

Supporting Information
for
Theoretical study of complexes between fullerenes and concave
receptors with interest in photovoltaics

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Cartesian coordinates in Å of the molecules studied and their most stable dimers at the B97-D2/def2-TZVP level.

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Table S1. Complexation energies for complexes obtained at the B97-D2/def2-TZVP//B97-D2/def2-SVP level in the initial search of the most stable structure for each dimer.

	cora	suma	porf	sbpc	cora5CN
C ₆₀ -a	-14.76	-18.45	-17.71	-24.35	-22.59
C ₆₀ -b	-17.49	-20.22	-18.69	-24.37	-22.26
C ₆₀ -c	-16.82	-20.09	-18.64	-24.01	-21.95
C ₆₀ -d	-17.09	-18.34	-17.73	-24.50	-22.61
C ₆₀ -e	-16.95	-18.24	-18.65	-23.92	-21.95
C ₆₀ -f	-17.62	-18.62	-18.68	-24.30	-22.22
C ₇₀ -a	-18.72	-20.72	-20.47	-25.83	-24.27
C ₇₀ -b	-17.27	-18.46	-17.66	-24.56	-22.45
C ₇₀ -c	-17.25	-19.56	-21.08	-25.86	-24.26
C ₇₀ -d	-17.24	-18.46	-17.61	-24.57	-22.49
C ₇₀ -e	-17.25	-19.57	-20.36	-25.84	-24.26
C ₇₀ -f	-18.70	-18.55	-21.08	-24.32	-24.07
Sc ₃ N@C ₆₈ -a	-18.88	-19.75	-21.56	-26.78	-26.28
Sc ₃ N@C ₆₈ -b	-17.68	-20.23	-21.24	-26.27	-23.61
Sc ₃ N@C ₆₈ -c	-19.11	-19.77	-21.94	-26.27	-24.50
Sc ₃ N@C ₆₈ -d	-18.87	-19.78	-21.55	-26.79	-26.46
Sc ₃ N@C ₆₈ -e	-18.97	-20.22	-21.24	-25.66	-24.49
Sc ₃ N@C ₆₈ -f	-18.09	-20.07	-17.55	-25.65	-22.24
Sc ₃ N@C ₈₀ -a	-16.69	-19.36	-21.37	-26.12	-26.97
Sc ₃ N@C ₈₀ -b	-20.44	-22.96	-21.81	-28.50	-25.28
Sc ₃ N@C ₈₀ -c	-21.35	-23.20	-21.98	-28.41	-24.40
Sc ₃ N@C ₈₀ -d	-18.63	-19.51	-21.27	-26.37	-27.22
Sc ₃ N@C ₈₀ -e	-20.75	-21.90	-22.32	-28.59	-26.34
Sc ₃ N@C ₈₀ -f	-20.18	-22.39	-22.58	-28.28	-26.37

The values obtained with the B97-D2/def2-TZVP optimised geometry are -14.53, -17.80, -17.09, -17.42, -16.99, -17.90 kcal/mol for cora-C₆₀-a to cora-C₆₀-f, respectively.

Table S2. Number of contacts below 4 Å between non-hydrogen atoms for the dimers studied.

	$N_{\text{contacts} < 4 \text{ \AA}}$	Sum (R)	R_{average}
cora-C₆₀	78	283.08	3.63
cora-C₇₀	78	282.16	3.62
cora-Sc₃N@C₆₈	75	270.76	3.61
cora-Sc₃N@C₈₀	80	287.70	3.60
suma-C₆₀	84	299.91	3.57
suma-C₇₀	80	286.93	3.59
suma-Sc₃N@C₆₈	74	264.16	3.57
suma-Sc₃N@C₈₀	84	301.58	3.59
porf-C₆₀	59	213.60	3.62
porf-C₇₀	71	254.55	3.59
porf-Sc₃N@C₆₈	74	268.74	3.63
porf-Sc₃N@C₈₀	74	267.66	3.62
sbpc-C₆₀	109	396.39	3.64
sbpc-C₇₀	100	359.14	3.59
sbpc-Sc₃N@C₆₈	111	405.17	3.65
sbpc-Sc₃N@C₈₀	115	416.21	3.62
cora5CN-C₆₀	92	334.49	3.64
cora5CN-C₇₀	96	348.37	3.63
cora5CN-Sc₃N@C₆₈	103	375.57	3.65
cora5CN-Sc₃N@C₈₀	103	375.84	3.65

Table S3. Energy components of the complexation energy obtained with the def2-TZVP basis set. B97-D2/def2-TZVP geometry. The 3-body term is the same for B3LYP and TPSS.

	B3LYP-D			TPSS-D			3body	B97-D2		
	B3LYP	D	BSSE	TPSS	D	BSSE		B97	D2	BSSE
cora-C ₆₀	11.99	-28.49	0.96	9.16	-25.13	0.80	1.29	16.21	-34.11	0.97
cora-C ₇₀	12.29	-30.38	0.90	9.54	-26.82	0.78	1.41	17.00	-36.11	0.94
cora-Sc ₃ N@C ₆₈	12.36	-29.03	1.05	9.68	-25.74	0.90	1.78	17.05	-36.55	1.08
cora-Sc ₃ N@C ₈₀	12.69	-31.04	1.12	9.52	-27.45	0.97	1.53	17.08	-38.47	1.16
suma-C ₆₀	14.79	-32.69	0.94	10.99	-28.53	0.81	1.38	20.32	-41.03	0.99
suma-C ₇₀	14.91	-33.37	0.86	11.52	-29.27	0.77	1.48	20.64	-41.62	0.95
suma-Sc ₃ N@C ₆₈	13.43	-30.32	1.16	10.31	-26.70	0.99	0.81	18.74	-40.04	1.22
suma-Sc ₃ N@C ₈₀	14.17	-33.76	1.18	10.97	-29.71	1.05	1.73	20.56	-43.84	1.25
porf-C ₆₀	9.73	-26.86	1.19	6.69	-23.82	1.27	1.38	13.05	-32.02	1.21
porf-C ₇₀	12.61	-32.16	1.40	9.13	-28.32	1.48	1.58	17.00	-38.61	1.45
porf-Sc ₃ N@C ₆₈	11.23	-30.11	1.48	8.31	-26.73	1.52	0.40	15.51	-38.17	1.47
porf-Sc ₃ N@C ₈₀	11.85	-31.37	1.61	8.23	-27.81	1.71	2.00	16.22	-39.32	1.67
sbpc-C ₆₀	16.09	-39.01	1.08	12.93	-34.58	0.99	2.00	21.77	-47.01	1.18
sbpc-C ₇₀	16.38	-40.62	1.12	13.28	-36.04	1.02	2.10	22.52	-48.75	1.23
sbpc-Sc ₃ N@C ₆₈	17.99	-40.23	1.44	14.35	-35.92	1.25	1.21	23.14	-50.22	1.46
sbpc-Sc ₃ N@C ₈₀	17.03	-41.87	1.53	13.38	-37.26	1.41	2.00	23.48	-52.58	1.63
cora5CN-C ₆₀	13.61	-35.67	0.86	10.67	-31.59	0.67	1.75	18.59	-41.68	0.87
cora5CN-C ₇₀	14.05	-37.97	0.88	10.97	-33.63	0.76	1.88	19.59	-44.25	0.97
cora5CN-Sc ₃ N@C ₆₈	13.90	-38.12	1.14	10.66	-33.83	0.94	1.78	19.71	-46.39	1.15
cora5CN-Sc ₃ N@C ₈₀	12.34	-38.96	1.08	8.96	-34.54	0.95	2.20	18.14	-45.86	1.16

Table S4. Electrostatic effect due to the solvent (kcal/mol) upon complexation energies as obtained with the COSMO model at the B3LYP/def2-TZVP level of calculation.

cora-C₆₀	0.77	porf-C₆₀	0.72
cora-C₇₀	0.77	porf-C₇₀	0.78
cora-Sc₃N@C₆₈	0.57	porf-Sc₃N@C₆₈	0.62
cora-Sc₃N@C₈₀	0.60	porf-Sc₃N@C₈₀	0.67
suma-C₆₀	0.83	sbpc-C₆₀	1.13
suma-C₇₀	0.84	sbpc-C₇₀	1.09
suma-Sc₃N@C₆₈	0.62	sbpc-Sc₃N@C₆₈	0.88
suma-Sc₃N@C₈₀	0.72	sbpc-Sc₃N@C₈₀	1.03
cora5CN-C₆₀	1.56	cora5CN-Sc₃N@C₆₈	1.77
cora5CN-C₇₀	1.48	cora5CN-Sc₃N@C₈₀	1.86

Table S5. SAPT(DFT) values (kcal/mol) obtained for complexes with C₆₀.

	Electrostatic	Induction	Repulsion	Dispersion
cora	-16.44	-0.47	38.55	-27.9
suma	-21.65	-0.75	50.13	-33.5
porf	-14.21	-1.72	33.95	-25.4
sbpc	-19.81	-0.73	48.17	-37.5
cora5CN	-16.83	-1.85	40.84	-32.4

SAPT(DFT) calculations have been performed with the PBE functional and the def2-SVP basis set. These calculations need a shift parameter obtained as the sum of the ionization potential and the energy of the highest occupied molecular orbital. Orbital energies and ionization potentials have been obtained by using the PBE functional with the def2-SVP basis set.

Table S6. Summary of the 12 most intense transitions in **cora** complexes. N_{tr} is the number of the transition, the transition from the ground state to the N^{th} excited state. The values are ordered by decreasing value of the oscillator strength. q and R are the amount of charge transferred and the transfer distance as commented in the text.

C_{60}					$Sc_3N@C_{68}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
349.4	0.1	19	0.69	4.97	430.6	13.7	9	0.44	1.16
348.9	0.1	20	0.65	5.05	426.9	9.4	10	0.43	1.30
431.4	0.1	11	0.37	0.78	472.0	6.1	6	0.56	0.25
423.0	0.1	15	0.42	0.35	472.3	5.4	5	0.58	0.17
345.7	0.1	22	0.50	4.03	398.2	1.4	16	0.37	0.30
342.7	0.1	24	0.64	4.77	531.0	1.2	2	0.41	0.25
354.9	0.1	17	0.30	2.38	373.0	1.1	22	0.35	0.16
430.5	0.1	12	0.38	0.67	530.0	0.8	3	0.40	0.29
348.6	0.1	21	0.74	5.20	414.5	0.7	14	0.42	0.27
426.5	0.0	14	0.37	0.47	413.5	0.5	15	0.46	0.13
344.9	0.0	23	0.72	5.28	373.9	0.3	21	0.52	0.19
427.1	0.0	13	0.38	0.53	384.5	0.3	18	0.41	0.25
C_{70}					$Sc_3N@C_{80}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
458.1	5.8	8	0.34	1.13	437.1	1.5	17	0.57	0.68
471.4	3.6	6	0.49	1.79	433.7	0.9	18	0.55	0.71
472.1	3.0	5	0.39	0.98	512.7	0.8	1	0.63	0.39
461.5	2.6	7	0.45	2.76	433.1	0.8	19	0.55	0.63
477.4	0.5	3	0.44	2.20	422.6	0.8	22	0.57	0.40
454.0	0.4	9	0.60	3.31	452.5	0.8	13	0.65	0.98
479.4	0.4	2	0.44	1.53	477.8	0.6	6	0.58	0.60
442.2	0.1	10	0.26	0.66	459.0	0.6	12	0.66	0.65
475.5	0.1	4	0.41	1.72	467.0	0.5	10	0.63	0.50
417.5	0.0	14	0.50	0.91	429.2	0.5	20	0.61	0.67
418.5	0.0	13	0.44	1.02	483.0	0.4	5	0.66	1.06
380.4	0.0	22	0.30	0.80	501.9	0.4	2	0.60	0.32

Table S7. Summary of the 12 most intense transitions in **suma** complexes. N_{tr} is the number of the transition, the transition from the ground state to the N^{th} excited state. The values are ordered by decreasing value of the oscillator strength. q and R are the amount of charge transferred and the transfer distance as commented in the text.

C_{60}					$Sc_3N@C_{68}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
414.8	2.4	17	0.84	5.11	429.7	13.2	9	0.42	1.00
421.1	0.2	15	0.42	0.56	428.1	10.5	10	0.43	1.34
413.9	0.2	19	0.74	4.78	471.5	5.0	6	0.58	0.27
485.2	0.2	7	0.41	1.21	476.0	5.0	5	0.57	0.15
413.9	0.1	18	0.72	4.83	398.3	1.4	16	0.37	0.63
350.1	0.0	24	0.25	1.05	532.0	1.0	2	0.40	0.20
434.2	0.0	12	0.41	2.85	528.3	1.0	3	0.41	0.22
434.2	0.0	11	0.43	2.69	373.1	1.0	22	0.47	2.68
432.4	0.0	13	0.43	3.26	413.3	0.9	15	0.46	0.35
431.9	0.0	14	0.43	3.20	420.5	0.6	11	0.51	0.26
487.7	0.0	5	0.37	0.56	375.3	0.5	21	0.51	4.00
487.5	0.0	6	0.36	0.61	415.1	0.4	14	0.43	0.41
C_{70}					$Sc_3N@C_{80}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
466.4	8.8	7	0.51	3.39	433.8	1.4	17	0.56	0.63
472.0	3.5	5	0.40	0.96	450.6	1.2	13	0.66	0.85
471.4	2.9	6	0.44	0.76	431.8	1.0	18	0.54	0.14
462.2	1.3	8	0.52	4.42	421.5	0.9	22	0.57	0.47
449.4	1.3	11	0.63	0.58	429.9	0.9	19	0.56	0.63
450.3	0.5	10	0.48	1.48	509.5	0.9	1	0.63	0.31
475.1	0.3	4	0.55	0.74	474.7	0.6	6	0.62	0.72
454.1	0.3	9	0.59	1.10	422.6	0.5	21	0.59	0.76
423.8	0.3	14	0.60	4.13	498.3	0.5	2	0.59	0.36
478.6	0.2	3	0.35	2.76	477.6	0.5	5	0.65	1.03
438.1	0.1	12	0.37	2.60	496.7	0.4	3	0.58	0.24
419.4	0.1	15	0.43	2.43	469.7	0.4	8	0.63	0.70

Table S8. Summary of the 12 most intense transitions in **porf** complexes. N_{tr} is the number of the transition, the transition from the ground state to the N^{th} excited state. The values are ordered by decreasing value of the oscillator strength. q and R are the amount of charge transferred and the transfer distance as commented in the text.

