3.0
1	D	300	SER	2.7
1	B	57	LYS	2.6
1	D	232	TYR	2.5
1	D	297	VAL	2.5
1	D	379	LYS	2.4
1	D	369	THR	2.3
1	D	368	GLY	2.2
1	C	60	GLU	2.1
1	C	59	PRO	2.1
1	C	1	MET	2.1
1	B	59	PRO	2.0
1	B	58	ASP	2.0

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

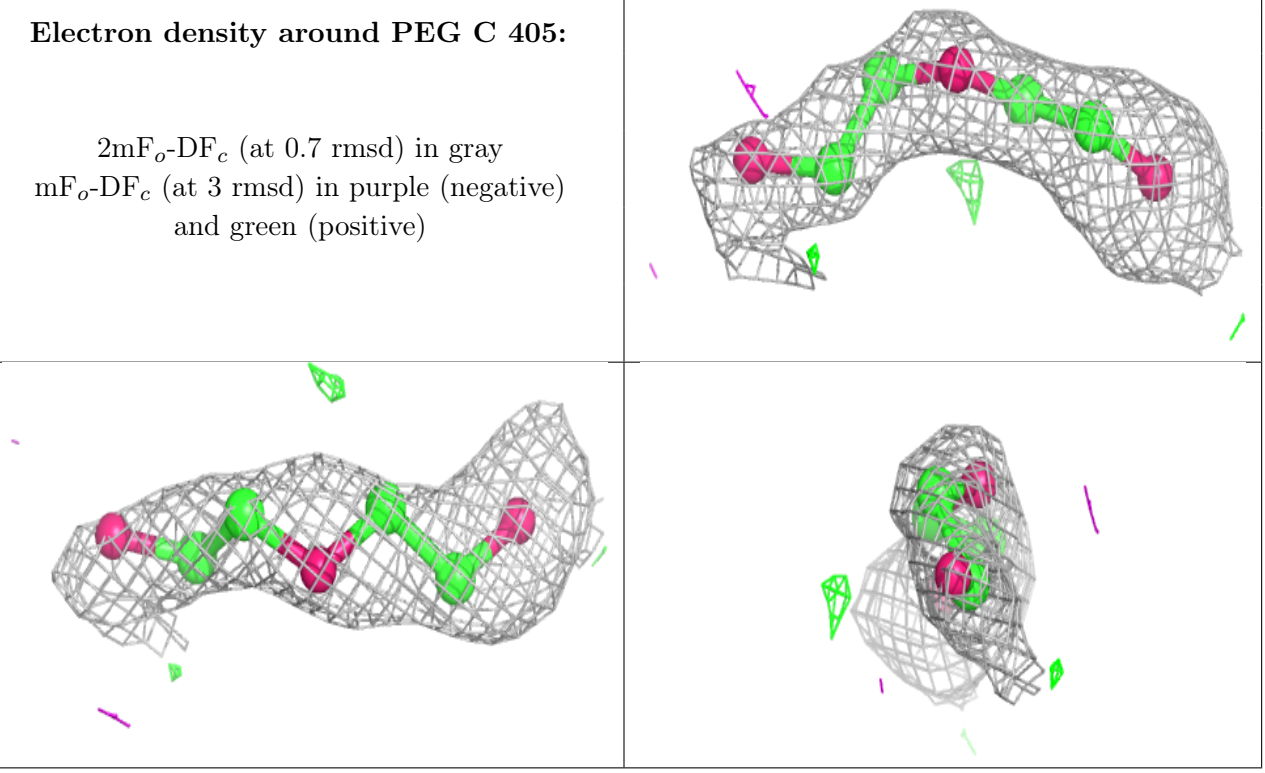
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	PEG	C	405	7/7	0.74	0.22	38,42,45,47	0
4	PEG	B	403	7/7	0.75	0.16	36,40,53,58	0
3	EDO	C	403	4/4	0.77	0.18	29,32,32,40	0
5	PGE	B	406	10/10	0.79	0.19	28,46,56,56	0
5	PGE	A	409	10/10	0.84	0.22	29,40,48,50	0
6	PG4	A	411	13/13	0.84	0.22	50,55,63,71	0
4	PEG	B	404	7/7	0.85	0.15	44,49,56,58	0
4	PEG	A	405	7/7	0.86	0.15	35,37,45,48	0
5	PGE	D	403	10/10	0.87	0.14	35,45,51,51	0
4	PEG	A	406	7/7	0.87	0.23	37,49,57,64	0
5	PGE	A	410	10/10	0.89	0.16	35,42,57,58	0
5	PGE	B	405	10/10	0.90	0.13	28,32,38,43	0
4	PEG	C	404	7/7	0.91	0.16	35,38,54,54	0
4	PEG	A	407	7/7	0.91	0.11	39,41,45,56	0
3	EDO	A	403	4/4	0.91	0.09	33,34,36,44	0
4	PEG	A	404	7/7	0.91	0.13	31,38,46,49	0
5	PGE	A	408	10/10	0.93	0.13	32,44,51,56	0
5	PGE	C	406	10/10	0.95	0.13	22,30,42,46	0
2	ZN	D	402	1/1	0.96	0.06	34,34,34,34	0
2	ZN	A	402	1/1	0.97	0.05	39,39,39,39	1
2	ZN	B	402	1/1	0.99	0.04	30,30,30,30	1
2	ZN	D	401	1/1	1.00	0.08	21,21,21,21	0
2	ZN	B	401	1/1	1.00	0.07	19,19,19,19	0
2	ZN	A	401	1/1	1.00	0.06	21,21,21,21	0
2	ZN	C	401	1/1	1.00	0.06	20,20,20,20	0
2	ZN	C	402	1/1	1.00	0.04	25,25,25,25	1

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

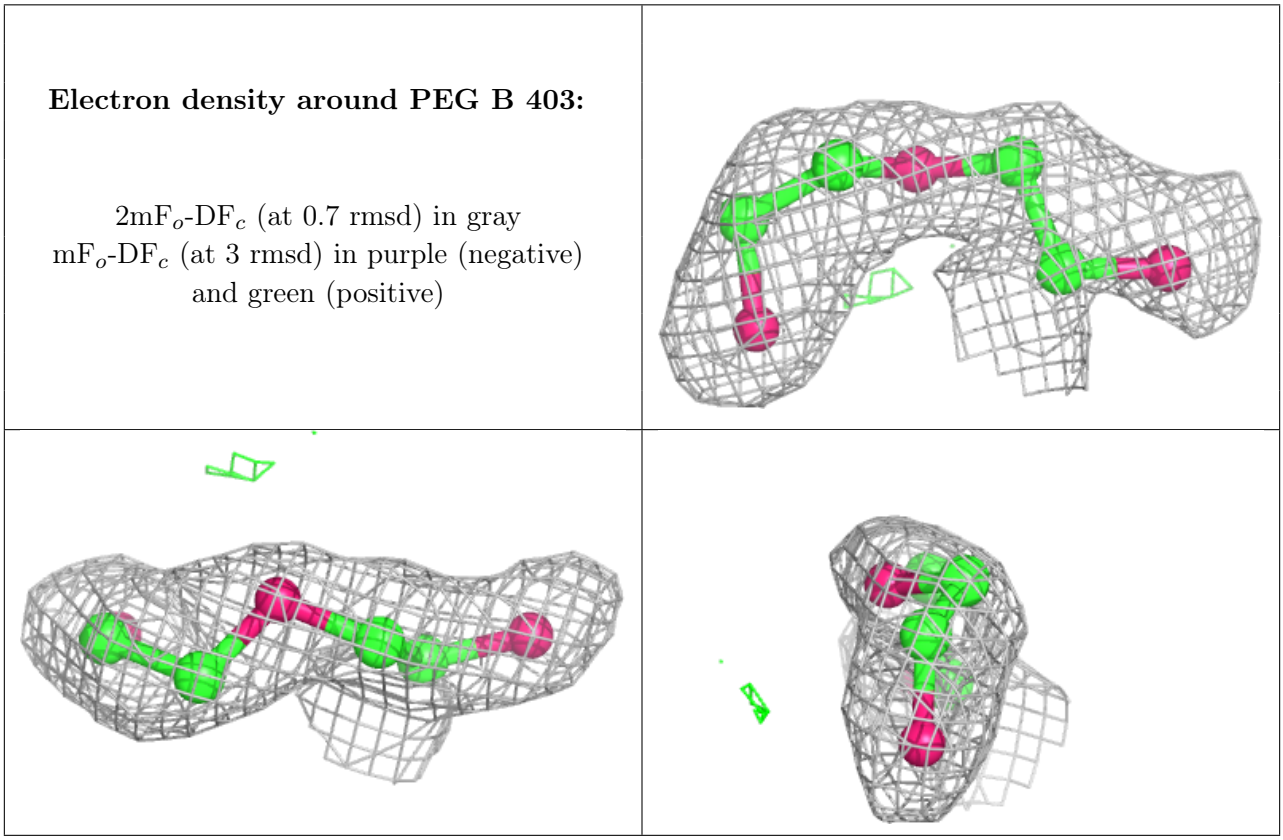
Electron density around PEG C 405:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



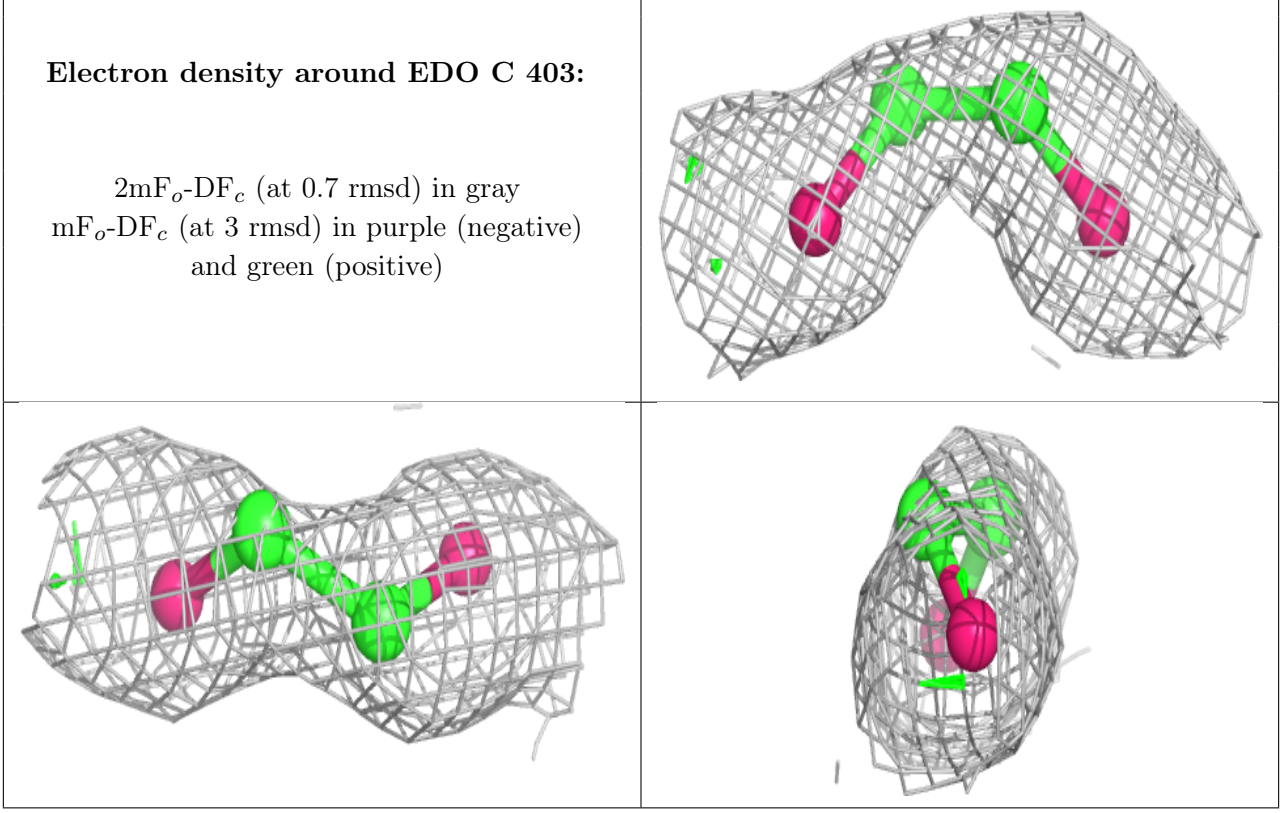
Electron density around PEG B 403:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