C_{60}					$Sc_3N@C_{68}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
470.6	4.2	15	0.59	4.28	432.9	15.3	12	0.48	2.79
507.6	3.4	2	0.67	3.98	476.4	10.0	7	0.57	0.20
456.8	0.8	18	0.66	5.24	433.4	4.6	11	0.43	2.38
499.2	0.5	4	0.14	0.12	472.2	4.1	8	0.56	0.27
495.5	0.4	6	0.57	3.95	416.7	2.3	19	0.47	3.89
489.4	0.4	10	0.50	2.90	419.4	2.1	17	0.56	3.83
427.1	0.3	20	0.41	0.49	424.2	1.6	14	0.67	5.20
425.8	0.3	21	0.40	0.40	398.6	1.3	22	0.36	0.40
497.9	0.2	5	0.14	0.09	535.9	1.3	2	0.40	0.52
422.7	0.1	23	0.38	1.49	435.2	0.9	10	0.52	0.42
493.5	0.1	8	0.47	3.73	528.1	0.5	3	0.42	0.10
425.0	0.1	22	0.38	0.68	413.7	0.5	21	0.52	0.38
C_{70}					$Sc_3N@C_{80}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
518.1	4.3	3	0.91	4.55	432.6	1.6	21	0.58	0.25
470.1	3.2	12	0.54	1.80	435.7	1.3	19	0.57	0.67
435.1	2.6	18	0.81	7.48	515.1	0.8	1	0.63	0.32
461.8	2.6	13	0.41	0.97	423.9	0.8	24	0.55	0.38
471.0	2.3	11	0.36	1.85	434.5	0.6	20	0.55	0.41
457.7	1.9	14	0.35	3.69	448.4	0.6	16	0.63	0.21
480.8	1.4	7	0.44	2.40	499.2	0.5	5	0.57	0.22
474.7	1.1	10	0.57	3.61	459.0	0.5	14	0.64	0.45
411.3	0.7	24	0.44	0.75	467.4	0.4	12	0.62	0.46
453.1	0.6	15	0.61	3.12	478.2	0.4	8	0.57	0.63
478.8	0.5	8	0.43	2.88	504.8	0.4	2	0.19	0.17
500.5	0.5	4	0.15	0.84	425.9	0.4	23	0.57	0.60

Table S9. Summary of the 12 most intense transitions in **sbpc** complexes. N_{tr} is the number of the transition, the transition from the ground state to the N^{th} excited state. The values are ordered by decreasing value of the oscillator strength. q and R are the amount of charge transferred and the transfer distance as commented in the text.

C_{60}					$Sc_3N@C_{68}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
466.3	29.6	15	0.39	1.03	467.7	20.5	8	0.45	0.70
466.9	28.4	14	0.37	1.13	467.7	19.0	7	0.47	0.70
520.6	0.5	2	0.95	5.03	428.5	16.3	14	0.41	1.08
423.9	0.4	20	0.40	0.34	428.5	16.1	15	0.41	1.05
426.5	0.3	18	0.35	0.53	467.6	4.5	9	0.77	4.95
425.9	0.2	19	0.34	0.36	421.6	1.5	17	0.54	0.49
482.4	0.1	10	0.38	0.45	421.8	1.5	16	0.52	0.45
500.9	0.1	3	0.86	5.45	399.2	1.5	21	0.38	0.36
481.7	0.0	11	0.43	1.59	478.8	1.4	6	0.51	0.34
429.5	0.0	16	0.34	0.44	451.0	1.2	10	0.86	5.41
493.3	0.0	5	0.28	0.32	450.6	1.2	11	0.86	5.39
352.7	0.0	23	0.23	0.17	479.5	1.0	5	0.52	0.32
C_{70}					$Sc_3N@C_{80}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
472.7	23.7	7	0.41	0.88	467.9	15.4	11	0.49	0.77
455.2	14.4	13	0.45	1.31	466.3	15.4	12	0.49	0.71
464.5	7.4	10	0.45	3.27	470.2	8.7	9	0.53	0.34
456.1	7.4	12	0.31	1.98	469.1	8.3	10	0.51	0.46
459.5	5.0	11	0.37	1.68	450.2	2.6	16	0.64	0.42
468.0	2.5	9	0.50	1.18	423.5	2.0	24	0.56	0.42
511.8	2.4	3	0.86	5.55	435.2	1.8	20	0.56	0.52
421.2	2.0	18	0.73	4.62	435.9	1.6	19	0.55	0.48
471.8	1.7	8	0.52	2.20	433.8	1.3	21	0.58	0.25
450.9	1.3	14	0.56	5.96	463.3	1.2	13	0.61	0.26
476.1	0.9	6	0.51	1.46	474.0	1.1	8	0.62	0.33
571.3	0.7	1	0.94	4.27	499.7	0.5	3	0.58	0.29

Table S10. Summary of the 12 most intense transitions in **cora5CN** complexes. N_{tr} is the number of the transition, the transition from the ground state to the N^{th} excited state. The values are ordered by decreasing value of the oscillator strength. q and R are the amount of charge transferred and the transfer distance as commented in the text.

C_{60}					$Sc_3N@C_{68}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
374.9	1.7	23	0.97	5.22	428.8	8.9	15	0.42	1.14
378.5	0.2	21	0.95	5.22	427.0	8.4	16	0.44	1.46
378.3	0.2	22	0.95	5.21	474.0	5.6	8	0.56	1.05
379.0	0.1	20	0.96	5.17	464.0	2.2	11	0.76	5.20
429.4	0.1	12	0.37	0.60	467.8	2.2	10	0.67	3.75
429.6	0.1	11	0.37	0.61	395.6	1.5	22	0.40	0.73
428.0	0.0	13	0.30	0.80	522.7	1.1	5	0.45	1.24
379.0	0.0	19	0.96	5.18	470.2	1.0	9	0.73	4.72
382.2	0.0	16	0.94	5.14	530.7	0.7	4	0.40	0.43
381.9	0.0	17	0.93	5.16	569.2	0.7	3	0.96	5.52
381.8	0.0	18	0.91	5.15	410.0	0.4	21	0.45	0.85
356.4	0.0	24	1.00	6.00	411.1	0.4	20	0.50	0.72
C_{70}					$Sc_3N@C_{80}$				
ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$	ν /nm	$f_{osc}/10^{-2}$	N_{tr}	q	$R/\text{\AA}$
463.3	5.0	7	0.31	1.26	452.1	3.6	16	0.73	2.23
459.3	3.8	8	0.43	1.45	508.6	1.2	1	0.63	0.71
478.0	2.1	3	0.55	2.39	454.4	1.1	15	0.79	3.16
470.0	2.1	5	0.50	2.56	432.6	1.0	23	0.57	0.66
467.5	2.0	6	0.47	2.51	431.7	0.9	24	0.55	0.89
478.7	1.1	2	0.61	2.73	464.9	0.7	12	0.79	4.35
429.7	0.1	11	0.62	4.13	474.6	0.5	7	0.63	1.04
475.6	0.1	4	0.44	2.74	477.8	0.4	6	0.65	1.38
400.1	0.1	22	0.41	0.27	483.2	0.4	4	0.70	3.82
454.8	0.0	9	0.59	3.15	494.9	0.3	3	0.58	0.25
389.2	0.0	24	0.51	4.91	498.0	0.2	2	0.56	0.62
397.1	0.0	23	0.31	1.61	440.6	0.2	22	0.64	2.00

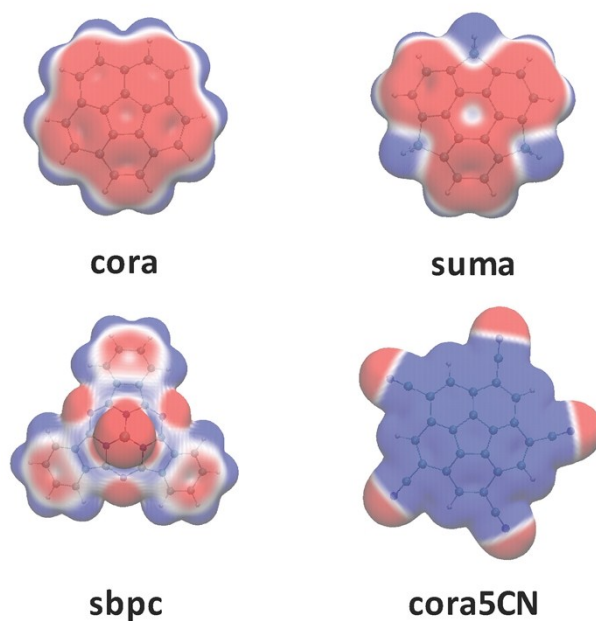


Figure S1. Molecular Electrostatic Potentials (MEP) of the bowls employed in this work at the B3LYP-D/def2-TZVP level by the convex face. MEP mapped onto a isodensity surface of 0.002 a.u. Colour scale runs from -0.010 a.u. (red) to 0.010 a.u (blue). White is 0.0.

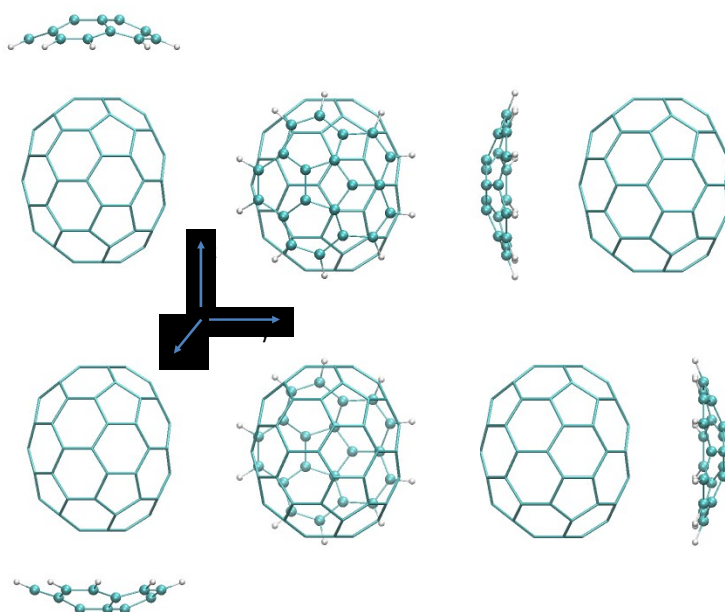


Figure S2. Representation of the starting structures employed for searching the minimum energy structures of the dimers. The corannulene-C70 case is shown.

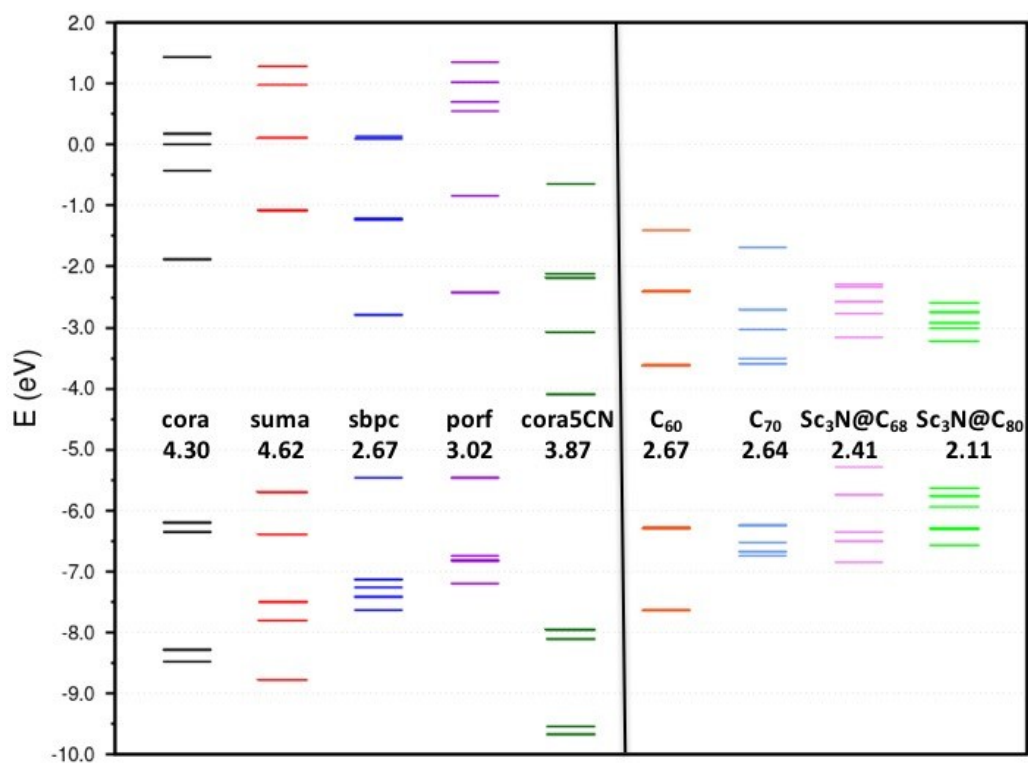


Figure S3. Frontier orbital energies of the molecules studied at the B3LYP/def2-TZVP//B97-D2/def2-TZVP level. Numbers correspond to the HOMO-LUMO gap.

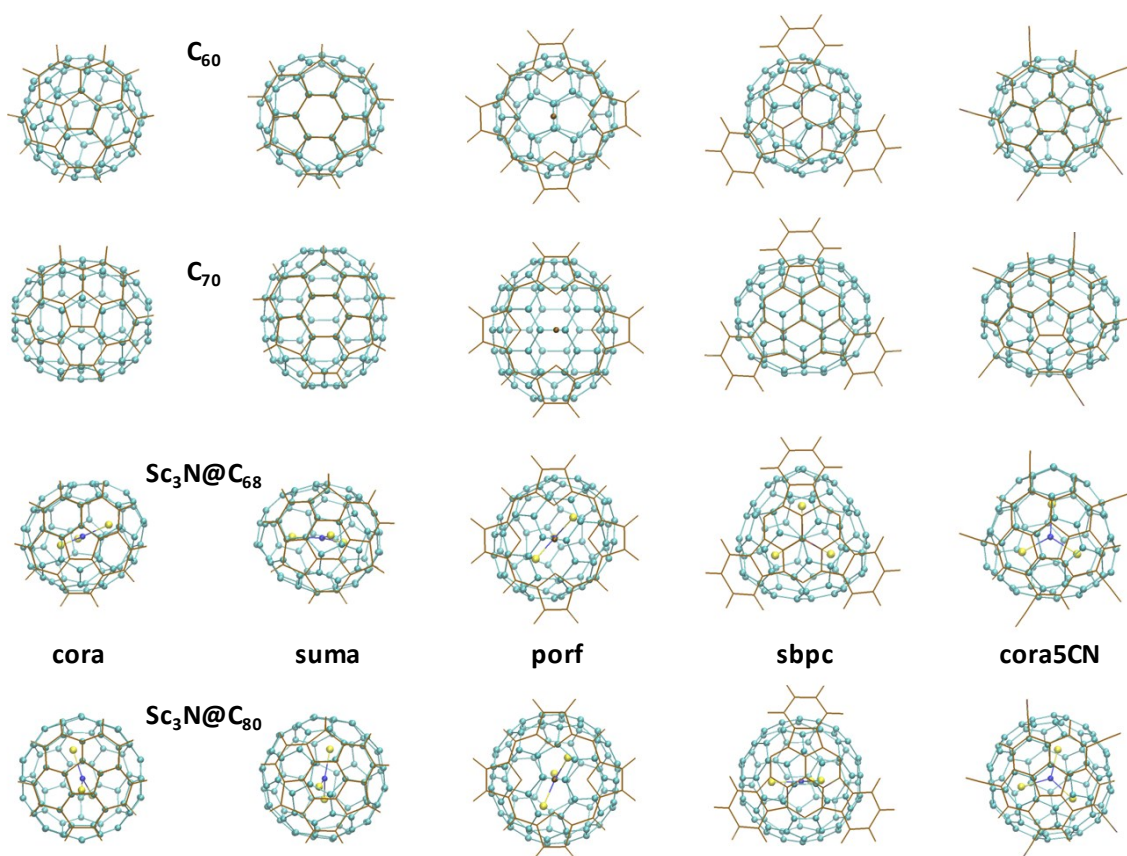


Figure S4. Another view of the most stable structures found for the complexes studied at the B3LYP-D/def2-TZVP//B97-D2/def2-TZVP shown in Figure 5. The bowl is shown in ochre, with the complex observed from the bottom of the bowl.

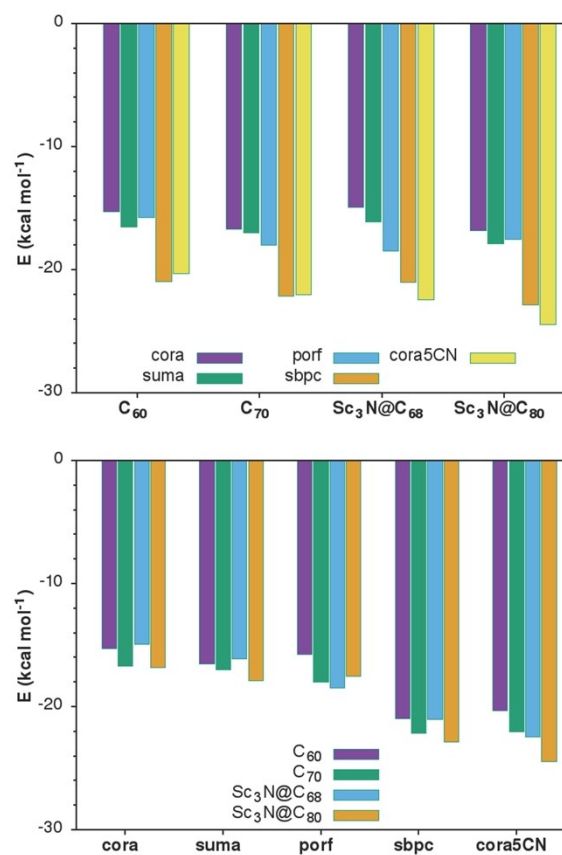


Figure S5. Complexation energies of the complexes studied. B3LYP-D/def2-TZVP+3-body results.

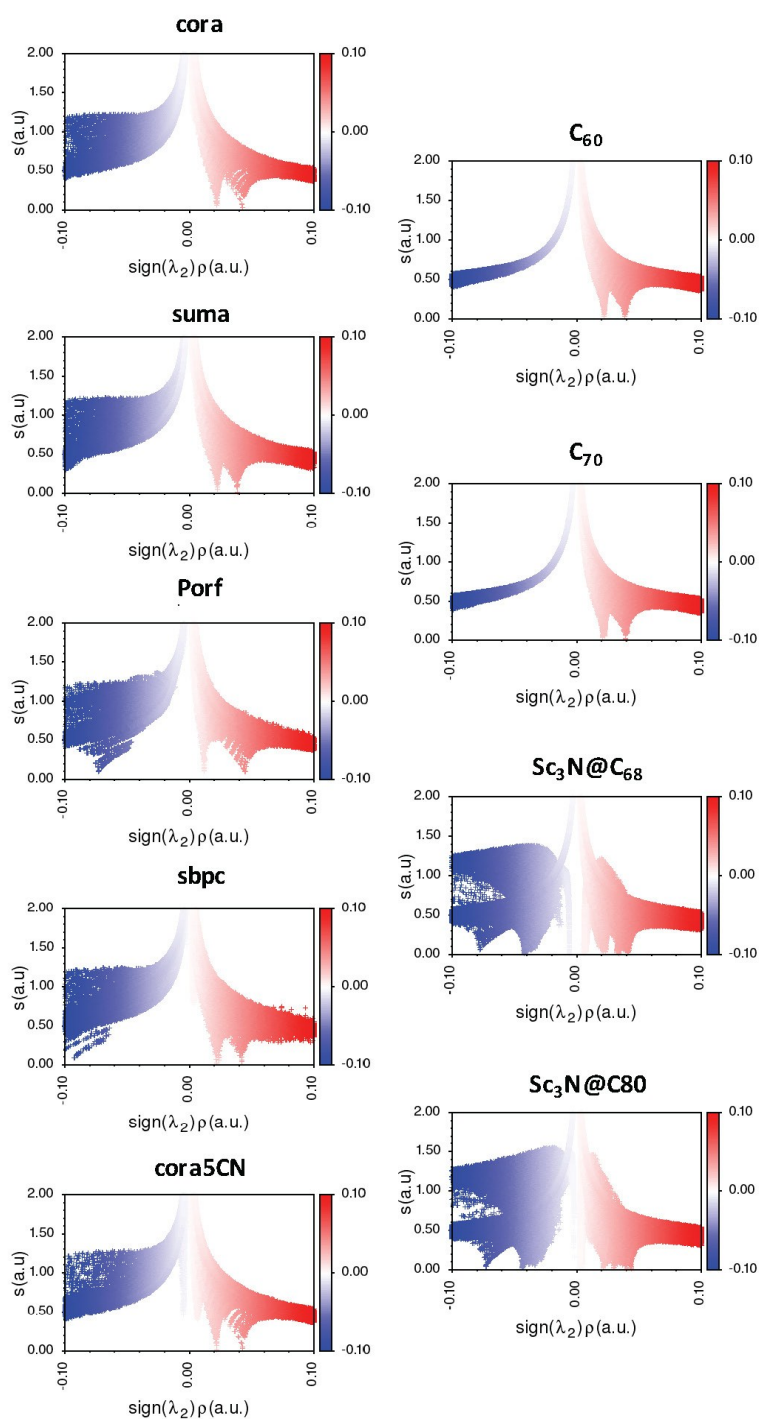


Figure S6. Non covalent interaction index for the isolated molecules. The product of the density times the sign of the second eigenvalue of its Hessian is mapped onto an isosurface of reduced density gradient with value 0.5 a.u.; the color scale goes from -0.1 au (blue) to $+0.1$ au (red).

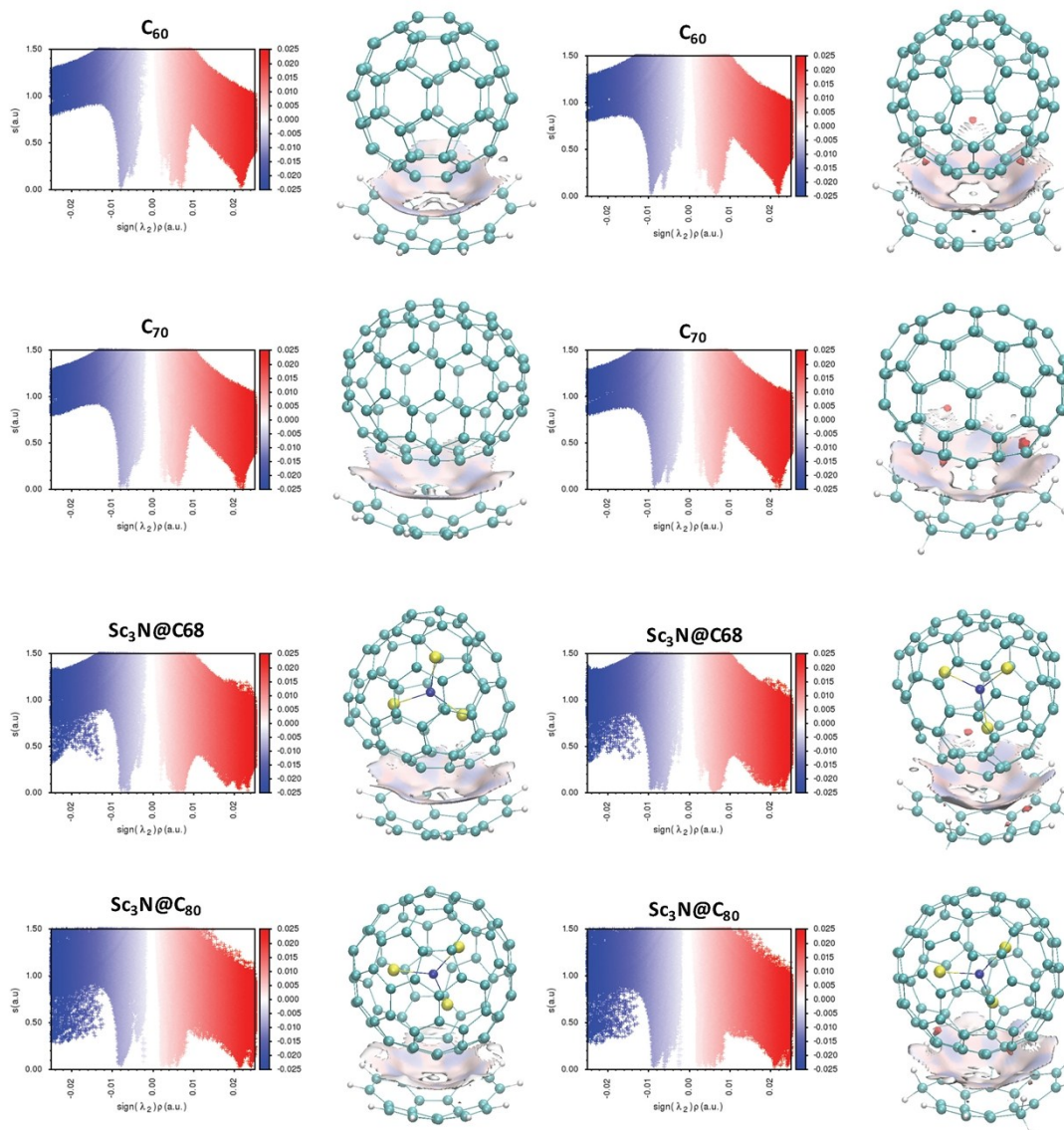


Figure S7. NCI plots for the most stable minima found for the dimers formed with cora (left) and suma (right) at the B3LYP-D/def2-TZVP level. Values corresponding to a isosurface of reduced density gradient of 0.5 a.u.; colour scale runs from -0.025 to 0.025.

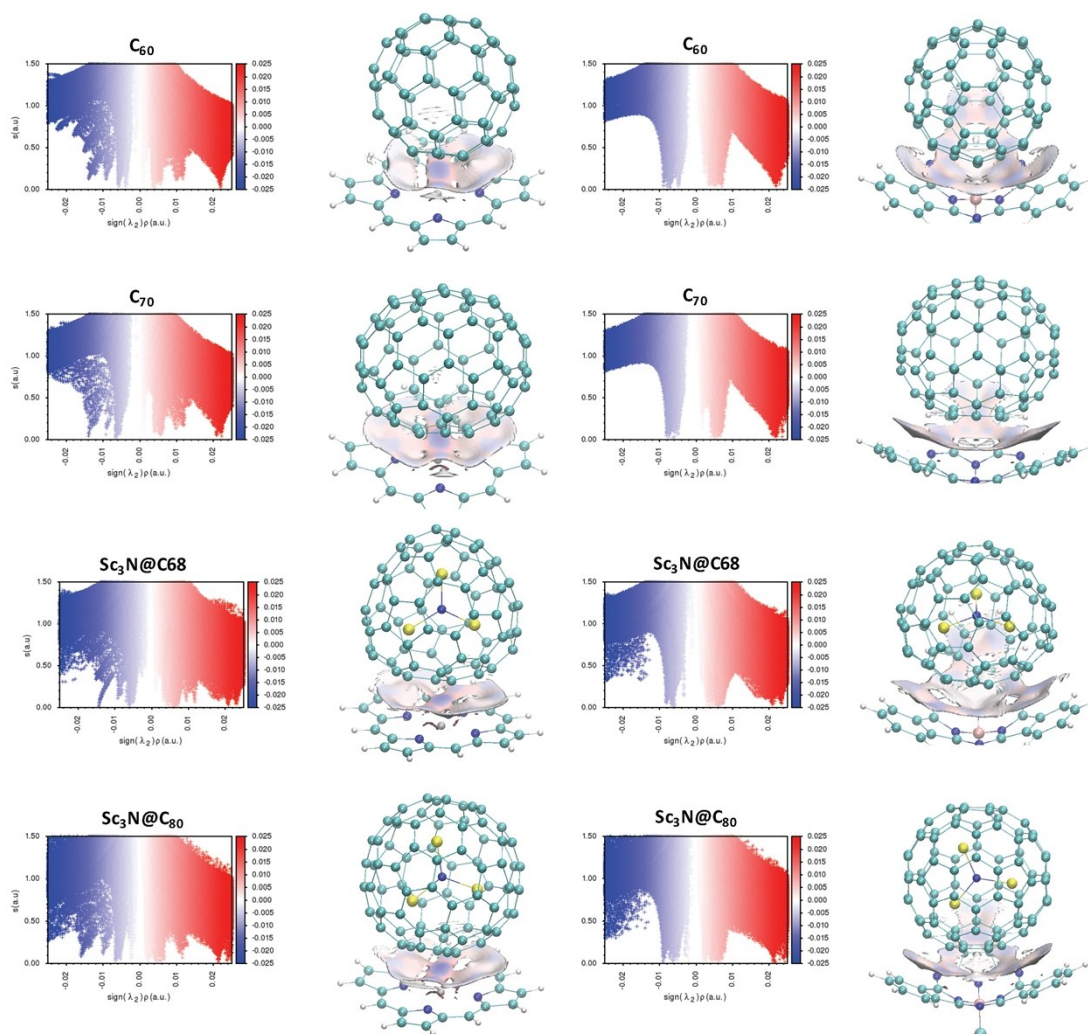


Figure S8. NCI plots for the most stable minima found for the dimers formed with porf (left) and sbpc (right) at the B3LYP-D/def2-TZVP level. Values corresponding to a isosurface of reduced density gradient of 0.5 a.u.; colour scale runs from -0.025 to 0.025.