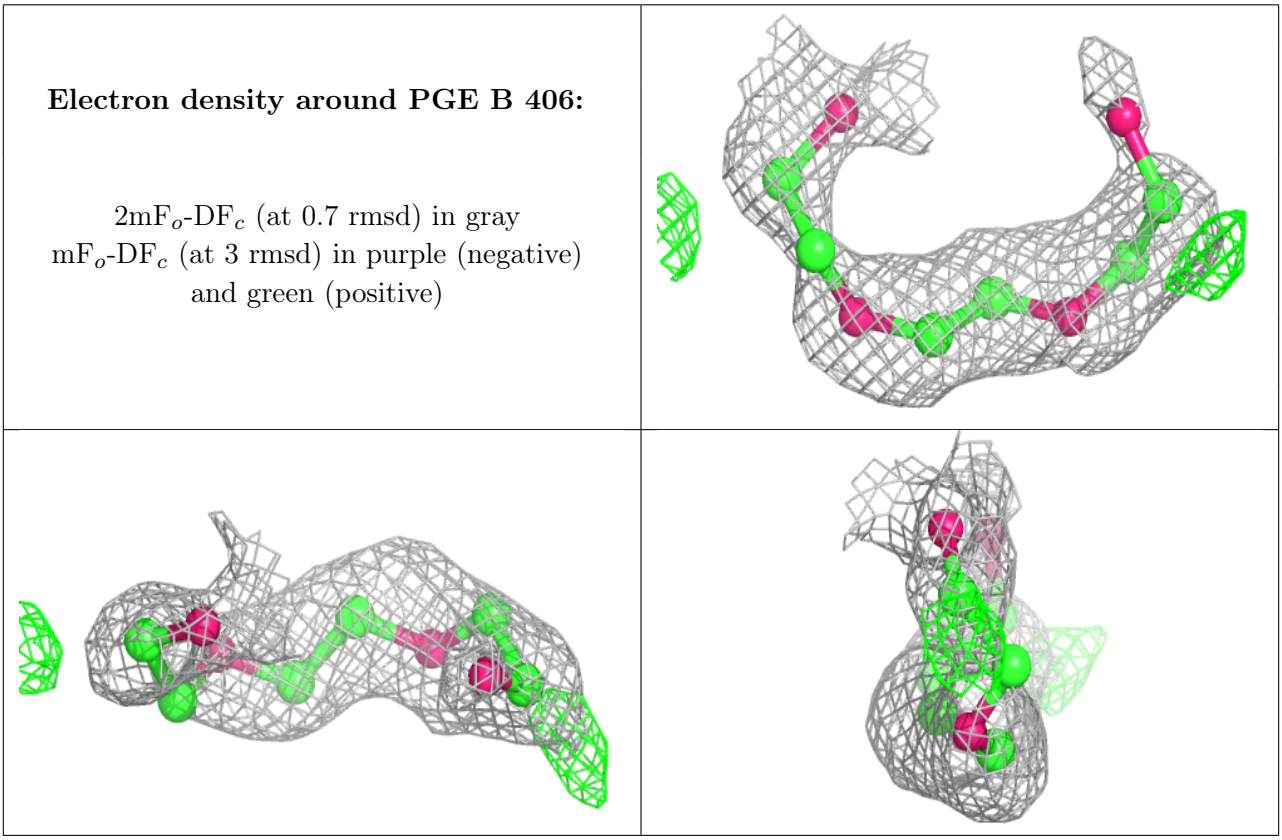
Electron density around EDO C 403:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



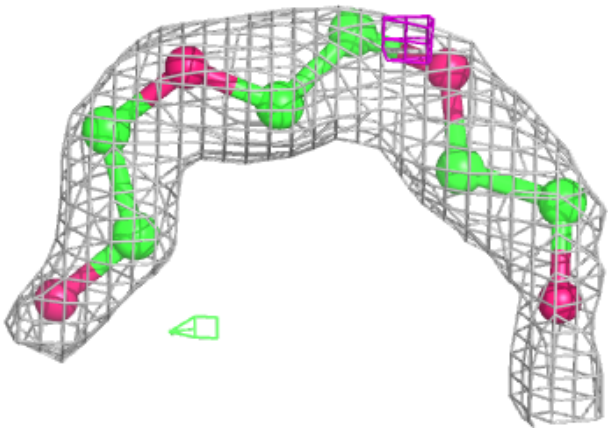
Electron density around PGE B 406:

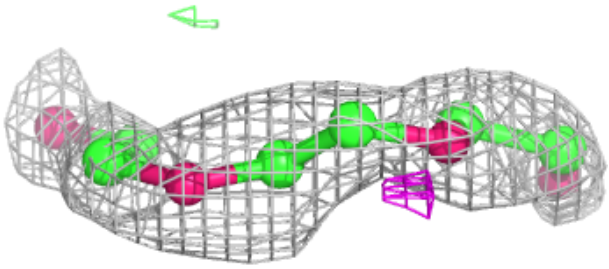
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

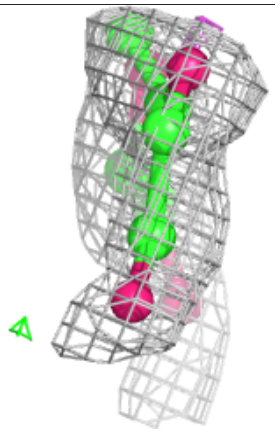


Electron density around PGE A 409:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

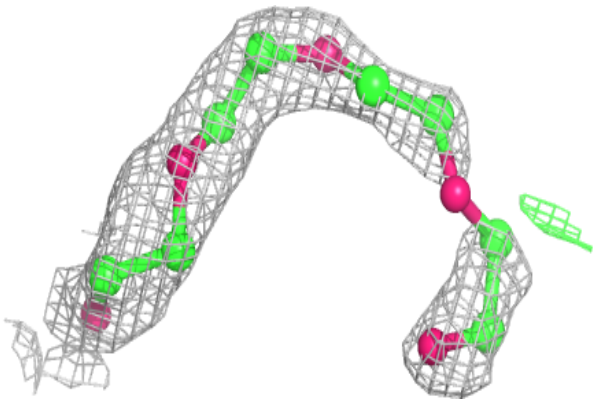


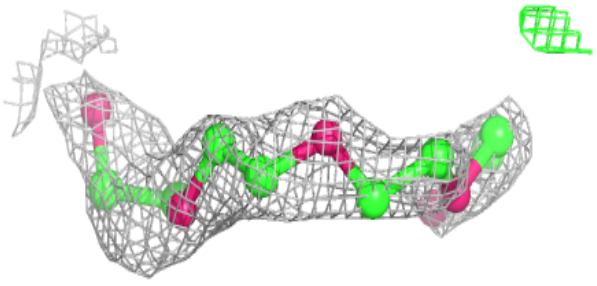


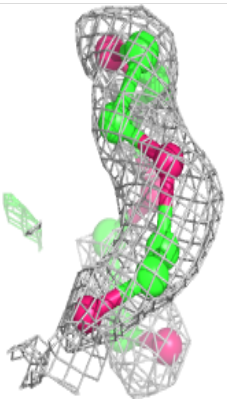


Electron density around PG4 A 411:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