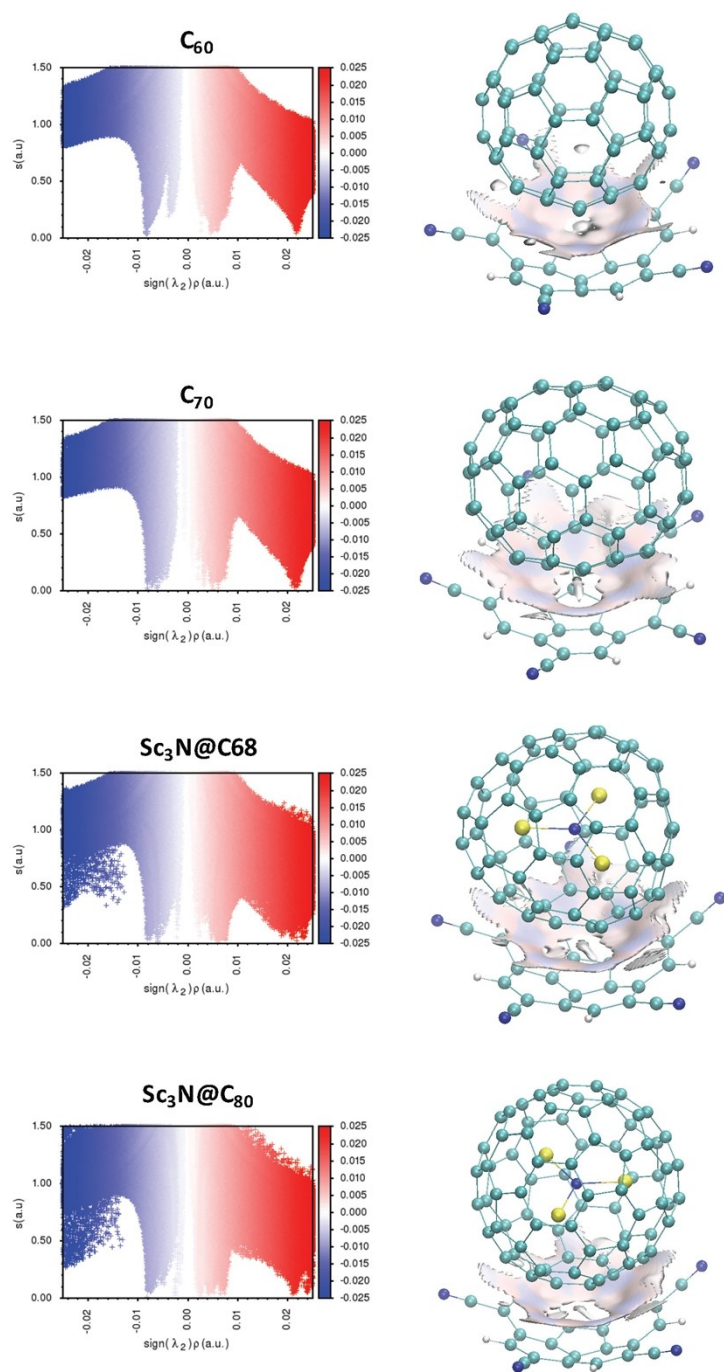


Figure S9. NCI plots for the most stable minima found for the dimers formed with cora5CN at the B3LYP-D/def2-TZVP level. Values corresponding to a isosurface of reduced density gradient of 0.5 a.u.; colour scale runs from -0.025 to 0.025.

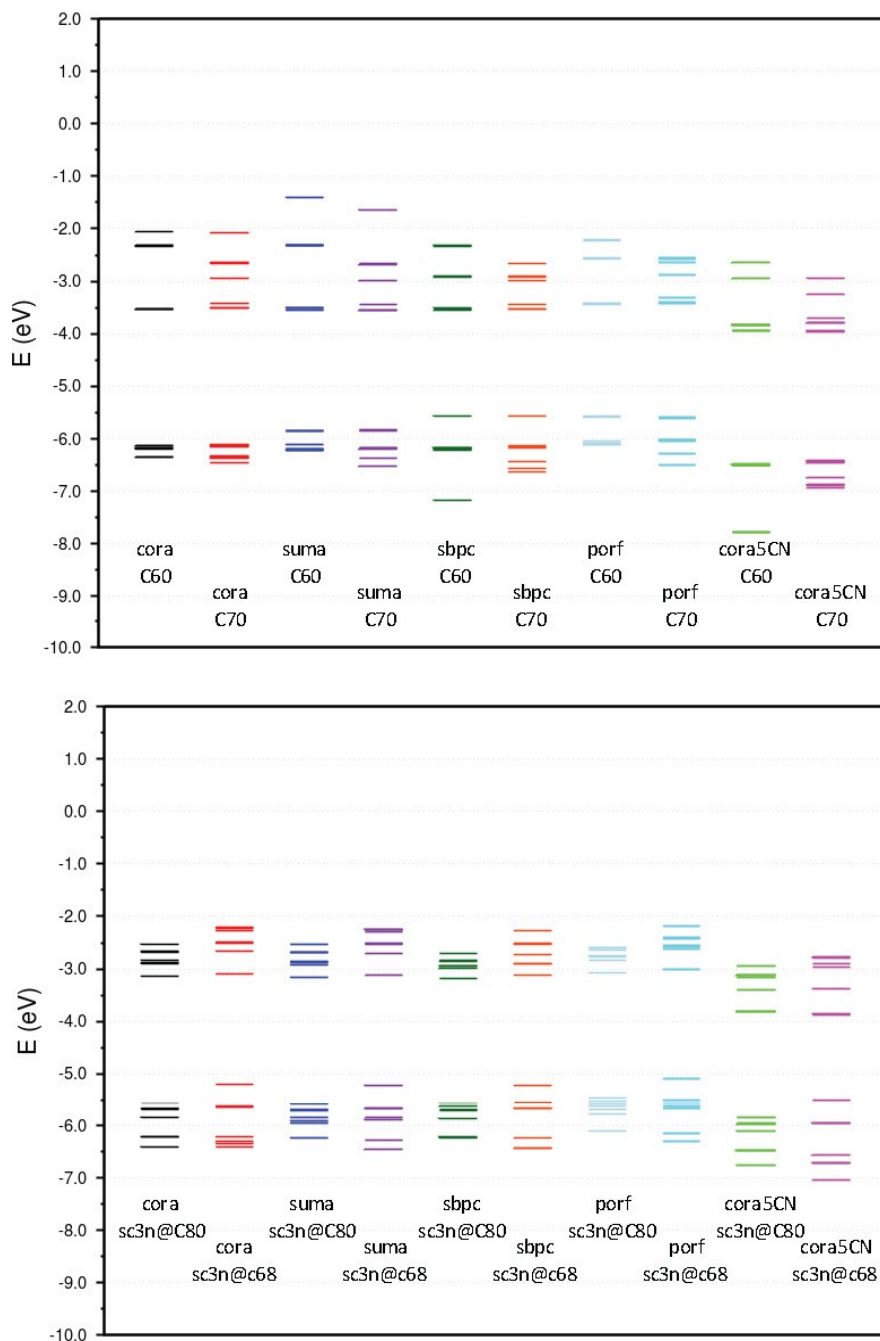


Figure S10. Schematic representation of the energy levels of highest occupied and lowest unoccupied molecular orbitals in the dimers studied. B3LYP-D/def2-TZVP//B97-D2/def2-TZVP.

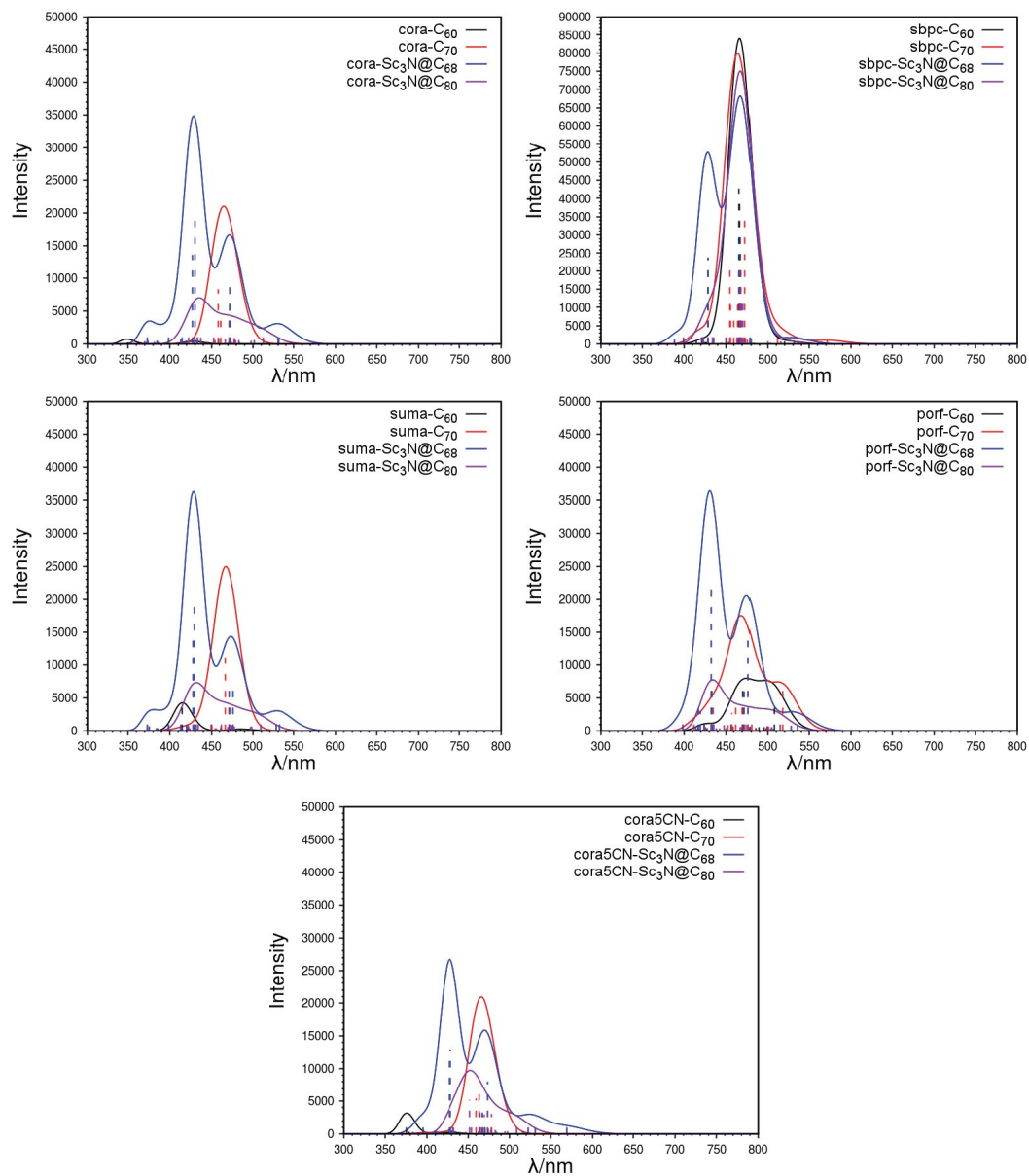


Figure S11. Predicted absorption spectra of the dimers studied as obtained at the CAM-B3LYP/TZVP level.

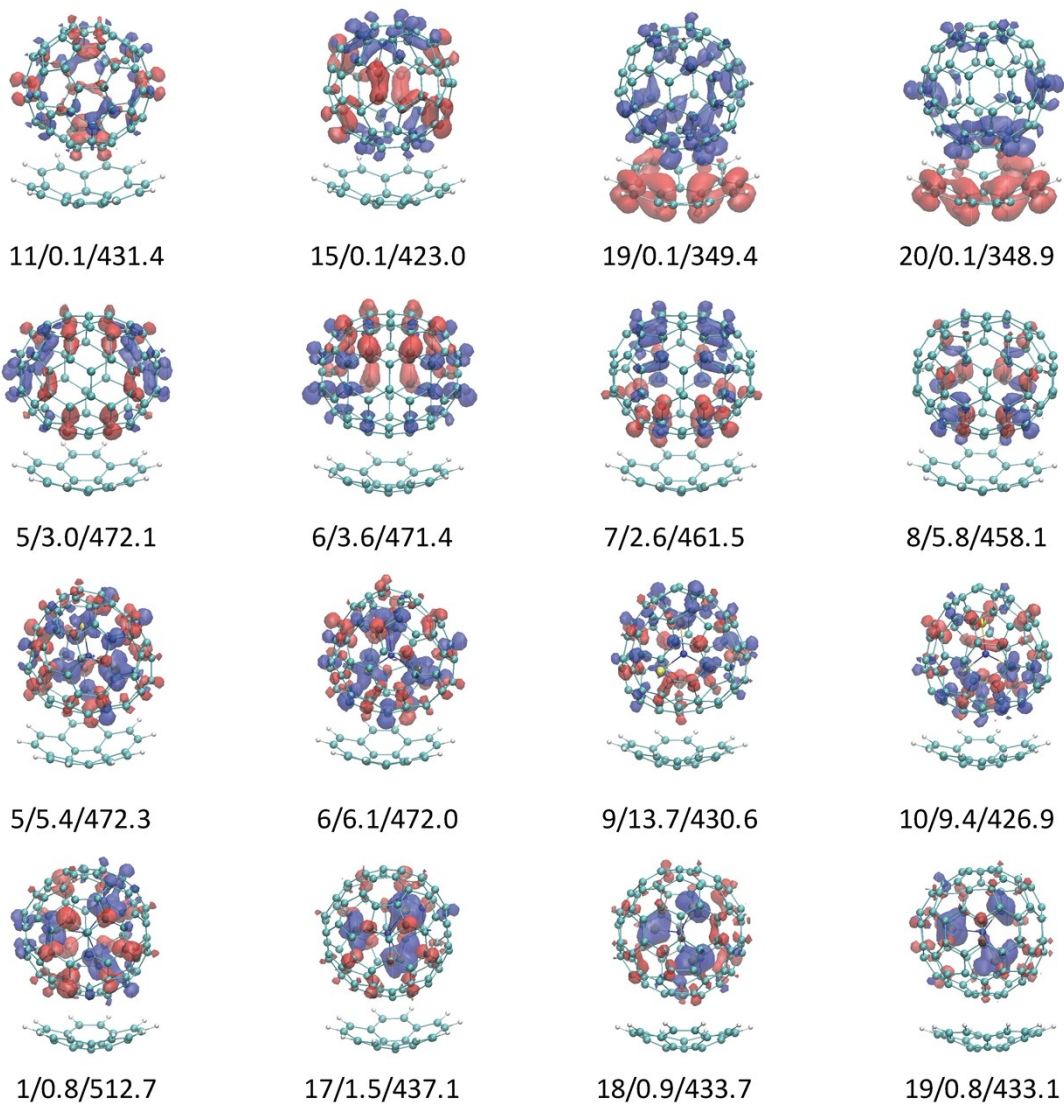


Figure S12. Density difference upon transition for the four most intense transitions in cora complexes. The numbers are the number of the transition/ oscillator strength * 100/ wavenumber (nm). Surfaces correspond to +0.001 a.u. (blue) and -0.001 a.u. (red).

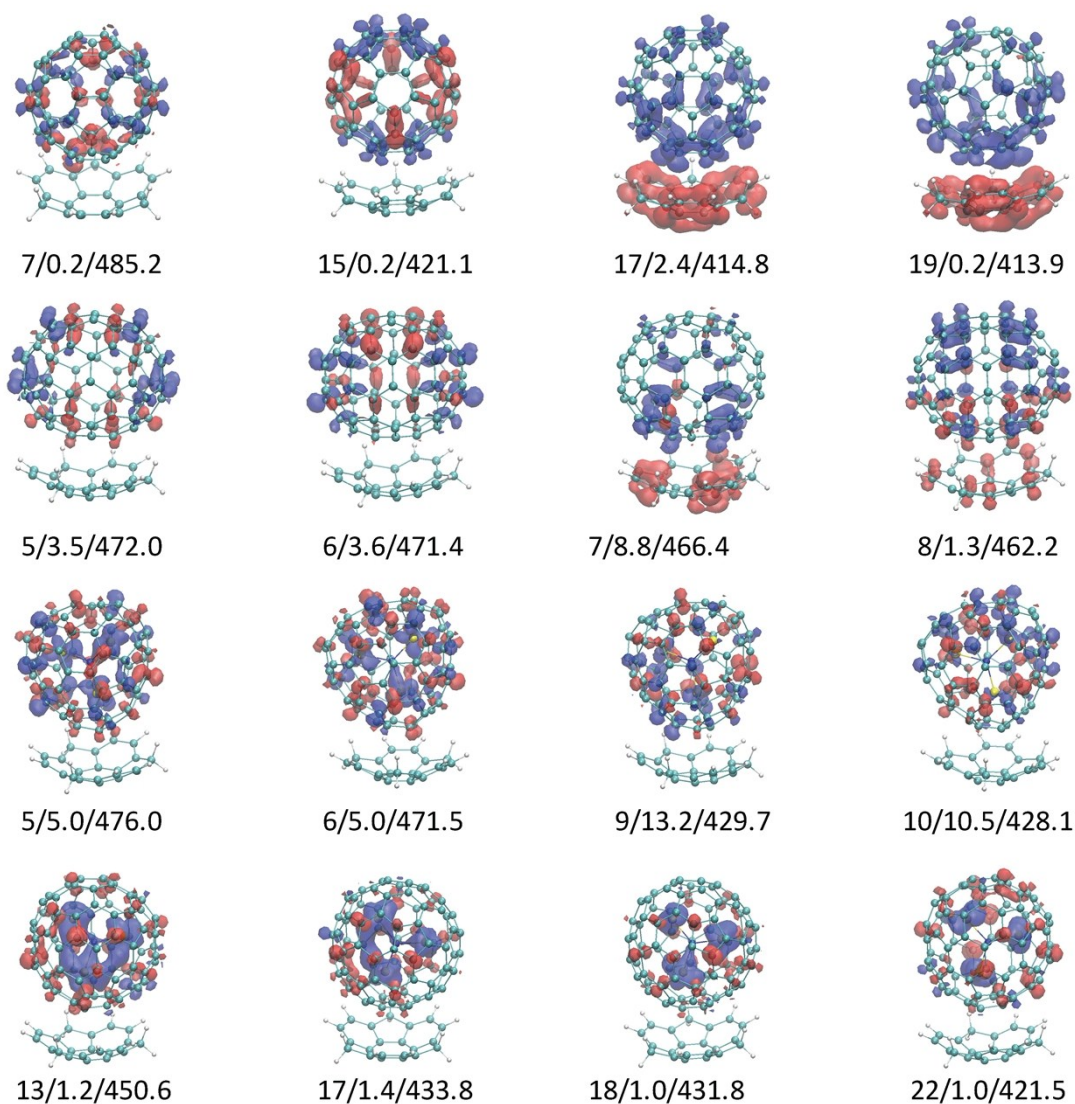


Figure S13. Density difference upon transition for the four most intense transitions in suma complexes. The numbers are the number of the transition/ oscillator strength * 100/ wavenumber (nm). Surfaces correspond to +0.001 a.u. (blue) and -0.001 a.u. (red).

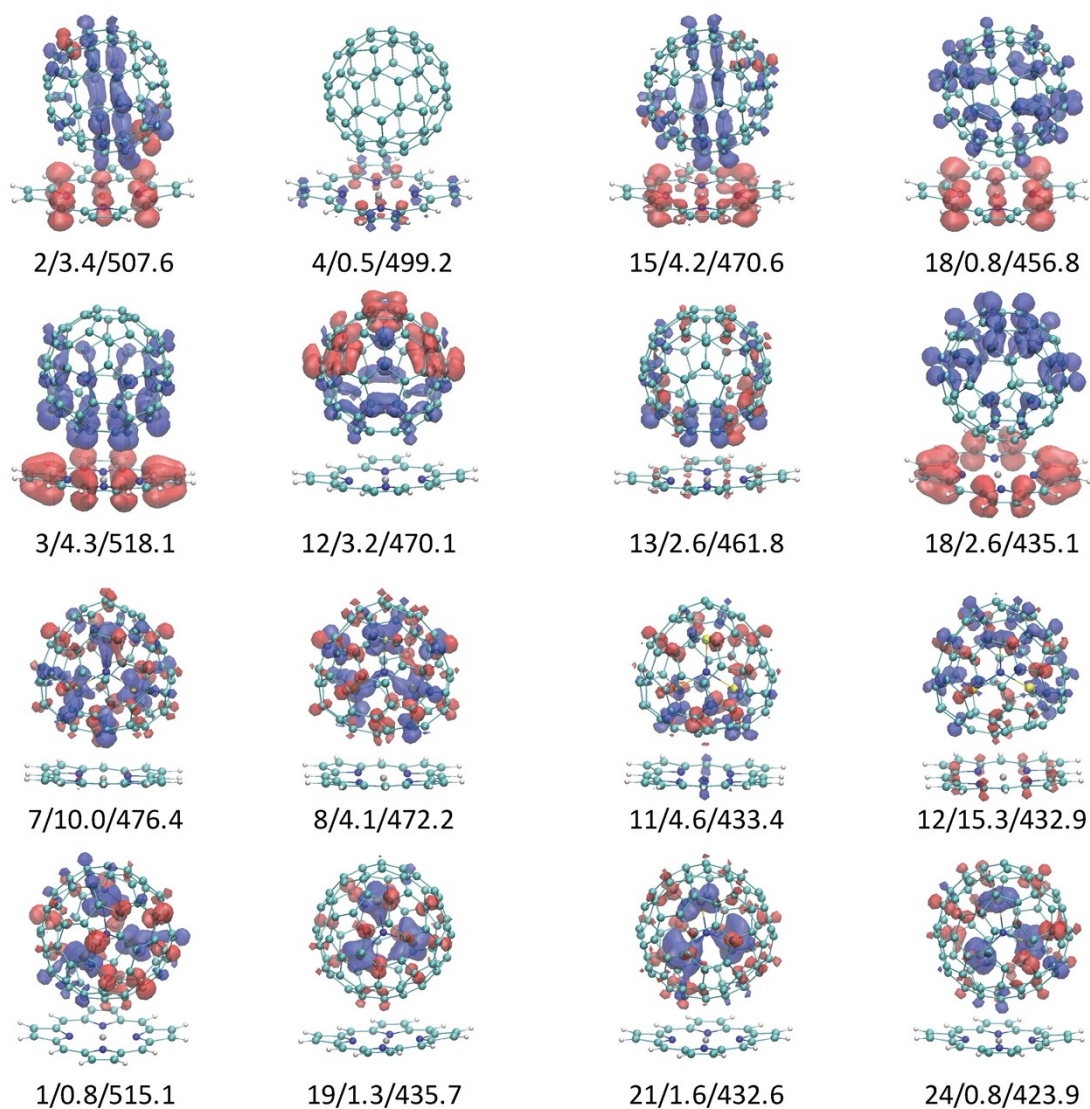


Figure S14. Density difference upon transition for the four most intense transitions in porf complexes. The numbers are the number of the transition/ oscillator strength * 100/ wavenumber (nm). Surfaces correspond to +0.001 a.u. (blue) and -0.001 a.u. (red).

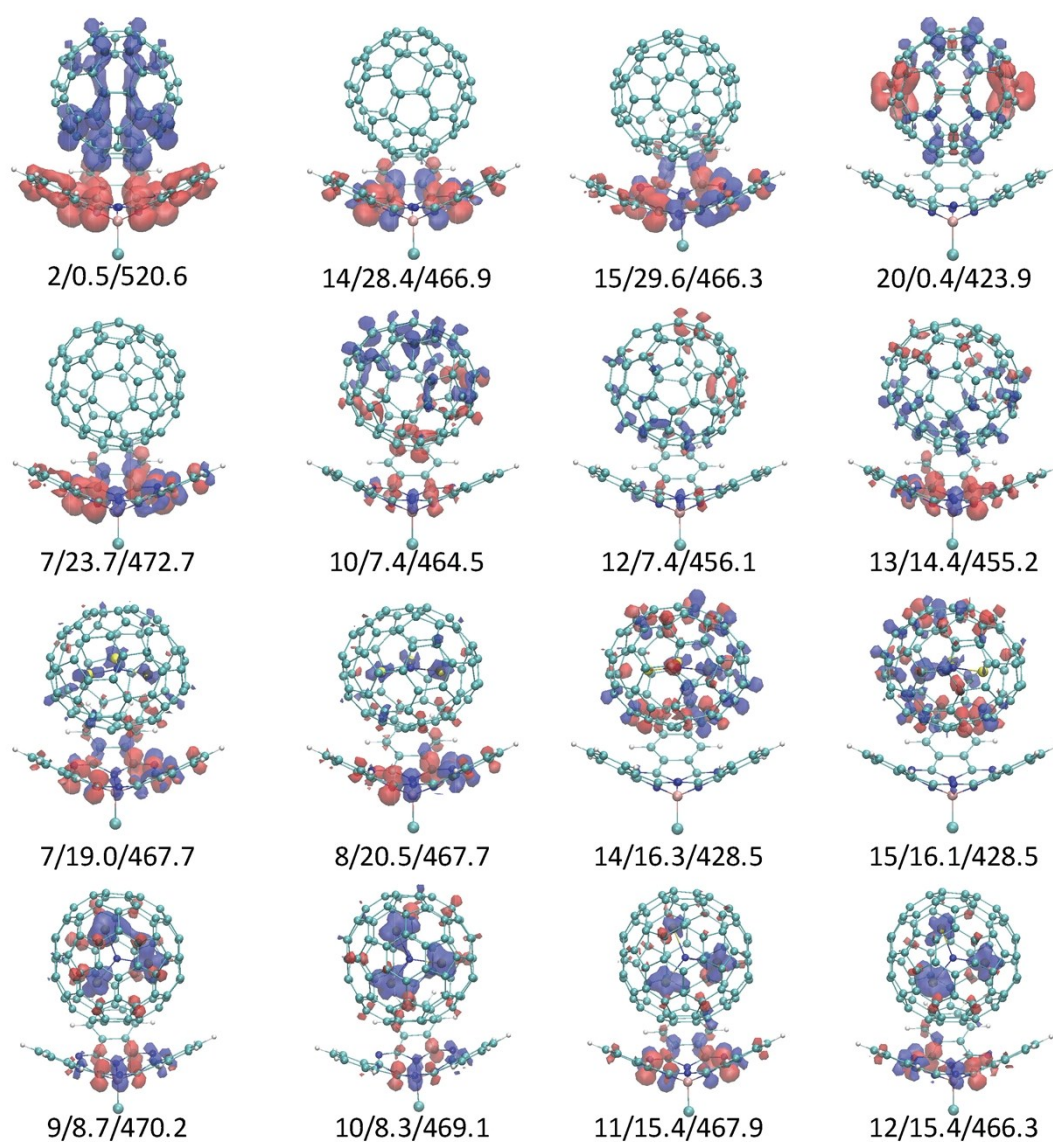


Figure S15. Density difference upon transition for the four most intense transitions in sbpc complexes. The numbers are the number of the transition/ oscillator strength * 100/ wavenumber (nm). Surfaces correspond to +0.001 a.u. (blue) and -0.001 a.u. (red).