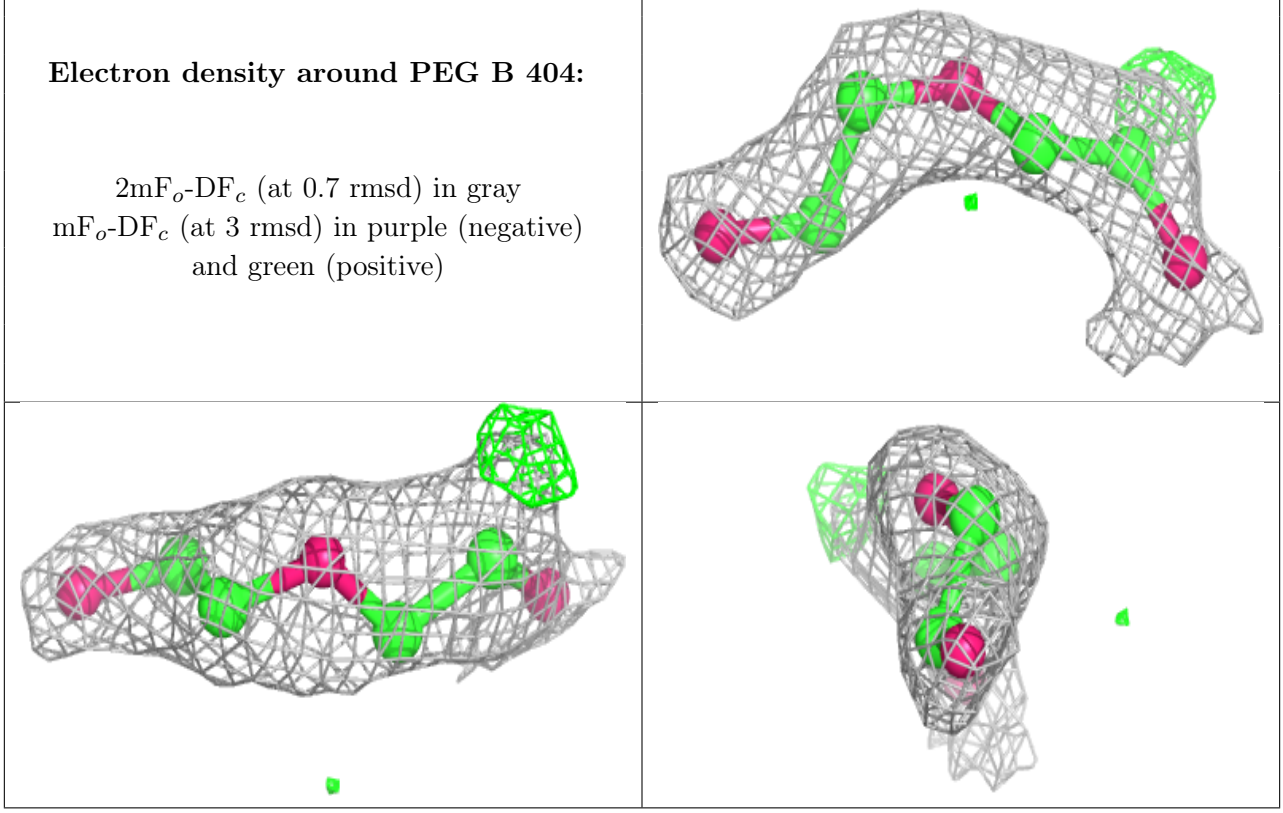






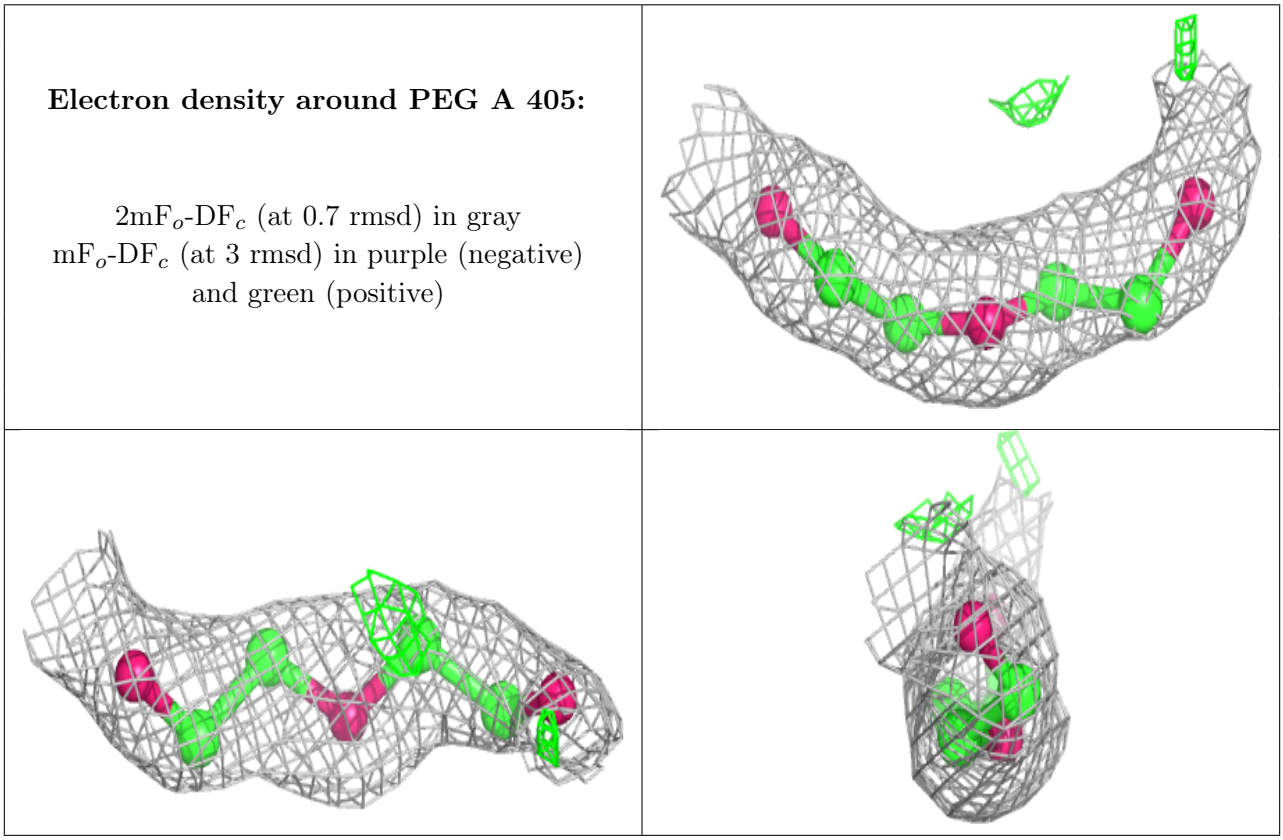
Electron density around PEG B 404:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



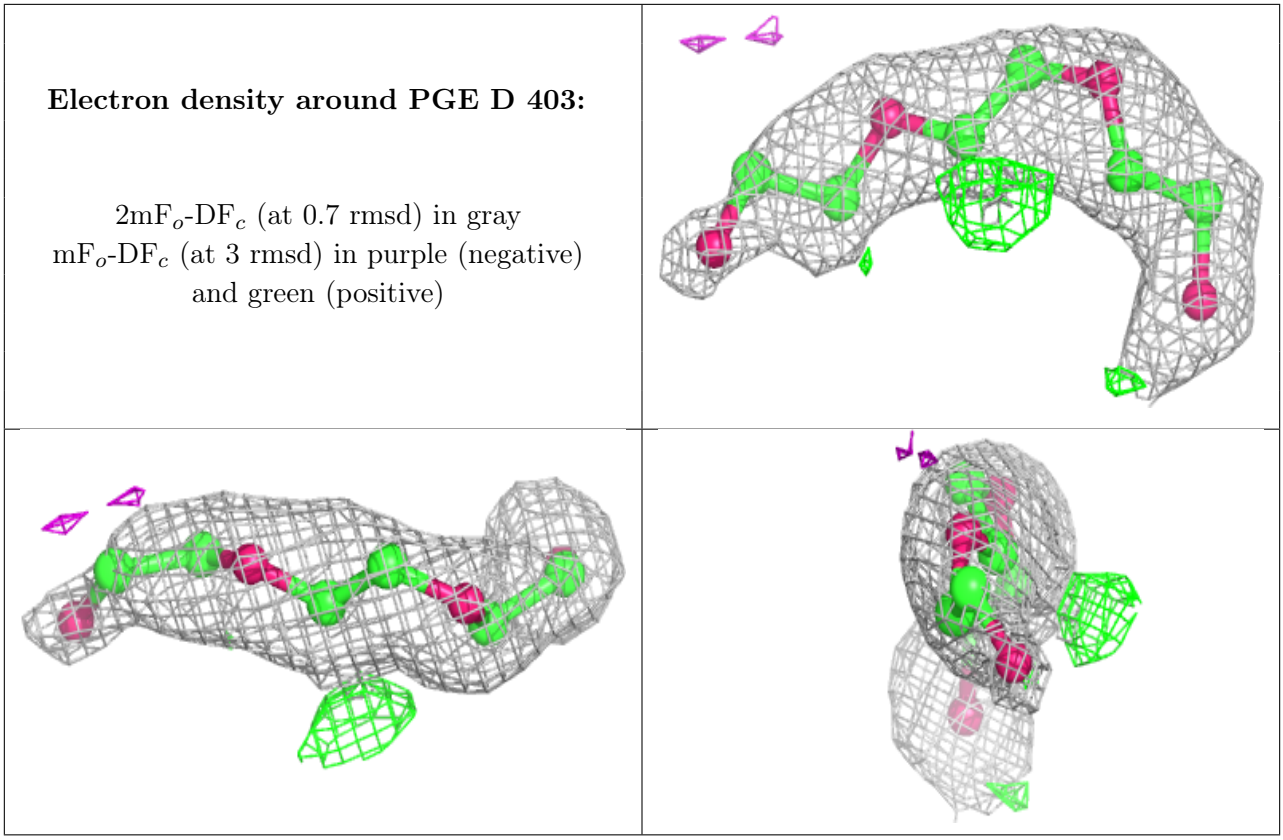
Electron density around PEG A 405:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



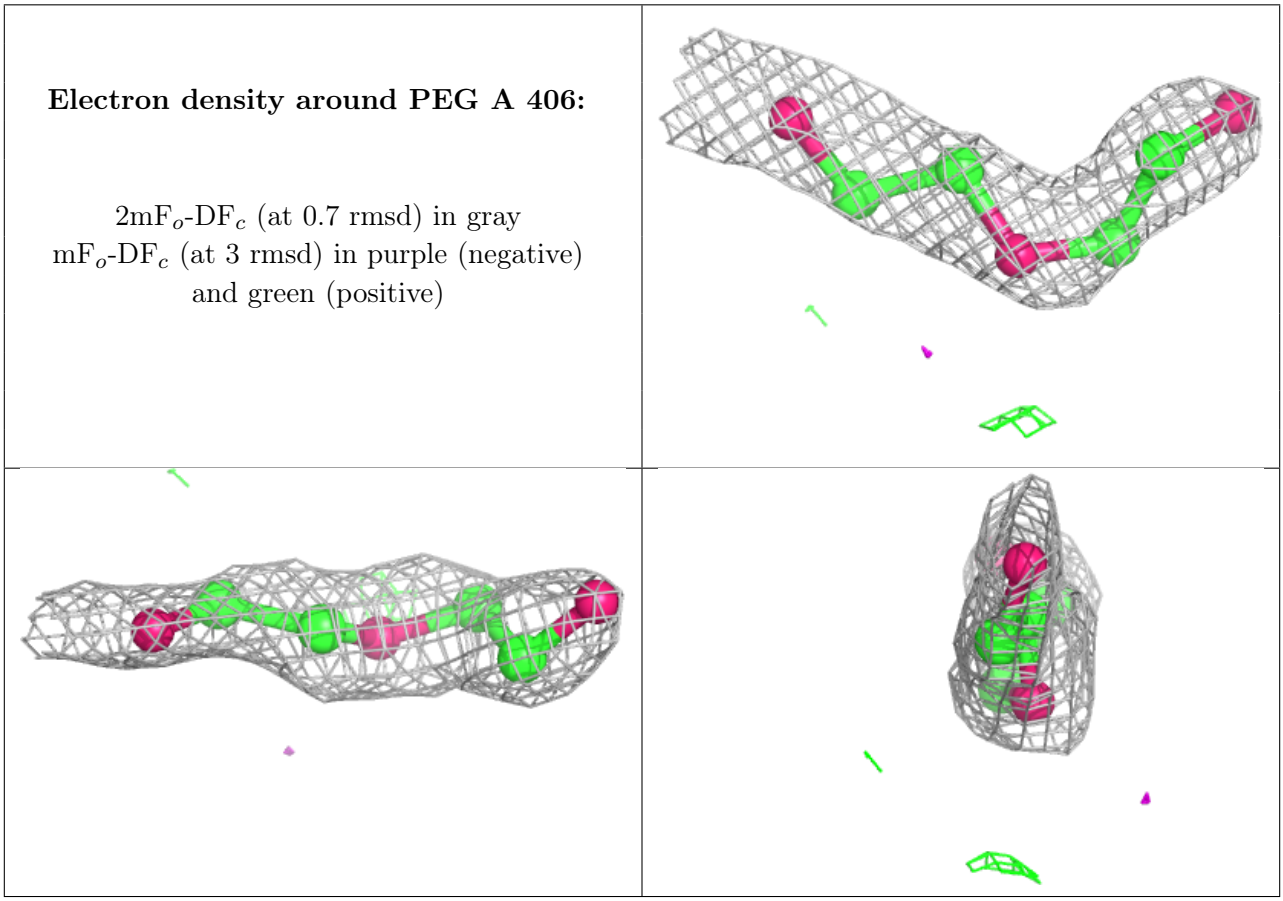
Electron density around PGE D 403:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