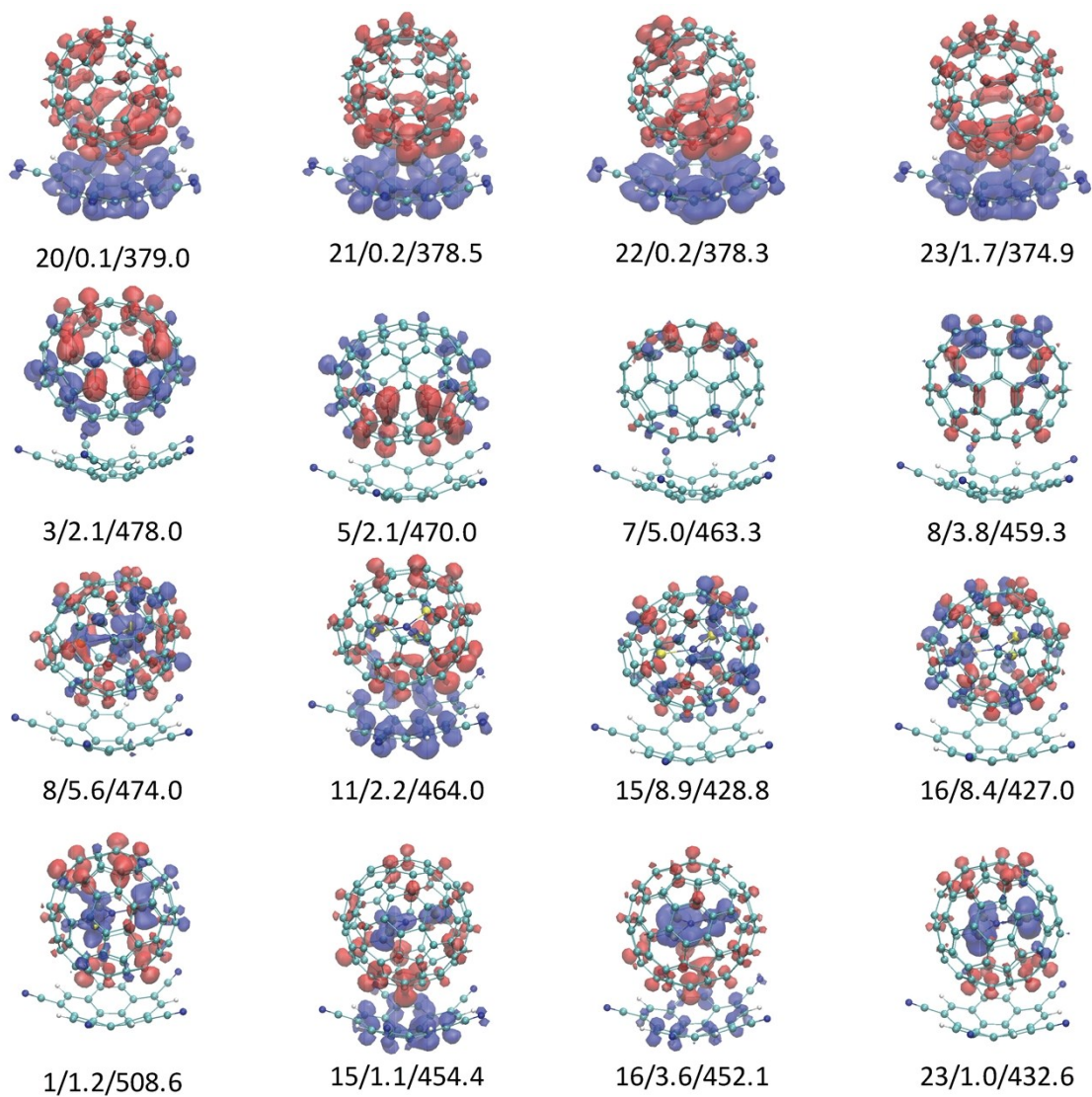


Figure S16. Density difference upon transition for the four most intense transitions in cora5CN complexes. The numbers are the number of the transition/ oscillator strength * 100/ wavenumber (nm). Surfaces correspond to +0.001 a.u. (blue) and -0.001 a.u. (red).

Cartesian coordinates in Å of the molecules studied and their most stable dimers at the B97-D2/def2-TZVP level.

```
-----cora-----
30
C -0.975354 0.708579 0.830891
C -0.975354 -0.708579 0.830891
C 0.372686 -1.146675 0.830803
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C 0.372686 1.146675 0.830803
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C -2.009581 -1.460003 0.284351
C 0.767565 -2.362410 0.284201
C 2.483972 -0.000000 0.283891
C 0.767565 2.362410 0.284201
C 2.164328 2.432962 -0.086266
C 2.982527 1.306699 -0.086507
C 2.982527 -1.306699 -0.086507
C 2.164328 -2.432962 -0.086266
C -1.644991 -2.810107 -0.086026
C -0.321092 -3.240343 -0.086056
C -3.180873 -0.696021 -0.086492
C -3.180874 0.696021 -0.086492
C -1.644991 2.810108 -0.086026
C -0.321092 3.240343 -0.086056
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H 3.996877 1.402202 -0.471676
H 3.996877 -1.402202 -0.471676
H 2.568532 -3.368418 -0.470944
H -2.409634 -3.483622 -0.470975
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H -4.057459 -1.215067 -0.472037
H -4.057459 1.215067 -0.472037
H -2.409634 3.483622 -0.470975
H -0.098443 4.234812 -0.470585
```

```
-----suma-----
33
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C -3.305259 -0.716304 -0.250402
C 3.295909 -0.000000 0.018488
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C 1.216661 -0.716177 0.918337
C 1.216661 0.716177 0.918337
C 2.361699 1.211557 0.280929
C 1.032128 -3.220549 -0.251246
C 2.272930 -2.504186 -0.250761
C -2.229953 -1.439096 0.281146
C -1.228068 -0.695551 0.918626
C 0.012140 -1.411914 0.918299
C -0.131637 -2.651061 0.280539
```