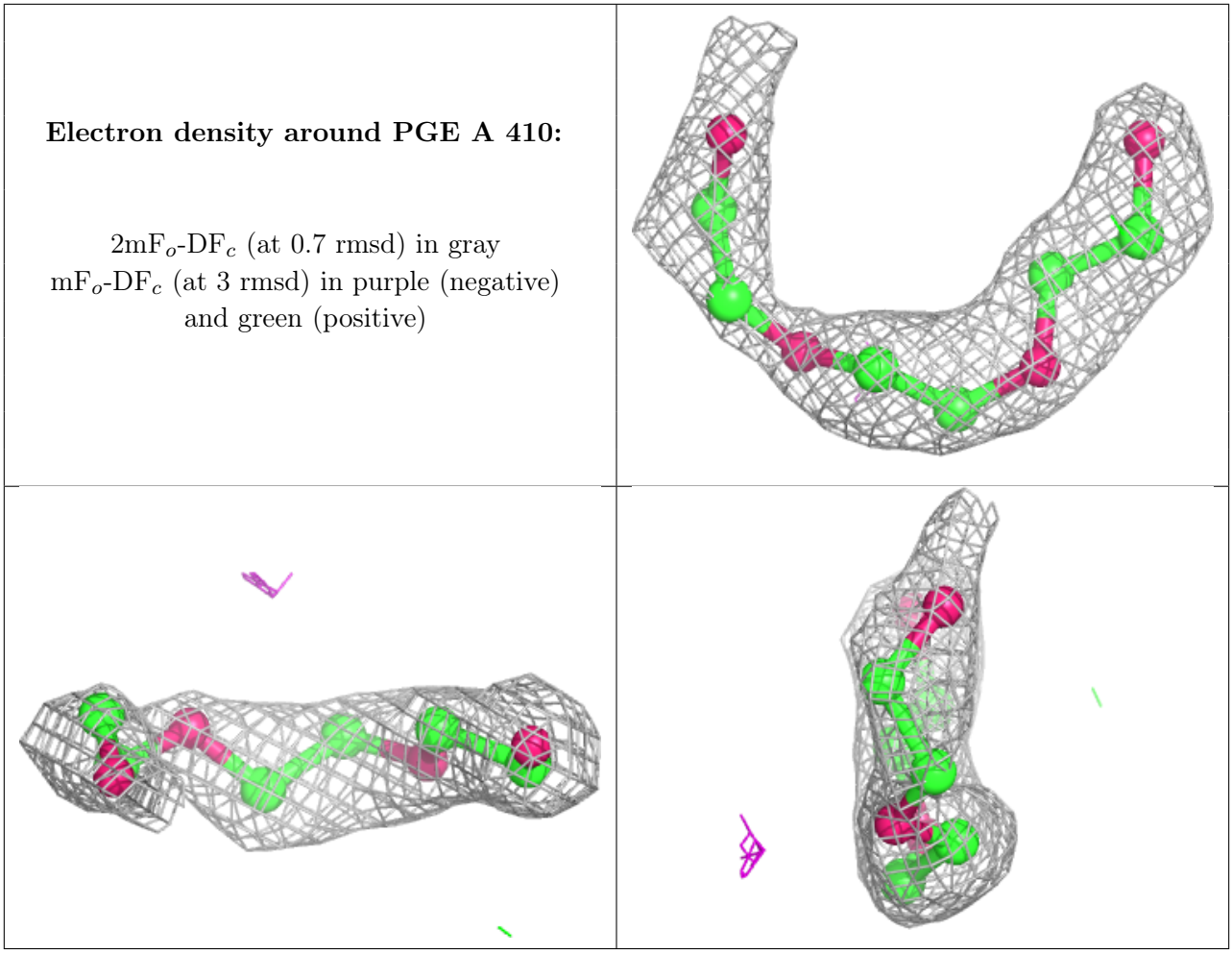
Electron density around PEG A 406:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



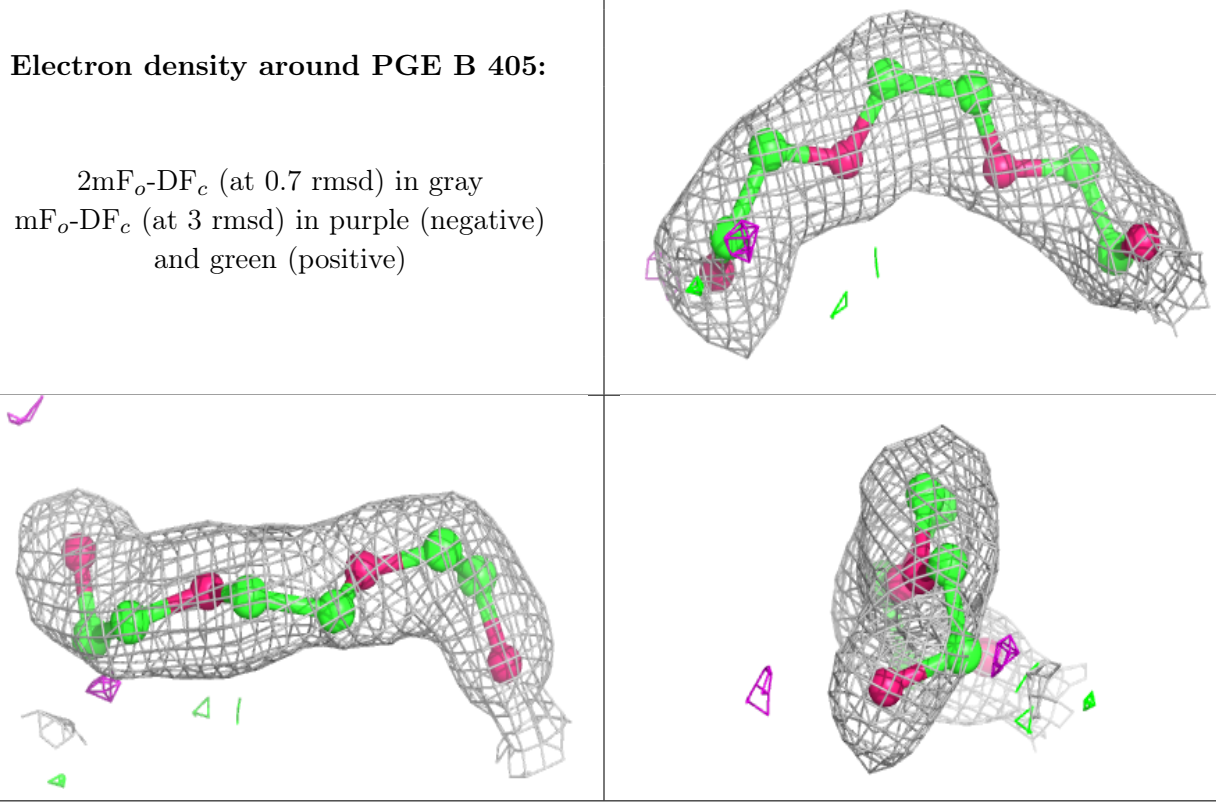
Electron density around PGE A 410:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



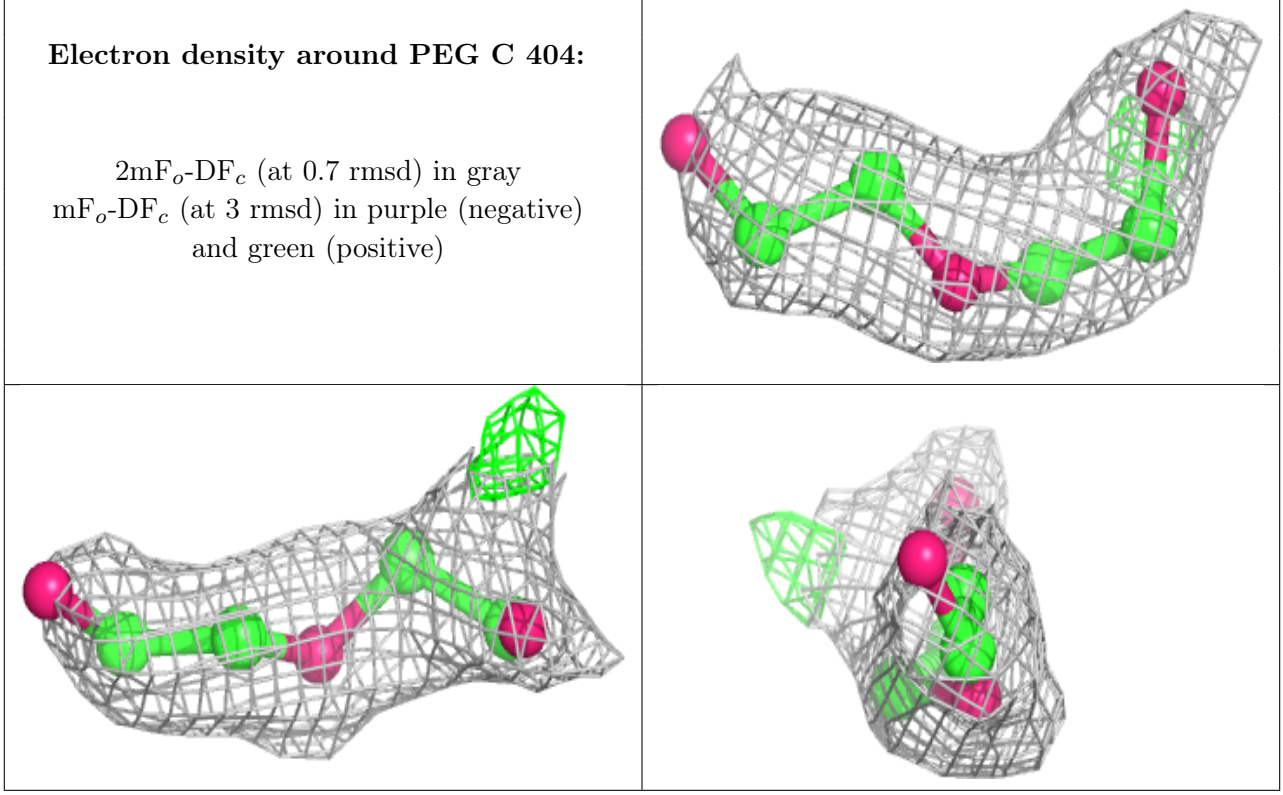
Electron density around PGE B 405:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