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C -1.228068 0.695551 0.918626
C -2.229953 1.439096 0.281146
C 2.272930 2.504186 -0.250761
C 1.032128 3.220549 -0.251246
H -4.101238 1.220969 -0.796456
H -4.101238 -1.220969 -0.796456
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H 0.993293 -4.162096 -0.797534
H 3.107918 -2.941627 -0.796582
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```

```
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37
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C 1.104163 -2.874519 0.000000
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N 0.000000 2.058691 0.000000
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N -0.000000 -2.058691 0.000000
Zn 0.000000 0.000000 0.000000

-----sbpc-----

44

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C 0.000388 -2.295030 0.766786
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N -1.370181 0.000000 1.199290
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N -1.334680 2.311913 0.628543
N -1.334680 -2.311913 0.628543
N 2.668826 0.000000 0.623257
B 0.001296 0.000000 1.801844
Cl 0.003391 -0.000001 3.680575

-----cora5CN-----

35

C -0.080266 -1.201368 0.950301
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C 0.771330 0.924573 0.950740
C -0.641037 1.019256 0.951138

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C -0.158607 -2.478819 0.418584
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C 1.585276 1.912235 0.419009
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C -2.406101 -0.615024 0.418617
C -3.223835 0.540941 0.062699
C -2.698128 1.842012 0.060788
C -0.482014 3.233793 0.063642
C 0.917849 3.135328 0.060887
C 3.265366 0.095960 0.059762
C 2.926183 1.457659 0.062698
C 2.290421 -2.332785 0.062300
C 1.100126 -3.076117 0.060074
C -1.510804 -2.899300 0.062961
C -2.585342 -1.996778 0.060212
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H 1.495769 3.979119 -0.308650
H 4.246544 -0.192662 -0.309807
H 1.128275 -4.098567 -0.309288
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C 3.874770 2.418351 -0.404249
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60

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C 0.381993 1.174548 -3.328877
C 1.235589 0.000000 -3.329682
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C 0.749345 -2.305663 -2.592971
C -1.579139 -2.598731 -1.828863
C -3.196340 -1.424946 -0.594475
C -3.423301 -0.725888 0.595039
C -3.423301 0.725888 0.595039
C -3.196341 1.424946 -0.594475
C -2.343334 2.599712 -0.594605
C -1.579139 2.598732 -1.828863
C -0.249582 3.031413 -1.829400
C 0.749345 2.305663 -2.592971
C 2.424524 0.000000 -2.593267
C 2.805724 1.174571 -1.829762
C 1.983894 2.305910 -1.829669
C 1.748789 3.032369 -0.594968

C 0.367689 3.480152 -0.594567
 C -0.367690 3.480152 0.594567
 C -1.748788 3.032369 0.594968
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 C 0.998749 -0.725818 3.328693

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70

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 C 1.966851 2.290187 2.440723
 C 0.381347 1.173360 3.965992
 C 2.785729 1.163339 2.441041
 C 3.394286 0.718494 1.208192
 C 3.253798 1.455099 -0.000000
 C 3.394286 0.718494 -1.208192
 C -1.955272 1.420628 3.217958
 C -1.569778 2.578201 2.440421
 C -0.998135 0.725142 3.966047
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 C 0.365669 3.450471 1.207910
 C -0.378958 3.544878 -0.000000
 C 0.365670 3.450472 -1.207911
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 C -1.777506 3.091117 -0.000000
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C 1.949443 -1.937607 2.486425
C 2.312180 -0.576222 2.727469
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C 1.718211 1.676322 2.796989
C 0.702514 2.655319 2.485955
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C -1.725546 2.710678 1.844016
C -2.774190 1.739241 1.959538
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C	3.033992	-2.461254	1.091771
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C	1.260729	-3.891588	0.234013
C	-1.959359	-3.403107	-1.393202
C	-0.646317	-3.928193	-1.120636
C	-2.940155	-1.370782	-2.528039
C	-2.058047	-2.518406	-2.519732
C	-2.517571	1.020560	-3.051738
C	-2.361411	-0.363897	-3.367126
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C	-1.436608	1.897346	-3.353048
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C	-1.113614	-0.868465	-3.869553
C	0.374703	-2.690943	-3.053026
C	-0.195284	1.398240	-3.870411
C	0.865825	2.226553	-3.367822
C	2.142011	1.668851	-3.051600
C	0.000078	-0.000328	-4.088564
C	3.208924	-0.524164	-2.520752
C	2.658004	-1.861476	-2.529648
C	1.495411	-1.863652	-3.368031
C	2.362037	0.294619	-3.352859
C	1.308269	-0.530407	-3.869583
N	-0.001192	-0.000968	0.046702
Sc	-1.008000	-1.736265	0.013725
Sc	-0.992280	1.744979	0.048051
Sc	2.005648	-0.017696	0.062189

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90

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100

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-----cora-sc3nc68-----

102

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C 4.709838 0.494127 2.150056
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C 4.449532 2.646892 0.940145
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C 4.195706 -2.275316 -2.833116
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C 4.177980 -3.661711 -0.610911
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-----cora-sc3nc80-----
114

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93

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C	-0.013693	0.801704	-5.406265
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C	-1.218469	1.478353	-5.070388
C	3.243338	-0.010229	0.460136
C	2.467574	1.147447	0.845751
C	3.986616	0.003579	-0.725789
C	2.468300	2.287383	0.048333
C	1.234864	3.009644	-0.166526
C	0.031486	2.638923	0.494027
C	-1.180403	3.011935	-0.149491
C	0.012357	3.574637	-2.263035
C	1.225616	3.469743	-1.528168
C	-1.190529	3.472696	-1.510740
C	0.035920	1.436508	1.338433
C	1.240234	0.695967	1.455821
C	-1.167990	0.698821	1.473964
C	-3.199774	2.317404	-1.129832
C	-2.412699	2.292876	0.084042
C	-2.403007	1.152615	0.881501
C	-3.951664	1.197184	-1.504409
C	-3.219434	1.472316	-3.842257
C	-2.437979	2.623898	-3.448155
C	-2.428137	3.039045	-2.118195
C	-3.961651	0.765693	-2.888534
C	-3.222890	-1.369612	-3.877661
C	-2.451884	-0.633763	-4.856378
C	-2.450169	0.759215	-4.839081
C	-3.963483	-0.685149	-2.906714
C	-3.205156	-2.281766	-1.187019
C	-2.435448	-2.980654	-2.192920
C	-2.444352	-2.532735	-3.512365
C	-3.954503	-1.150989	-1.533786
C	-3.185982	-0.003123	0.506981
C	-2.405860	-1.169660	0.853151
C	-2.418112	-2.289396	0.027251
C	-3.945795	0.012379	-0.667405

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C	-2.836683	4.354701	-0.130989
C	-2.431294	4.429433	-1.502166
C	3.737878	4.079001	1.041159
C	3.201772	4.480652	-0.361620

C	1.994657	5.156353	-0.155300
C	1.591462	5.075232	1.213148
C	2.515150	4.341161	1.964948
C	2.478905	4.208832	-2.706535
C	3.463640	4.068507	-1.676151
C	-1.143294	4.861061	-1.856242
C	-0.348071	5.346472	-0.813637
C	1.037965	5.288865	-1.154136
C	1.217006	4.758981	-2.435533
C	-0.197662	4.619946	-3.067075
C	-1.810361	4.304653	2.401572
C	-0.283444	4.461025	2.653310
C	0.242950	5.130314	1.544109
C	-0.740313	5.270421	0.517230
C	-1.958331	4.705250	0.906168
C	2.036522	3.780049	3.157448
C	0.647179	3.842712	3.501316
H	-3.792618	3.879810	0.082979
H	-3.103610	4.005851	-2.246296
H	4.045203	3.026597	1.068191
H	2.690026	3.742743	-3.667703
H	4.365001	3.507135	-1.917155
H	-0.347595	3.620684	-3.494767
H	-2.140270	3.272234	2.571573
H	-2.407950	4.948121	3.064994
H	2.679429	3.163679	3.783631
H	0.318429	3.268525	4.365851
H	-0.365152	5.347141	-3.876025
H	4.611496	4.680649	1.335639
C	0.293116	-1.777245	3.369985
C	-0.897590	-0.986918	3.297402
C	-2.178130	-1.598022	3.068466
C	-2.301593	-3.022861	2.863492
C	-1.108600	-3.804746	2.960076
C	0.158734	-3.197667	3.262349
C	1.196756	-3.995111	2.669095
C	2.386883	-3.385398	2.122115
C	2.522272	-1.969824	2.258678
C	1.514866	-1.186059	2.918621
C	1.532954	0.137796	2.359843
C	0.315069	0.889859	2.190040
C	-0.894629	0.306179	2.672363
C	-2.149239	0.473520	1.969524
C	-2.964771	-0.664118	2.287513
C	-0.870694	-4.940284	2.093547
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C	3.116512	-1.158501	1.216278
C	2.563548	0.159002	1.341884
C	2.425583	0.994768	0.207637
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C	-2.207489	1.087778	0.672800
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C	-4.236223	-2.551168	1.340439

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C	-3.006181	-4.527055	0.984123
C	-1.734844	-5.232937	0.984025
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C	0.301550	-5.815438	-0.354383
C	1.130706	-5.659857	0.825459
C	2.442904	-5.216987	0.415135
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C	0.825244	1.951870	-1.188255
C	-0.613152	1.884921	-1.120123
C	-1.305125	1.083678	-2.059839
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C	-3.363631	-1.909618	-2.080738
C	-4.148795	-1.770823	-0.876505
C	-4.396334	-2.932308	-0.040667
C	-3.650489	-4.149665	-0.257799
C	-2.936986	-4.312901	-1.470376
C	-1.720412	-5.070737	-1.505042
C	-0.905471	-4.518224	-2.567132
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C	1.114507	-5.429406	-1.511316
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C	1.433843	-1.166010	-3.149298
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C	-0.572364	0.237227	-2.979417
C	-1.398702	-0.908525	-3.249900
C	-2.827908	-3.210385	-2.404668
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C	1.270332	-3.489445	-3.052111
C	0.608373	-2.291756	-3.490471
C	-0.819279	-2.195258	-3.482990
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Sc	1.012335	-3.474710	-0.189219
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C	-3.086539	-0.204223	4.660982
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C	1.744709	-0.099530	5.418160
C	2.944263	0.111660	4.732802
C	0.429950	-3.800618	4.199597
C	1.816471	-3.444085	4.120307
C	-2.197070	-1.221920	5.034147

C	-0.978250	-0.804243	5.578894
C	0.016064	-1.820077	5.444637
C	-0.504615	-2.951288	4.808330
C	-2.040122	-2.731273	4.694183
C	-0.489202	2.777434	4.867514
C	0.935259	2.166560	5.001348
C	0.777150	0.889503	5.546757
C	-0.603075	0.532099	5.626169
C	-1.416687	1.556191	5.132700
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C	2.191758	2.447165	4.442226
H	-3.384779	1.901358	4.279839
H	-4.041320	-0.438480	4.193641
H	3.764171	-1.327158	3.274851
H	0.108662	-4.685464	3.652544
H	2.461849	-4.079149	3.515814
H	-2.415702	-2.967363	3.691850
H	-0.652115	3.194628	3.866144
H	-0.660835	3.591895	5.587595
H	4.082312	1.674198	3.738343
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H	-2.594811	-3.366018	5.402362
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C	2.411545	-2.033667	0.564392
C	3.774157	-0.700773	-0.782616
C	3.144766	-0.789673	0.502021
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C	3.509667	-0.598291	-3.600552
C	2.256893	-2.691368	-3.517997
C	1.552414	-3.496417	-1.252674
C	1.414230	-3.490362	-2.679416
C	0.363557	-3.686000	-0.493049
C	1.202639	-2.170012	1.321970
C	0.185207	-3.020023	0.772109
C	0.756409	-1.039549	2.105367
C	2.650149	0.369794	1.155985
C	1.451865	0.215897	1.937536
C	3.527433	1.733162	-0.726698
C	2.890647	1.639016	0.558623
C	2.966397	2.856608	-1.416983
C	3.270500	1.710652	-3.552237
C	2.787247	2.837590	-2.827221
C	2.732374	-0.210867	-4.755482
C	2.582884	1.221121	-4.716446
C	1.533025	-2.373799	-4.732704
C	1.718898	-1.058350	-5.313487
C	0.140152	-3.633575	-3.329096
C	0.196730	-2.978851	-4.621734
C	-0.921949	-3.801262	-1.123543
C	-1.063696	-3.740080	-2.542502
C	-1.227815	-2.718310	0.918349
C	-1.900636	-3.196274	-0.266105
C	-0.669553	-0.736604	2.272432

C	-1.682292	-1.555612	1.630113	C	-0.932070	-3.769837	4.253866
C	0.499956	1.277553	2.014594	C	0.434429	-3.761643	4.257123
C	-0.802865	0.701580	2.173915	C	0.857383	-3.866318	2.878133
C	1.931550	2.705095	0.661228	C	-1.347259	-3.877749	2.872679
C	1.976406	3.468076	-0.559517	C	2.182185	-3.809451	2.435612
C	0.711412	2.535047	1.362676	C	-4.479644	-3.709735	-0.697020
C	0.812903	4.126627	-1.079419	C	-4.483917	-3.709182	0.669685
C	1.630063	3.522545	-3.348104	C	-3.106836	-3.828067	1.093671
C	0.676612	4.233657	-2.519418	C	-3.099931	-3.828982	-1.112292
C	1.396838	1.840033	-5.190592	C	-2.669181	-3.832276	2.421676
C	0.945545	3.011510	-4.497910	C	0.461160	-3.765691	-4.253475
C	0.549115	-0.409949	-5.841587	C	-0.905325	-3.773682	-4.258701
C	0.397411	1.022936	-5.791509	C	-1.329103	-3.880514	-2.880041
C	-0.985770	-2.267941	-5.082273	C	0.875486	-3.869351	-2.871770
C	-0.775116	-0.998006	-5.724493	C	2.197462	-3.812148	-2.420936
C	-2.237227	-3.140129	-3.070666	C	-2.653857	-3.834472	-2.437470
C	-2.185695	-2.385849	-4.304322	H	4.854194	-3.588360	1.370124
C	-3.037827	-2.518651	-0.802659	H	4.862623	-3.590164	-1.339144
C	-3.221932	-2.541097	-2.218725	H	-1.605822	-3.692579	5.099846
C	-2.836413	-0.900027	1.086964	H	1.103194	-3.676563	5.106291
C	-3.519493	-1.384724	-0.087187	H	2.945745	-3.718277	3.204828
C	-1.952675	1.361989	1.615110	H	-5.325310	-3.629872	-1.370883
C	-2.989867	0.537672	1.110540	H	-5.333793	-3.628783	1.338171
C	-0.445153	3.217608	0.893775	H	-3.439559	-3.753570	3.185450
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C	-1.702415	3.881058	-0.960963	H	2.965932	-3.721838	-3.185352
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C	-1.000379	1.322210	-5.653181	N	-0.229034	-3.959108	-2.064611
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C	-3.141620	-1.311913	-4.191192	C	-3.269224	2.989594	-0.713151
C	-3.774759	-1.408248	-2.907664	C	-2.636348	4.020804	-1.414367
C	-2.905080	-0.048537	-4.804936	C	-1.973022	5.090595	-0.690695
C	-4.088959	-0.259829	-0.771740	C	-1.967788	5.090332	0.707461
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97							
C	4.009897	-3.680711	0.696247	C	-2.352823	1.323129	2.316335
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 C 3.369705 1.206232 -3.469327
 C 3.089504 -0.002268 -4.164948
 C 3.369107 -1.210260 -3.468193
 C -2.016893 3.218731 -3.135615
 C -1.859992 2.440118 -4.345384
 C -0.942610 3.964349 -2.635631
 C -0.641562 2.438982 -5.020952
 C -0.126762 1.205786 -5.570519
 C -0.875985 -0.001906 -5.518417
 C -0.127371 -1.210029 -5.569406
 C 2.014228 -0.002469 -5.166635
 C 1.300048 1.205802 -5.397018
 C 1.299438 -1.210596 -5.395890
 C -1.473030 3.220405 -0.346199
 C -2.576929 2.443337 -0.869627
 C -0.665674 3.965969 -1.212425
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 C -3.208026 1.208988 -2.896374
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 C -2.160246 -0.001243 -4.804941
 C -2.599967 1.207599 -4.198462
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 C 1.349171 3.219424 -0.001674
 C 0.509668 2.440138 0.881498
 C 0.774928 3.966407 -1.036103
 C -0.872326 2.440832 0.714318
 C -1.611689 1.209504 0.849509
 C -0.975735 0.001291 1.235334
 C -1.612281 -1.206957 0.850613
 C -3.111606 0.000904 -0.726082
 C -2.666887 1.209969 -0.122498
 C -2.667515 -1.207819 -0.121352
 C 2.549009 3.217508 -2.577736

C	3.135294	2.441638	-1.506387	H	-3.237752	4.175404	4.096725
C	1.386838	3.964321	-2.351174	H	-0.742033	5.224678	4.030521
C	2.547659	2.442716	-0.243092	H	1.693944	4.180659	4.057196
C	2.452590	1.208852	0.503181	H	-4.164684	-3.226214	3.960713
C	3.028188	-0.000282	0.024109	H	-5.224070	-0.733994	4.026500
C	2.451994	-1.208683	0.504296	H	-4.191555	1.701297	4.180987
C	0.482176	0.001009	1.410995	H	3.237860	-4.175224	4.096895
C	1.193168	1.208884	1.188938	H	0.742138	-5.224500	4.030827
C	1.192553	-1.207421	1.189983	H	4.191665	-1.701110	4.180943
C	3.647491	-0.001069	-1.307659	H	-1.693835	-4.180479	4.057507
C	3.645784	1.207111	-2.058825	N	1.896051	0.798831	4.272946
C	3.645176	-1.209955	-2.057690	N	-0.805925	1.900967	4.331530
C	1.347550	-3.219170	0.001328	N	-1.895936	-0.798638	4.273052
C	2.546446	-2.443310	-0.240807	N	0.806040	-1.900769	4.331620
C	3.134070	-2.443713	-1.504101	Zn	0.000058	0.000099	4.327282
C	0.772941	-3.966847	-1.032384	C	1.258589	3.243446	-2.133837
C	-1.474649	-3.219058	-0.343200	C	2.114706	2.679944	-3.132539
C	-0.873550	-2.438777	0.716571	C	1.617773	2.373315	-4.445442
C	0.508442	-2.438614	0.883731	C	0.228926	2.579353	-4.785081
C	-0.667667	-3.965859	-1.208708	C	-0.612142	3.164609	-3.788793
C	-2.018506	-3.219737	-3.132599	C	-0.092427	3.538655	-2.502393
C	-2.845144	-2.442742	-2.234631	C	-1.157012	3.450924	-1.540521
C	-2.578173	-2.441931	-0.867335	C	-0.905422	3.018703	-0.186065
C	-0.944608	-3.965435	-2.631915	C	0.451055	2.752733	0.176766
C	0.466892	-3.219936	-4.511443	C	1.522253	2.915716	-0.766990
C	-0.642788	-2.442454	-5.018675	C	2.577180	2.003028	-0.415737
C	-1.861201	-2.442319	-4.343091	C	3.377313	1.358181	-1.430923
C	0.323452	-3.965669	-3.335576	C	3.121815	1.713705	-2.791895