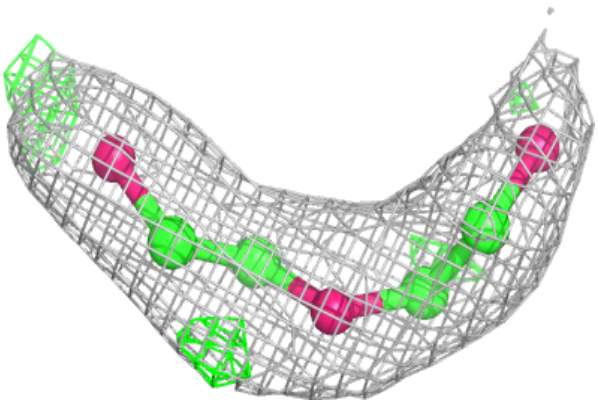
Electron density around PEG C 404:

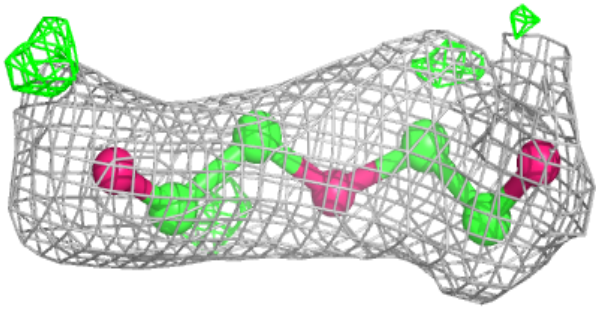
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

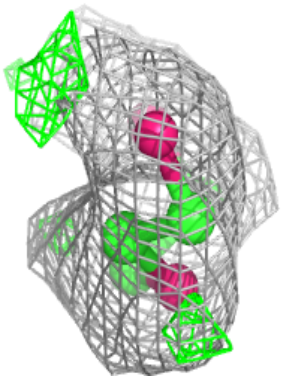


Electron density around PEG A 407:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

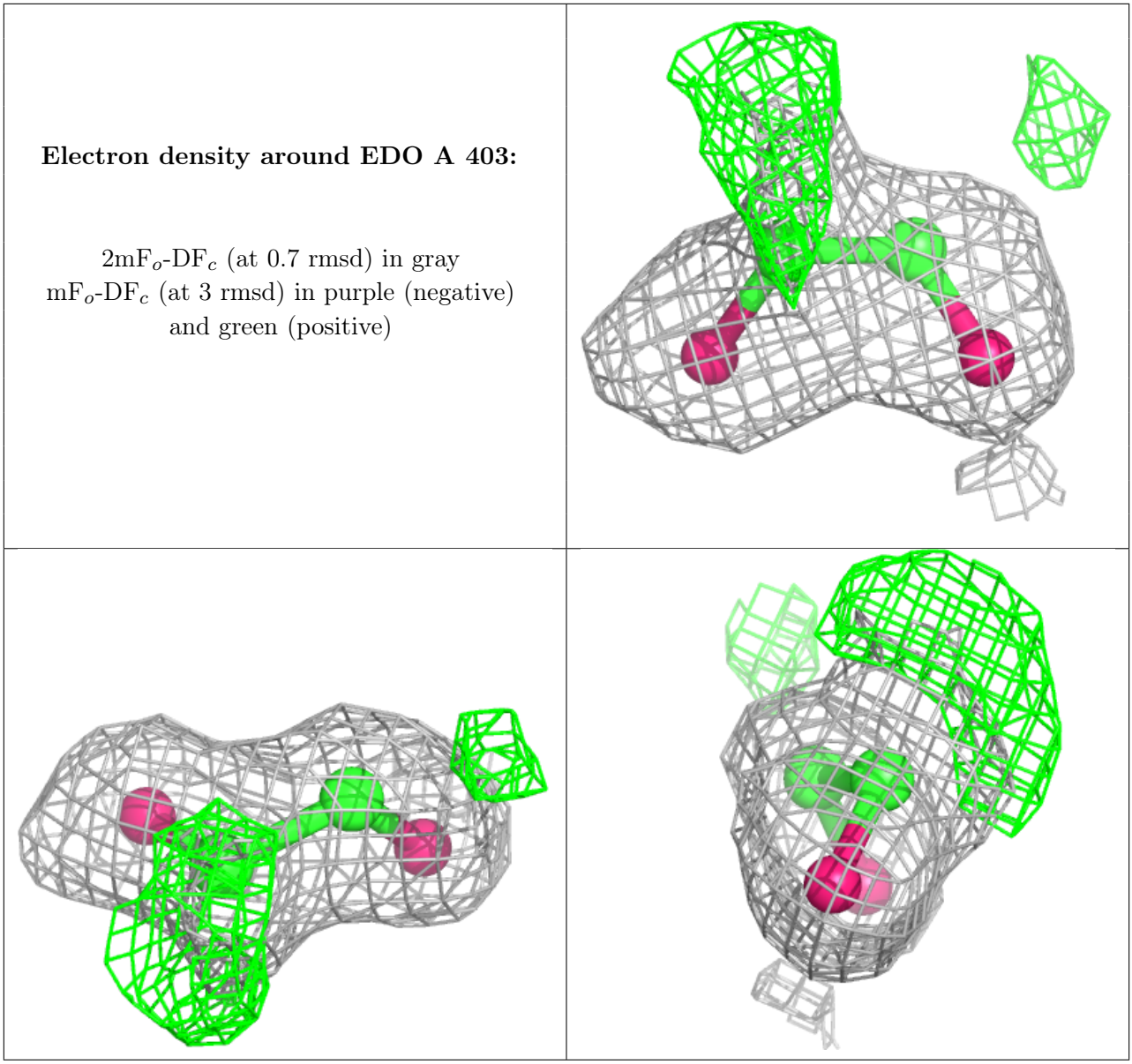






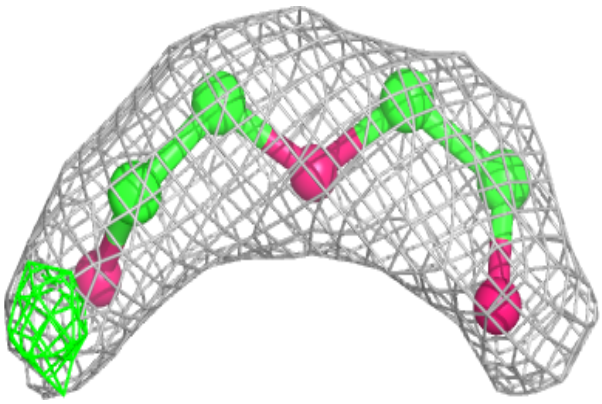
Electron density around EDO A 403:

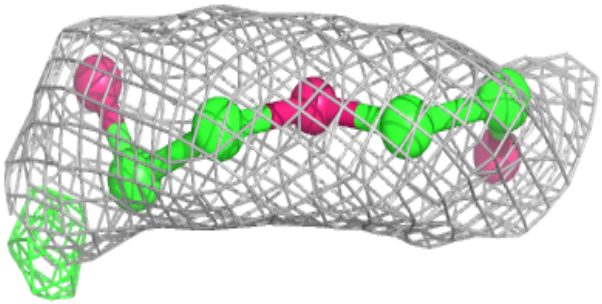
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

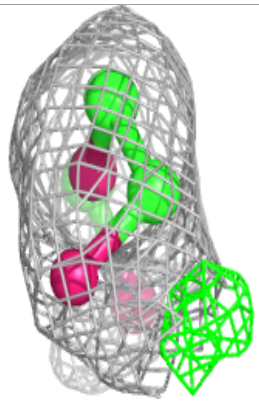


Electron density around PEG A 404:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

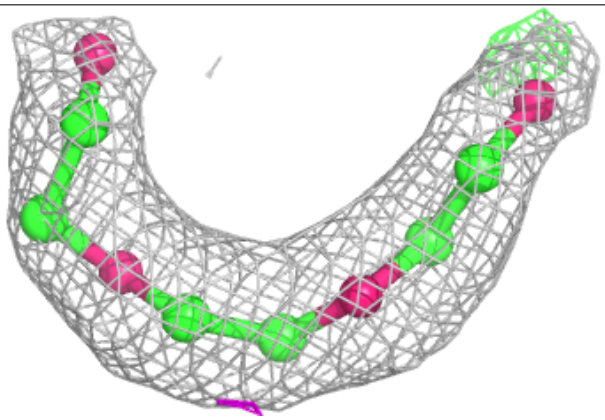


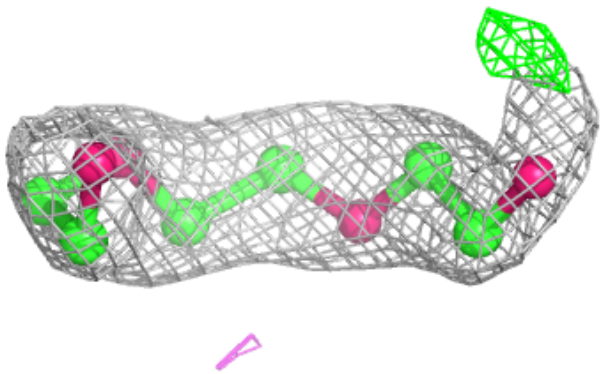


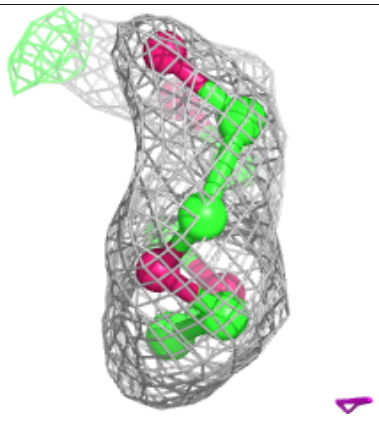


Electron density around PGE A 408:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