C	2.547395	-3.220294	-2.574723	C	3.194544	0.738858	-3.859599
C	2.686081	-2.442967	-3.787548	C	2.328929	1.197551	-4.907377
C	1.666625	-2.443421	-4.737377	C	-1.989552	2.750917	-3.618055
C	1.384840	-3.966306	-2.347459	C	-2.340190	3.009531	-2.252165
-----porf-sc3nc68-----				C	0.796110	1.667847	1.066367
109				C	2.137752	1.271265	0.755706
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C	3.646198	2.279470	4.059767	C	3.564382	-0.624648	0.089810
C	4.181025	1.021937	4.094185	C	3.869121	0.023499	-1.175832
C	3.075680	0.099439	4.223043	C	3.754912	-0.991373	-2.228203
C	2.212789	2.129301	4.173650	C	3.354672	-0.663223	-3.587622
C	-2.289230	3.653992	4.160214	C	2.528142	-1.619411	-4.321766
C	-1.029582	4.183609	4.126171	C	1.717292	-1.131250	-5.426379
C	-0.105661	3.075253	4.224027	C	1.696812	0.276027	-5.777683
C	-2.138370	2.220254	4.273869	C	0.395746	0.601925	-6.314909
C	1.286867	3.177231	4.158304	C	-0.389512	1.673823	-5.725095
C	-3.646092	-2.279292	4.060062	C	-1.717550	1.131261	-5.426220
C	-4.180918	-1.021757	4.094418	C	-2.528337	1.619393	-4.321548
C	-3.075567	-0.099250	4.223152	C	-3.354826	0.663184	-3.587388
C	-2.212677	-2.129114	4.173862	C	-3.754983	0.991283	-2.227931
C	-3.185137	1.294145	4.244850	C	-3.315877	2.220290	-1.595064
C	2.289340	-3.653808	4.160376	C	-3.191100	1.991818	-0.174667
C	1.029691	-4.183425	4.126400	C	-1.933337	2.269190	0.497716
C	0.105774	-3.075062	4.224213	C	-1.564939	1.068265	1.243432
C	2.138484	-2.220062	4.273942	C	-0.180913	0.707282	1.486081
C	3.185249	-1.293955	4.244831	C	0.181083	-0.707512	1.486038
C	-1.286757	-3.177045	4.158546	C	1.565096	-1.068483	1.243296
H	4.164783	3.226386	3.960321	C	1.933443	-2.269377	0.497504
H	5.224173	0.734166	4.026232	C	3.191160	-1.991970	-0.174945

C	3.315841	-2.220399	-1.595355	H	-4.447477	4.252624	2.008646
C	2.340131	-3.009636	-2.252424	H	-4.600534	-4.981895	-0.017408
C	1.989407	-2.750963	-3.618281	H	-4.624373	-4.213587	2.579689
C	0.611984	-3.164638	-3.788942	H	-4.728450	-1.867782	3.805548
C	-0.229143	-2.579354	-4.785167	H	-4.338800	0.136023	-5.433594
C	0.389230	-1.673795	-5.725199	H	-4.497947	-2.457575	-4.672831
C	-0.396062	-0.601865	-6.314923	H	-4.303874	2.438351	-4.118965
C	-1.697103	-0.275998	-5.777603	H	-4.660022	-3.676724	-2.325347
C	-2.329164	-1.197549	-4.907281	N	-4.593286	2.265013	-0.740449
C	-3.194704	-0.738887	-3.859423	N	-4.795641	0.882217	1.818234
C	-3.121906	-1.713773	-2.791764	N	-4.797129	-1.678774	0.416388
C	-3.377322	-1.358300	-1.430764	N	-4.739096	-0.288681	-2.146871
C	-3.869105	-0.023627	-1.175587	Zn	-4.747978	0.297013	-0.163609
C	-3.564290	0.624481	0.090054	C	-0.156967	-1.255110	3.385648
C	-2.567723	0.059695	0.971808	C	-1.096434	-0.380356	2.740596
C	-2.137628	-1.271467	0.755791	C	-0.683079	0.979559	2.976851
C	-0.795964	-1.668059	1.066353	C	0.847562	-0.441874	4.016353
C	-0.450966	-2.752910	0.176688	C	0.525935	0.932741	3.765441
C	0.905487	-3.018881	-0.186228	C	2.206520	-0.875627	4.086784
C	1.156997	-3.451050	-1.540718	C	2.513161	-2.186209	3.607044
C	0.092350	-3.538736	-2.502522	C	0.178012	-2.521826	2.824197
C	-1.617971	-2.373324	-4.445430	C	1.508656	-2.995815	2.984389
C	-2.114823	-2.680004	-3.132509	C	-0.520699	-2.936252	1.632086
C	-2.577126	-2.003183	-0.415651	C	-1.717223	-0.744574	1.522031
C	-1.522218	-2.915848	-0.767007	C	-1.437722	-2.043682	0.990829
C	-1.258645	-3.243538	-2.133879	C	-1.995619	0.282459	0.580948
N	-0.000036	-0.000064	-2.134994	C	-0.935607	2.024179	2.027004
Sc	-1.592211	0.594064	-1.146199	C	-1.618856	1.650323	0.820698
Sc	-0.000130	-0.000061	-4.097926	C	0.036047	3.092953	1.912888
Sc	1.592226	-0.594120	-1.146303	C	1.547697	1.904868	3.580588
-----porf-sc3nc80-----							
121							
C	-4.267024	4.543300	-0.694545	C	3.227945	0.119524	4.003569
C	-4.234949	4.154763	-2.004958	C	2.902295	1.496088	3.746374
C	-4.440434	2.724025	-2.023752	C	4.481050	-0.163911	3.369032
C	-4.489899	3.350764	0.091443	C	3.768264	-2.465980	2.965165
C	-4.686194	0.838677	4.117981	C	4.744181	-1.440764	2.801337
C	-4.626121	2.148683	3.733693	C	2.138466	-3.786066	1.950603
C	-4.680653	2.164697	2.288148	C	3.538576	-3.447905	1.940656
C	-4.778151	0.050774	2.908385	C	0.048638	-3.813992	0.627354
C	-4.551170	3.303476	1.487482	C	1.447848	-4.173483	0.754308
C	-4.662723	-3.976595	0.383863	C	-1.411510	-2.308909	-0.420416
C	-4.674516	-3.588896	1.694906	C	-0.524969	-3.426357	-0.672779
C	-4.759169	-2.145823	1.705213	C	-1.938844	0.041236	-0.830928
C	-4.738645	-2.771416	-0.410762	C	-1.621527	-1.240795	-1.361000
C	-4.769564	-1.345604	2.852336	C	-1.319280	2.254295	-0.465409
C	-4.474354	-0.262615	-4.434549	C	-1.510157	1.242869	-1.475753
C	-4.555185	-1.571363	-4.050798	C	0.345422	3.713058	0.614989
C	-4.703547	-1.577576	-2.611817	C	-0.308249	3.267860	-0.605936
C	-4.576395	0.534157	-3.231312	C	2.336974	3.511693	1.844552
C	-4.449228	1.924947	-3.171240	C	1.778917	3.928582	0.587295
C	-4.716493	-2.721432	-1.808231	C	3.955609	2.064731	2.950665
H	-4.145290	5.541016	-0.287961	C	4.941668	1.040662	2.717680
H	-4.082672	4.771716	-2.883514	C	3.689275	3.054695	1.968218
H	-4.651868	0.432462	5.122553	C	5.718576	1.007219	1.513206
H	-4.535246	3.028189	4.361311	C	5.550733	-1.472134	1.608289
				C	6.105273	-0.286541	0.988070
				C	4.275960	-3.439504	0.727583

C 5.301603 -2.447704 0.589189
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H -4.464263 2.349984 -2.512173
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 C -1.674617 1.148835 4.342861
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 H -5.971591 1.241294 2.369471
 H -5.973958 -1.230359 2.369514
 H -4.032565 -2.509781 3.281603
 C 2.527990 -2.480809 3.590506
 C 1.287897 -3.197710 3.665698
 C 1.175034 -4.480113 3.124638
 C 2.305824 -5.052097 2.540838
 C 3.523594 -4.347612 2.466495
 C 3.643252 -3.054466 2.976240
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 C 0.305078 -2.297673 4.246328
 H 0.226200 -5.008694 3.157004

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 H 4.381018 -4.817713 1.990742
 H 4.573326 -2.498195 2.894655
 C 1.293732 3.194826 3.665140
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 C 2.314752 5.046826 2.539237
 C 1.183109 4.477288 3.123775
 C 0.309323 2.296740 4.246095
 C 2.289787 1.145017 4.125840
 H 4.577480 2.488653 2.892968
 H 4.389182 4.808155 1.988122
 H 2.254759 6.047706 2.118425
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 Cl 0.470543 -0.000432 7.140904
 C 0.810307 3.217694 -4.386261
 C 2.023644 2.441709 -4.247985
 C 0.326332 3.964787 -3.305658
 C 2.718637 2.443269 -3.040530
 C 3.279201 1.211573 -2.532697
 C 3.216853 0.002306 -3.278986
 C 3.281444 -1.205147 -2.529973
 C -1.970490 3.215300 -3.798278
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 C -1.092332 3.963707 -3.006099
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 C 2.481948 0.000172 -4.551400
 C 1.866533 1.207317 -4.982991
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 C -2.271759 3.218419 -0.972640
 C -3.171228 2.439412 -1.796671
 C -1.246596 3.966043 -1.563753
 C -3.024219 2.438334 -3.182092
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 C -3.564455 -0.004132 -3.275503
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 C -1.612374 -0.004710 -5.435533
 C -2.211956 1.203374 -4.984404
 C -2.209641 -1.212911 -4.981661
 C 0.323032 3.218150 0.182959
 C -0.737273 2.441167 0.784300
 C 0.077842 3.967180 -0.972618
 C -2.009421 2.441566 0.219879
 C -2.756158 1.207260 0.136034
 C -2.262123 0.001583 0.698355
 C -2.753836 -1.206285 0.138705

C -3.720904 -0.002627 -1.814142
C -3.476881 1.206940 -1.106611
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C 2.228197 3.221740 -1.923837
C 2.472376 2.444787 -0.727993
C 1.049962 3.967153 -2.049047
C 1.535883 2.441372 0.300254
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C 1.922674 0.005571 0.700620
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C -0.922928 0.003550 1.296179
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C 3.130959 -1.203849 -1.100542
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116

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C -3.259603 0.695338 -3.718959
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C -5.332649 -0.740978 -2.531090
C -4.287414 -1.456267 -3.116597
C -1.982208 -1.161583 -4.288130
C -1.993187 1.134300 -4.283456
H -4.283698 2.485076 -3.073830
H -6.161572 1.195036 -2.046297
H -6.150288 -1.277813 -2.054992
H -4.259476 -2.542648 -3.091699
C 2.263163 -2.452043 -3.715538
C 1.023646 -3.172928 -3.710027
C 0.932296 -4.424048 -3.093898
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C 3.301126 -4.250245 -2.517315
C 3.400291 -2.988717 -3.105172

C 1.994763 -1.139184 -4.279842
C 0.011713 -2.295878 -4.277244
H -0.017377 -4.951990 -3.062259
H 2.035951 -5.933378 -2.029974
H 4.173936 -4.689855 -2.039507
H 4.328390 -2.423457 -3.080430
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C 2.231411 2.470180 -3.705999
C 3.358234 3.017257 -3.086363
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C -0.013584 2.294143 -4.283968
C 1.979621 1.154797 -4.272746
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Cl 0.007983 -0.002267 -7.211648
C 0.003521 -0.001417 5.578305
C -0.989156 1.007722 5.367914
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C -2.653747 -0.700839 4.592462
C -1.664364 -1.704564 4.830918
C -0.373847 -1.364836 5.365023
C 0.580914 -2.333049 4.899481
C 1.939251 -1.951419 4.587337
C 2.313067 -0.593310 4.829864
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C 1.734501 1.664833 4.901894
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C -0.066807 3.862479 2.539185
C -1.430624 3.379719 2.702902
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C -3.631272 1.508093 2.978995
C -4.179144 0.181495 2.810486
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C -2.209858 -2.928874 2.698302

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C 2.620215 -2.645286 3.518063
C 3.381760 -1.871782 2.532504
C 3.643587 -0.448568 2.696148
C 3.649599 0.403064 1.507137
C 3.405919 1.828893 1.669436
C 2.659322 2.617669 0.682676
C 1.990033 3.693908 1.397874
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C -2.648120 0.741755 -0.376923
C -3.591837 0.997002 0.685245
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C 0.683046 -2.657069 -0.379707
C 0.934223 -3.604685 0.679878
C 2.202775 -3.566433 1.392243
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C -2.312738 -0.627409 -0.679161
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C 1.700740 -1.681114 -0.681782
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C -0.001767 0.004729 -1.360733
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Sc 0.984054 -1.697015 2.070996
Sc -1.959899 0.000759 2.072532
Sc 0.987987 1.698084 2.071904

-----sbpc-sc3nc80-----

128

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C 1.988167 -2.949026 -5.108093
C 2.507065 -3.500930 -3.937077
C 1.810501 -4.706160 -1.738429
C -0.424356 -4.850261 -2.233224
H -1.341276 -3.711870 -4.760837
H 0.241747 -2.573779 -6.321820
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H 3.559714 -3.404969 -3.685161
C 2.145334 -4.103670 2.682080
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C 4.578521 -2.793812 3.041475
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C 2.403694 -3.490422 3.910851
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C -3.763643 2.980058 1.669284
C -3.103559 4.249530 1.835456
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C -0.697234 5.704855 1.832863
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C 0.180417 4.191547 3.549896
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C 1.429068 0.823272 3.589642
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C 0.030157 -1.030368 2.683199
C -2.974788 -0.941614 0.463682

C	-1.796443	-1.546187	1.043092	Sc	1.803800	1.841796	0.597732
C	-3.723826	0.573298	-1.157568		-----cora5CN-c60-----		
C	-3.088455	-0.717779	-0.982667	95			
C	-3.571535	2.859468	-2.027476				
C	-3.428714	1.456968	-2.255090	C	0.129579	-1.176253	-4.637121
C	-2.510998	4.922080	-1.778970	C	1.149824	-0.194226	-4.645240
C	-2.691871	3.796021	-2.664996	C	0.531298	1.079267	-4.626816
C	-0.870680	6.206766	-0.459705	C	-0.871342	0.884719	-4.608268
C	-1.278426	5.664344	-1.745883	C	-1.119395	-0.509568	-4.613767
C	0.628319	5.864093	1.314247	C	0.321187	-2.442378	-4.107242
C	0.529646	6.127046	-0.094843	C	2.414787	-0.414133	-4.123643
C	1.507599	4.374193	3.028738	C	1.133757	2.203729	-4.086140
C	2.240436	3.150526	3.233020	C	-1.751651	1.793658	-4.043994
C	1.751659	5.184197	1.888603	C	-2.254509	-1.077436	-4.058185
C	3.273746	2.729584	2.330912	C	-3.277818	-0.117057	-3.660015
C	2.481498	0.403001	2.699160	C	-3.028616	1.261139	-3.653231
C	3.458174	1.306075	2.122366	C	-1.148181	3.067538	-3.669254
C	1.027878	-1.396031	1.747856	C	0.239405	3.257076	-3.689525
C	2.261830	-0.674602	1.784765	C	3.147508	0.766287	-3.753682
C	-0.774568	-1.978053	0.129755	C	2.538703	2.027588	-3.735858
C	0.619994	-1.907765	0.485366	C	2.687712	-1.801420	-3.765543
C	-2.011000	-1.086793	-1.884934	C	1.676583	-2.770687	-3.758355
C	-0.875206	-1.745810	-1.300258	C	-0.907192	-3.126634	-3.719134
C	-2.450628	1.028939	-3.190633	C	-2.141021	-2.464053	-3.695742
C	-1.727905	-0.207657	-2.983731	H	-3.784631	1.923600	-3.239375
C	-1.651083	3.356055	-3.540646	H	0.642722	4.185262	-3.292433
C	-1.572884	1.960681	-3.835593	H	4.162297	0.674255	-3.374823
C	-0.250096	5.215905	-2.640154	H	1.909706	-3.760460	-3.373884
C	-0.439954	4.105430	-3.540723	H	-3.003392	-2.988296	-3.291666
C	1.558664	5.665181	-0.991417	C	-1.985599	4.087262	-3.123997
C	1.152025	5.248626	-2.286036	N	-2.700990	4.886300	-2.674671
C	2.800100	4.807621	1.000695	C	-4.505876	-0.608659	-3.122538
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C	2.703709	5.038447	-0.413251	C	-0.817939	-4.457405	-3.209444
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C	3.364349	3.960970	-1.092004	C	3.982093	-2.137281	-3.265171
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C	2.582662	-0.888999	-0.675480	C	-2.149368	-1.033347	-0.498963
C	-0.394244	-0.014643	-3.499593	C	-2.999038	-0.119168	0.239091
C	-0.301185	1.318042	-4.020287	C	-2.723141	1.251971	0.233173
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C	0.829031	3.468467	-3.741043	C	0.670542	1.042988	-1.198889
C	1.813315	4.177718	-2.971902	C	1.273946	-0.273712	-1.181058
C	2.900724	3.485949	-2.357498	C	0.207385	-1.254162	-1.189994
C	0.919748	2.055912	-3.933837	C	0.331493	-2.432063	-0.449589
C	3.556777	1.192135	-1.623939	C	-2.023063	-2.256855	0.269469
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C	1.973994	0.045292	-2.899750	C	-3.497800	-0.035879	2.652064
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Sc	-1.248966	0.454088	-0.230710	C	-0.993320	2.842471	0.249646
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C 0.793518 -0.889115 5.459945

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C	-4.003574	-0.862993	-1.468623
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C	-0.341797	-2.395990	-4.345345
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C	0.987081	-2.859495	-4.051939

C	-1.615913	-2.951072	-3.904171
C	-2.774618	-2.166360	-3.837583
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H	0.684023	4.169275	-3.608739
H	3.823683	0.314993	-3.804194
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C	-1.930160	4.336150	-3.325740
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C	-4.912097	-0.075444	-3.189678
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C	-1.642059	-4.282625	-3.389544
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C	-1.960725	-1.549367	4.367114
C	-0.749985	-1.263230	5.086208
C	0.204191	-2.298678	4.795911
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C	1.077482	0.352145	5.305071
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C	1.362660	2.147384	-0.837123	C	-1.205924	-2.135221	5.142257
C	0.420286	1.229190	-1.411043	C	-2.960669	-2.139215	3.445622
C	-1.697391	-0.636931	-1.203812	C	-3.793614	0.096436	2.680735
C	-0.358731	-1.086287	-1.452947	C	-3.624056	-1.313327	2.481807
C	2.200569	-1.916095	-0.566818	C	-3.781556	0.916177	1.516272
C	2.014521	-0.600275	-1.112512	C	-2.672268	2.789710	2.765360
C	0.722959	-0.158865	-1.531289	C	-3.216761	2.241943	1.553171
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Sc	1.074487	-1.789878	2.045158	C	-0.515110	2.734289	4.750648
Sc	-1.741638	0.097769	1.608665	C	-0.467257	3.583848	3.587735
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119							
C	-0.526807	-1.035329	-5.498858	C	2.217062	-1.043675	5.263687
C	0.609775	-0.194597	-5.579826	C	-0.547979	-3.200499	4.420848
C	0.166564	1.148908	-5.513297	C	0.870941	-3.037853	4.606737
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C	2.775386	0.486897	-4.836936	C	0.491959	4.007794	1.513712
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C	-0.413758	-1.027816	-2.076478
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