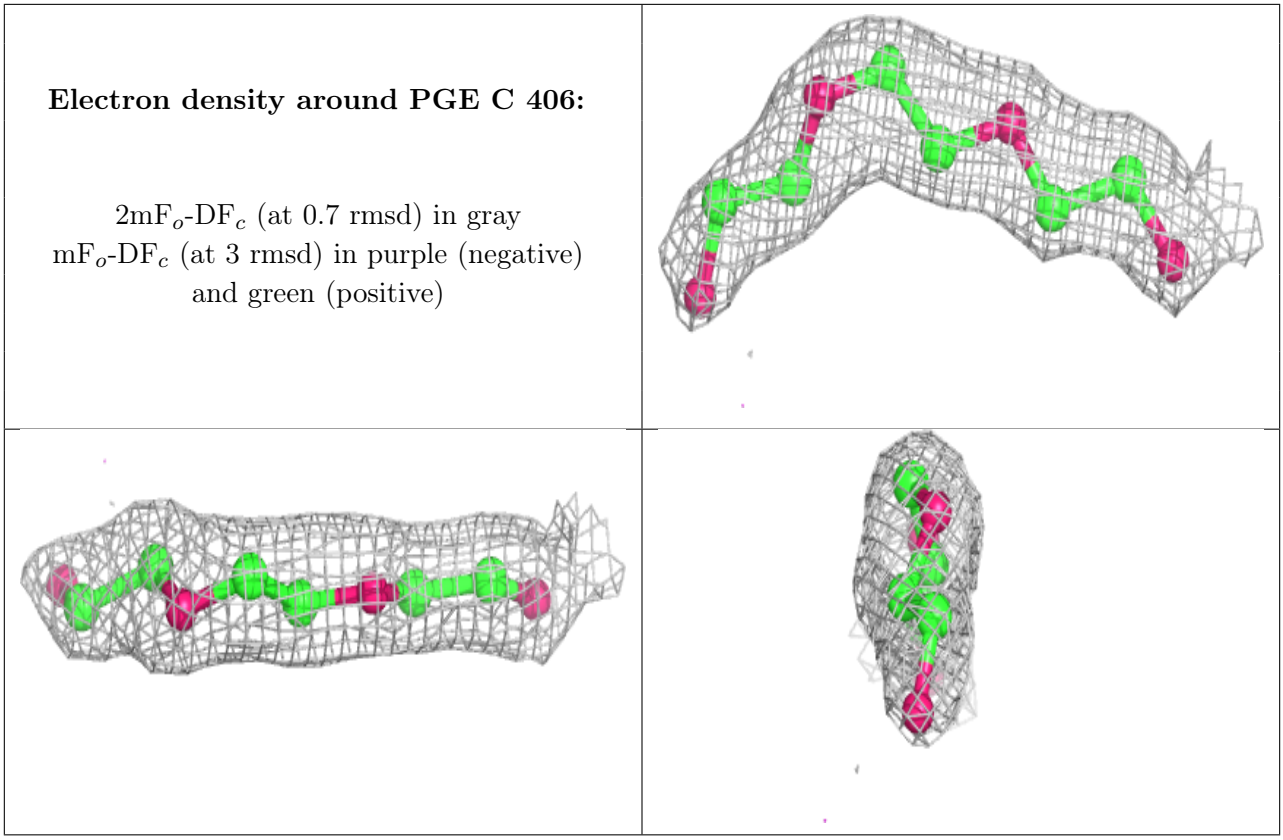






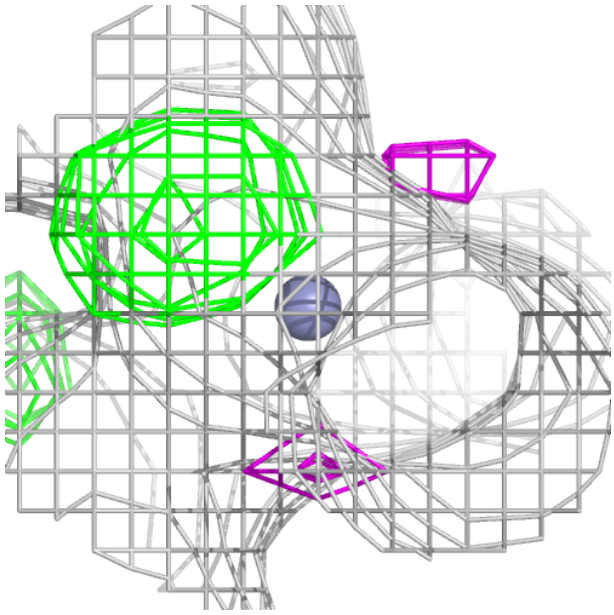
Electron density around PGE C 406:

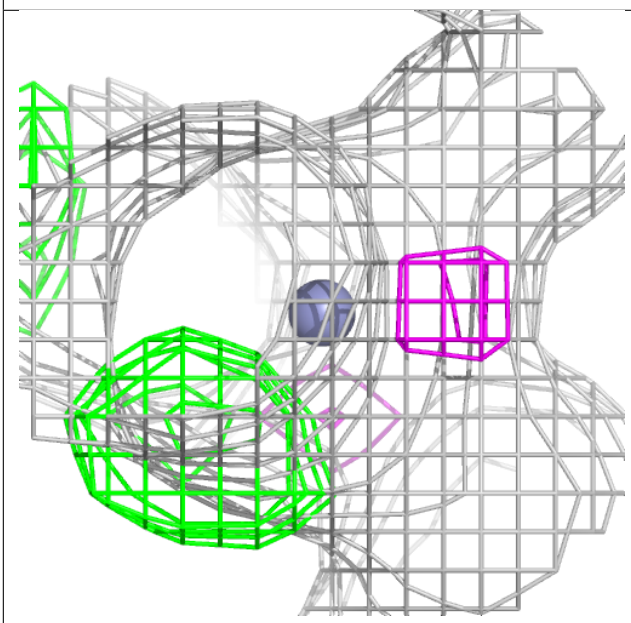
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

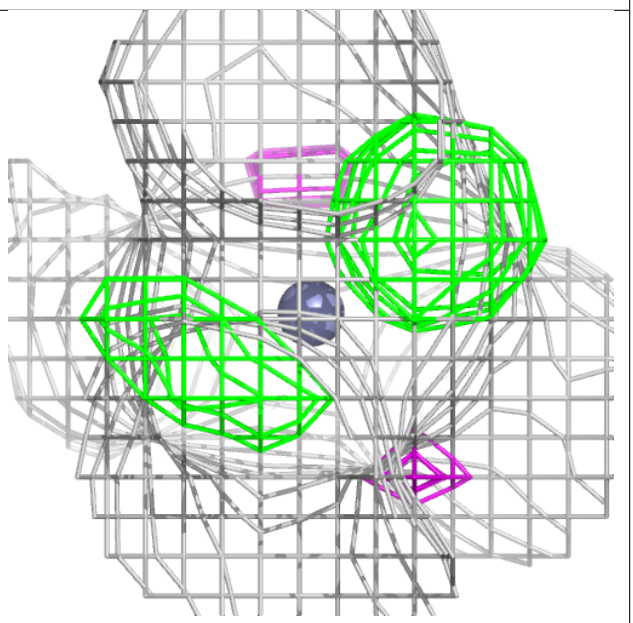


Electron density around ZN D 402:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

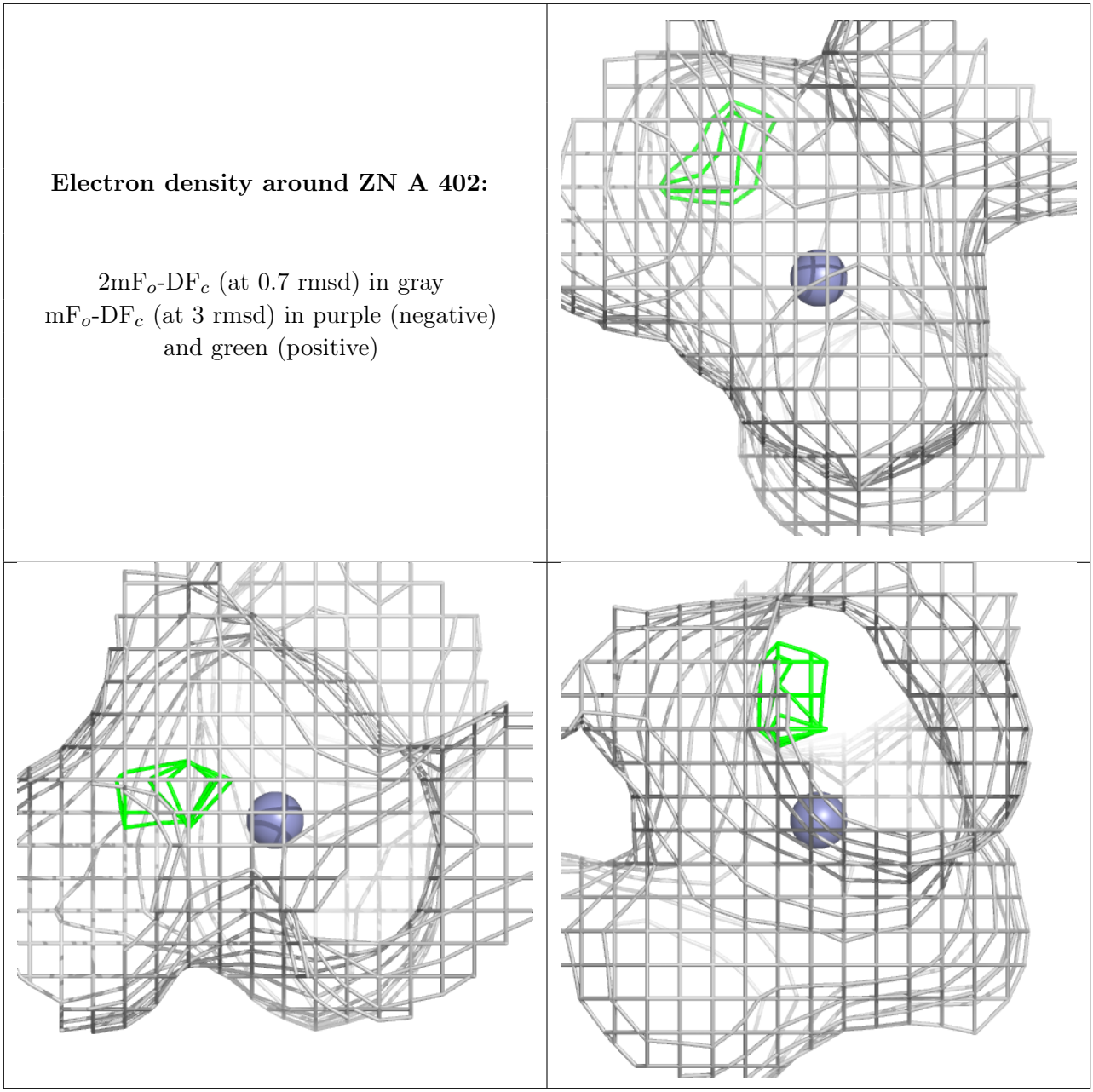






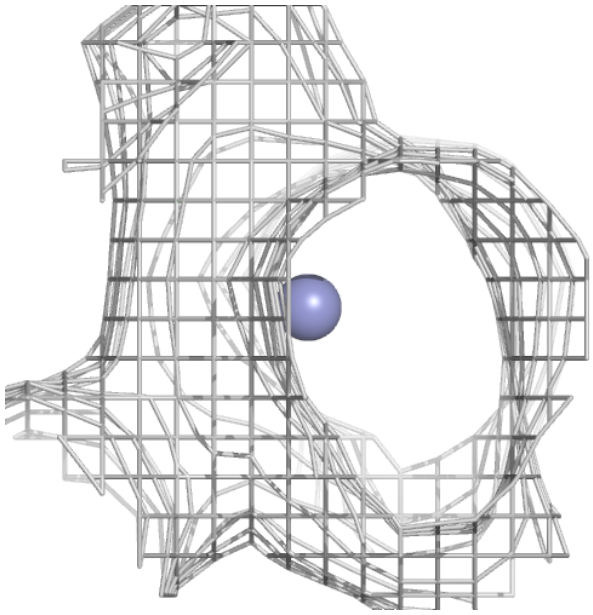
Electron density around ZN A 402:

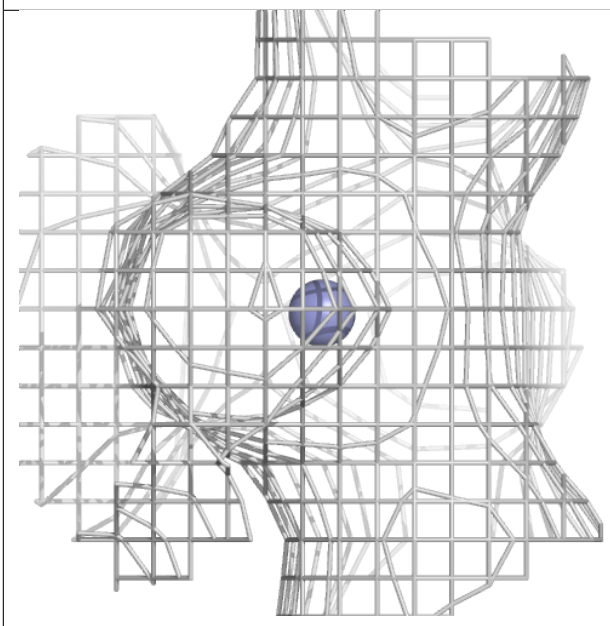
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

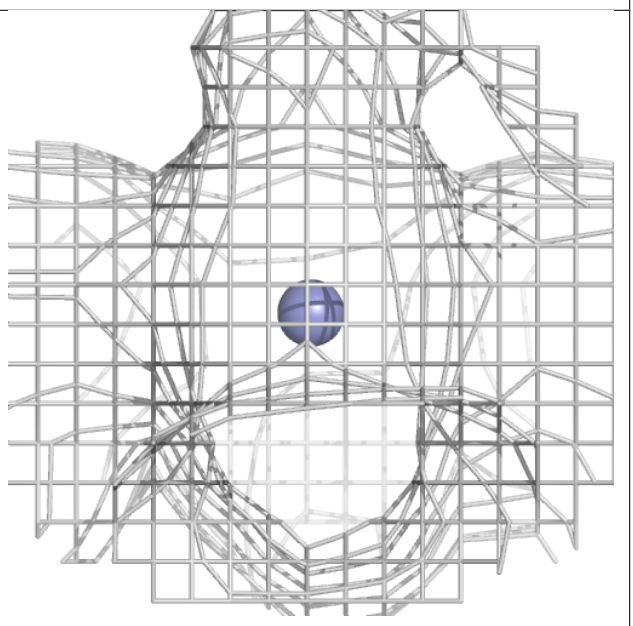


Electron density around ZN B 402:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

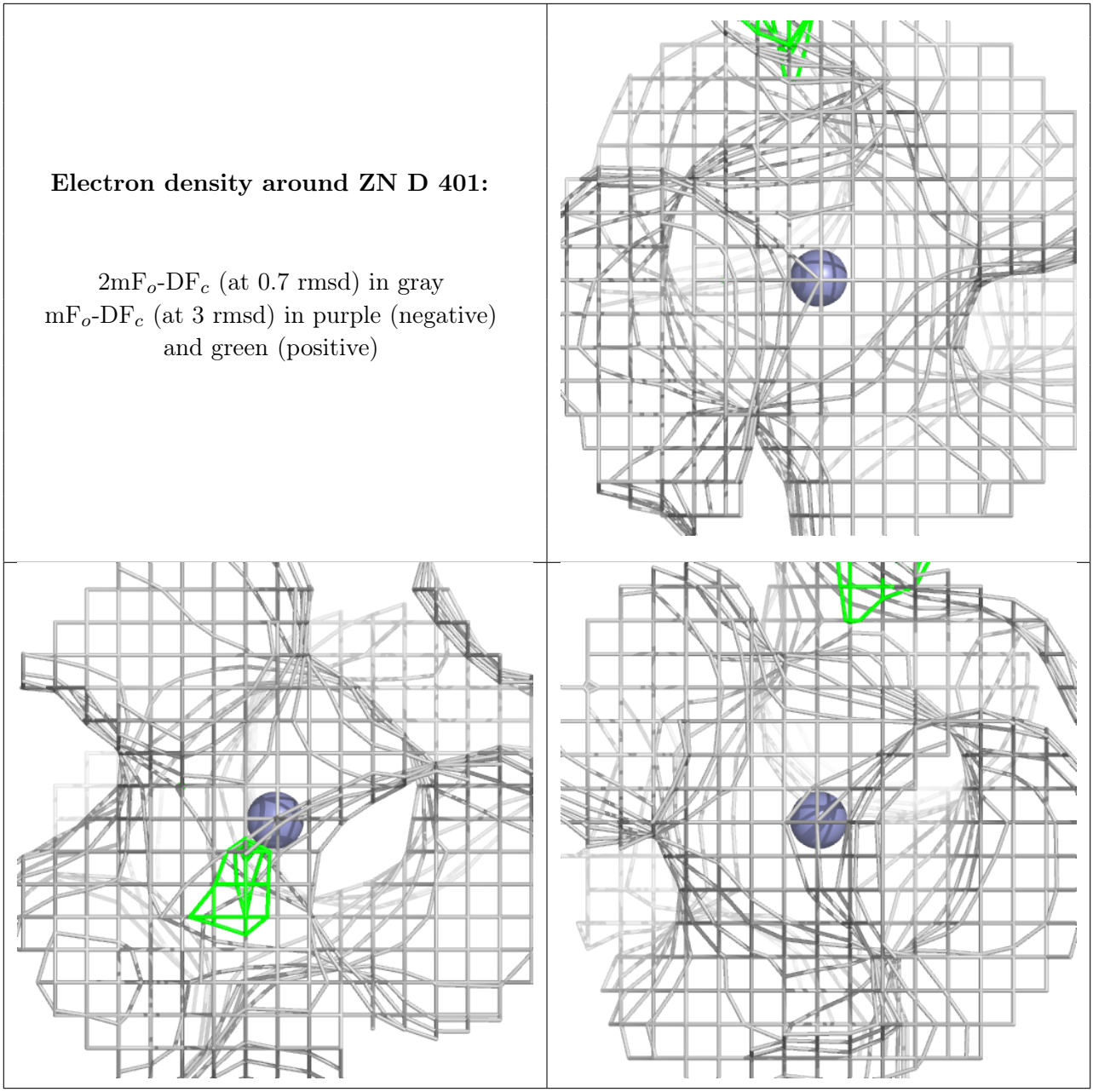






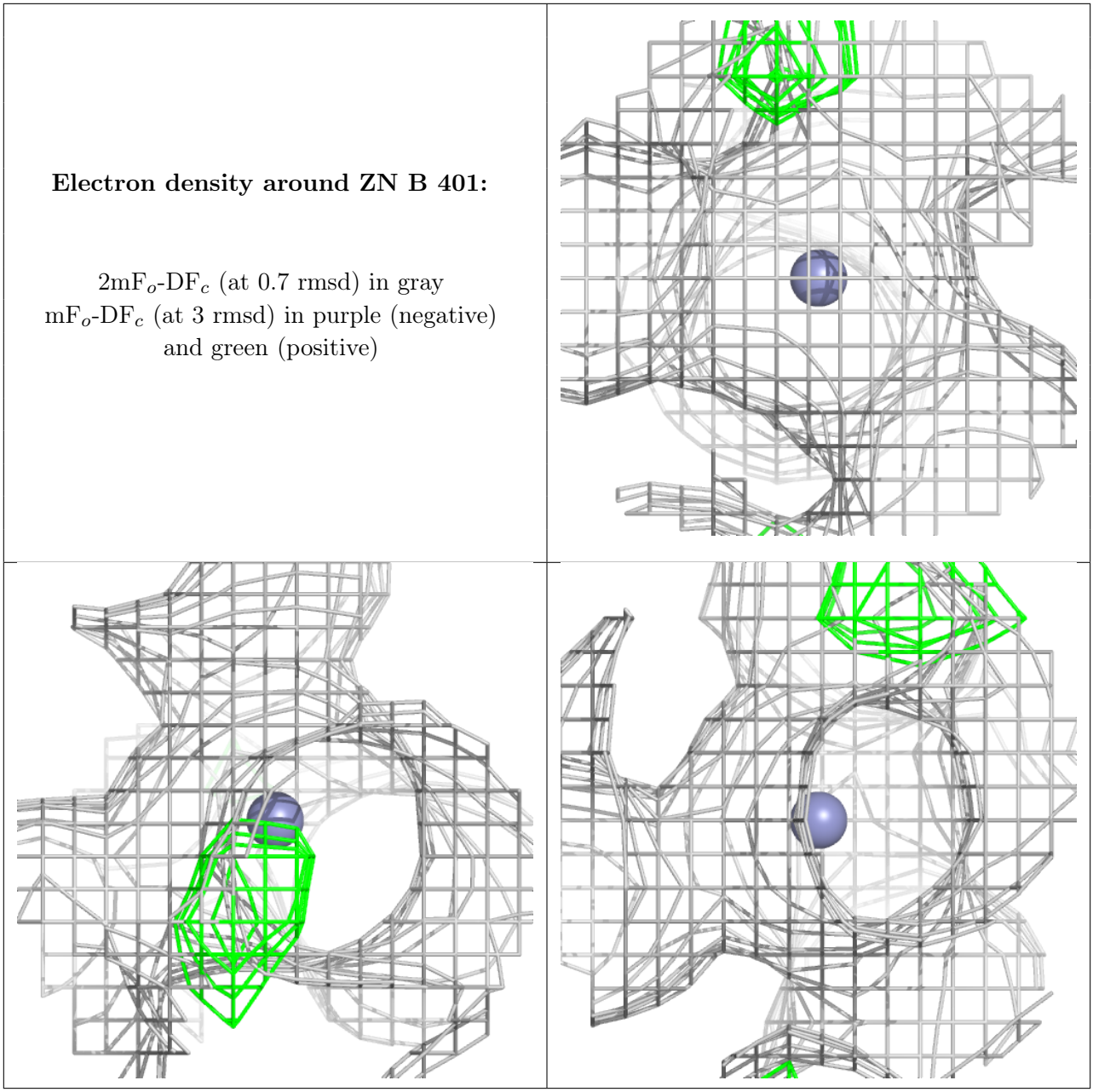
Electron density around ZN D 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



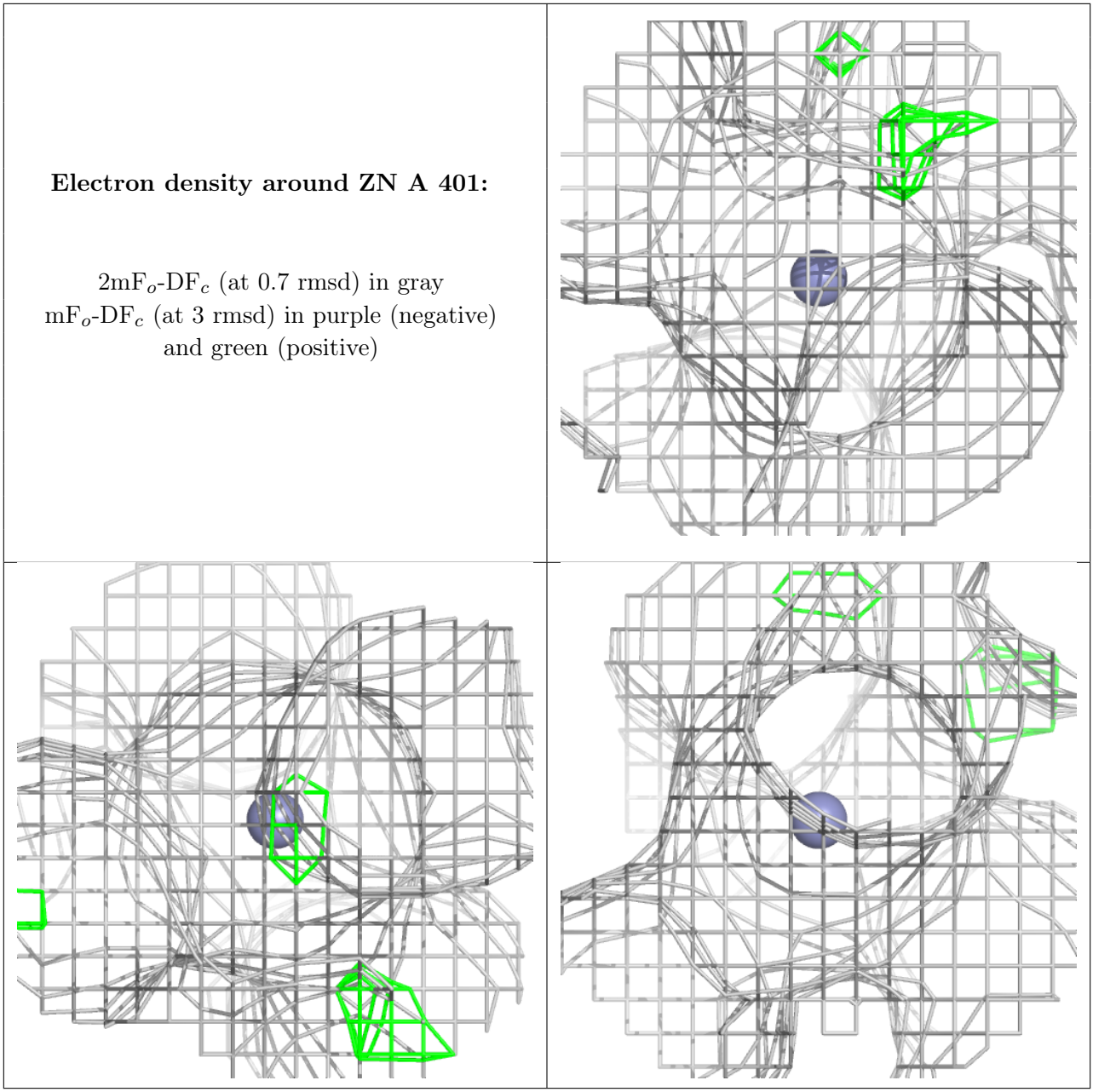
Electron density around ZN B 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



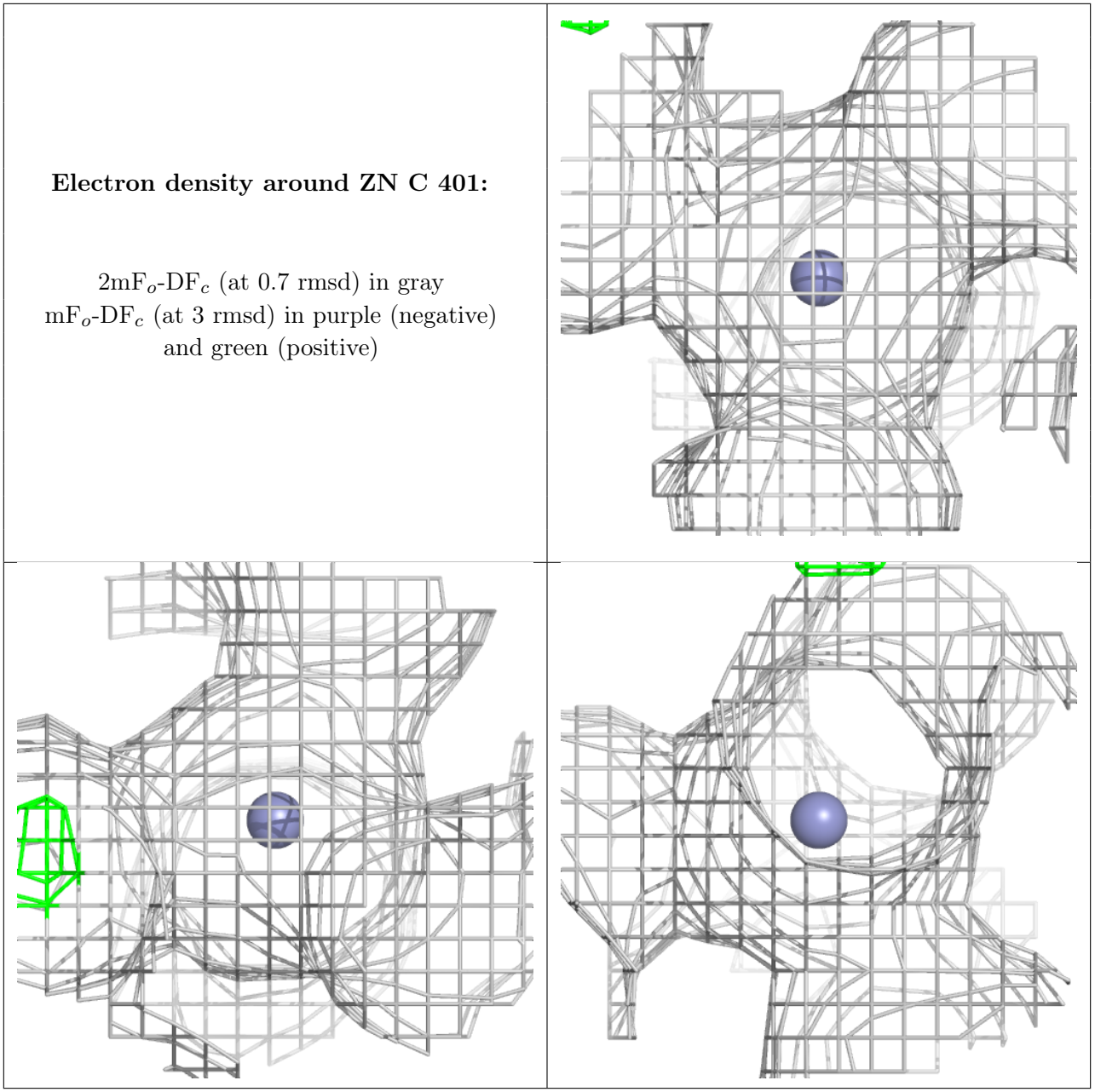
Electron density around ZN A 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



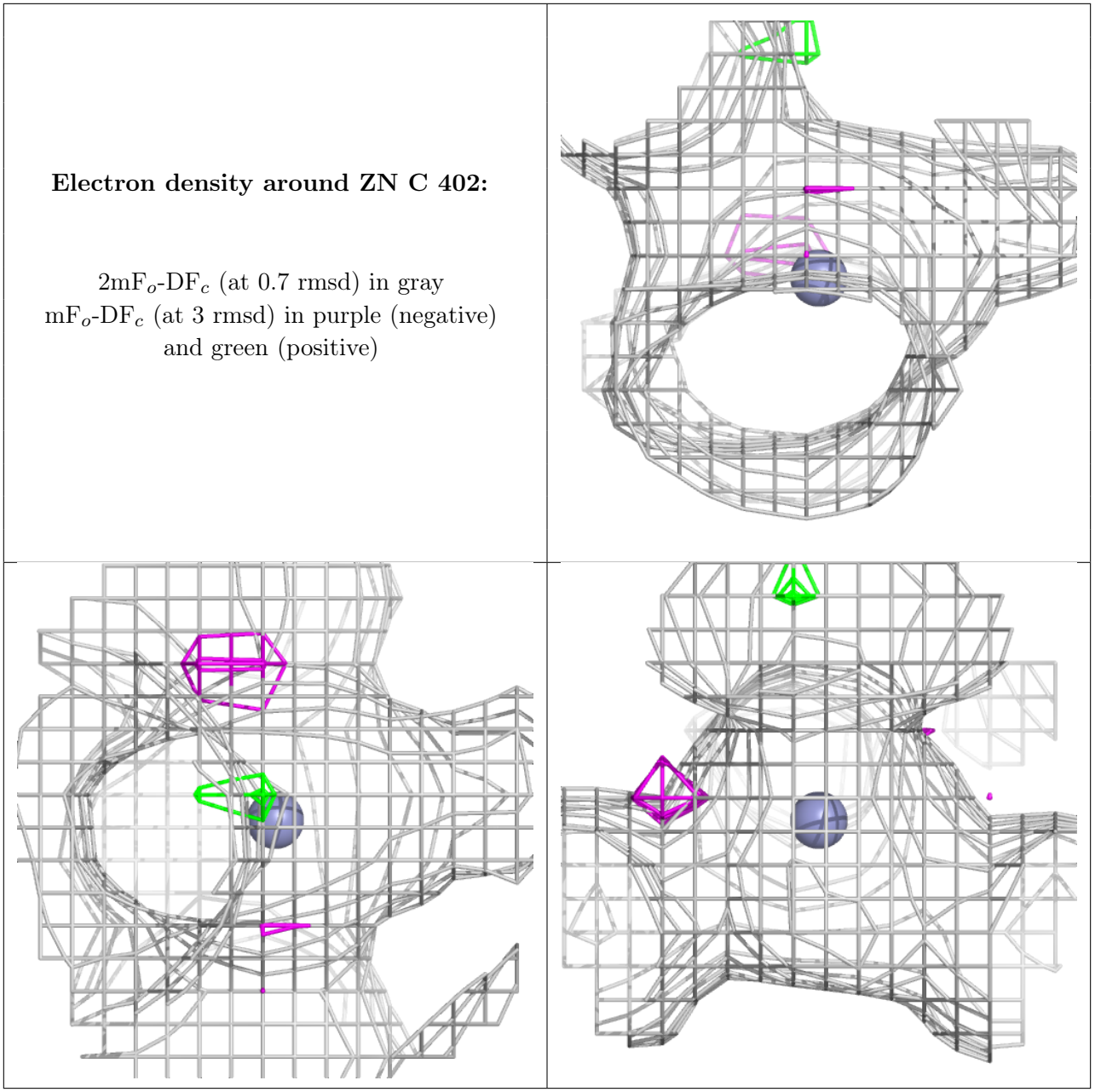
Electron density around ZN C 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



Electron density around ZN C 402:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.