## Supporting Information

# A Computational Study of the Interaction of Trinuclear Regium Complexes of Pyrazolate with Anions 

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Pg. S77. Figure S1. Energy profiles $\left(\mathrm{kJ} \mathrm{mol}^{-1}\right)$ as a function of the $\mathrm{X}-\mathrm{X}$ distance $(\AA)$ in the 1:2 apical complexes. Only one of the $X$ anions in move further away from the $(\mathrm{Pz}-\mathrm{M})_{3}$ system.

Pg. S78-79 Figure S2. Electron density at the BCP (au) vs. the interatomic distance ( $\AA$ ).

Table S1. Molecular graph, electronic energy and geometry of the $(\mathrm{Pz}-\mathrm{Au})_{3}: \mathrm{X}^{-} \mathrm{n}$ complexes.


|  | $\mathrm{MP} 2=-1180.85680735$ NIMAG $=0$ |
| :---: | :---: |
|  | N,0.6800672465,0.020703612,2.6772411945 |
|  | N,-0.680095464,0.0207131258,2.6772512226 |
|  | N,2.6586210257,0.0206972805,-0.7496551245 |
|  | N,1.9785326059,0.0207548899,-1.9275787427 |
|  | N,-1.9785217127,0.0207556484,-1.9275652164 |
|  | N,-2.6586171652,0.0207078801,-0.7496434328 |
|  | C,1.1147408995,0.0304221767,3.9714240123 |
|  | C,-1.1147582901,0.0304488726,3.9714373215 |
|  | C,3.9967489033,0.030356647,-1.0203278597 |
|  | C,2.8819754952,0.0304540065,-2.9511228376 |
|  | C,-2.8819643717,0.0304368725,-2.9511088262 |
|  | C,-3.9967450028,0.0303532959,-1.0203171563 |
|  | C,-0.0000040458,0.0334121437,4.8297495989 |
|  | C,4.1826833671,0.0333523787,-2.4148937257 |
|  | C,-4.1826745365,0.0333362176,-2.4148830743 |
| $\bigcirc \rightarrow-\left(\begin{array}{c}\text { - }\end{array}\right.$ | H,2.182800768,0.0350775944,4.1802642143 |
|  | H,-2.1828163869,0.0351310632,4.1802883734 |
|  | H,4.7116521253,0.0349696889,-0.1997915025 |
|  | H,2.5287952349,0.0351721305,-3.9805058387 |
|  | H,-2.5287819455,0.0351462594,-3.9804911429 |
|  | H,-4.7116493384,0.0349724337,-0.1997821784 |
|  | H,0.0000025247,0.0364999114,5.9189289853 |
|  | H,5.1259343636,0.036405956,-2.9594938798 |
|  | H,-5.1259237452,0.0363813632,-2.9594865883 |
|  | Au,1.662557897,-0.0089498858,0.9598766623 |
|  | Au, $0.0000025529,-0.0087043843,-1.919637215$ |
|  | Au,-1.6625461381,- |
|  | 0.0088957083,0.9598745037 |
|  | F,-0.0000168667,-1.7001114701,-0.0000517468 |


|  | $\begin{aligned} & \mathrm{MP} 2=-1180.86175663 \mathrm{NIMAG}=0 \\ & \mathrm{~N},-0.6805381842,0 .,-2.901753165 \\ & \mathrm{~N}, 0.6805381842,0 .,-2.901753165 \\ & \mathrm{~N},-2.7122653698,0 ., 0.4838306746 \\ & \mathrm{~N},-1.9647988648,0 ., 1.6182925702 \\ & \mathrm{~N}, 1.9647988648,0 ., 1.6182925702 \\ & \mathrm{~N}, 2.7122653698,0 ., 0.4838306746 \\ & \mathrm{C},-1.1146071046,0 .,-4.1970082244 \\ & \mathrm{C}, 1.1146071046,0 .,-4.1970082244 \\ & \mathrm{C},-4.0343153338,0 ., 0.8370160136 \\ & \mathrm{C},-2.7866567754,0 ., 2.7035545746 \\ & \mathrm{C}, 2.7866567754,0 ., 2.7035545746 \\ & \mathrm{C}, 4.0343153338,0 ., 0.8370160136 \\ & \mathrm{C}, 0 ., 0 .,-5.0538388065 \\ & \mathrm{C},-4.1188090253,0 ., 2.2428321966 \\ & \mathrm{C}, 4.1188090253,0 ., 2.2428321966 \\ & \mathrm{H},-2.1825935155,0 .,-4.4065198157 \\ & \mathrm{H}, 2.1825935155,0 .,-4.4065198157 \\ & \mathrm{H},-4.8038071091,0 ., 0.0663918324 \\ & \mathrm{H},-2.3088235269,0 ., 3.6870411416 \\ & \mathrm{H}, 2.3088235269,0 ., 3.6870411416 \\ & \mathrm{H}, 4.8038071091,0 ., 0.0663918324 \\ & \mathrm{H}, 0 ., 0 .,-6.1426948987 \\ & \mathrm{H},-5.0269783083,0 ., 2.8442301969 \\ & \mathrm{H}, 5.0269783083,0 ., 2.8442301969 \\ & \text { Au,-1.7063229334,0.,-1.2124144914} \\ & \text { Au,0.,0.,1.6110242171} \\ & \text { Au, } 1.7063229334,0 .,-1.2124144914 \\ & \mathrm{~F}, 0 ., 0 ., 4.0452749591 \end{aligned}$ |
| :---: | :---: |


|  | MP2 $=-1180.84901612$ NIMAG $=0$ |
| :---: | :---: |
|  | N,-0.6817423849,0.,-10.9846909446 |
|  | $\mathrm{N}, 0.6817423849,0 .,-10.9846909446$ |
|  | N,-2.6450200914,0,.,-7.570781069 |
|  | N,-1.9701430592,0.,-6.3902411174 |
|  | $\mathrm{N}, 1.9701430592,0 .,-6.3902411174$ |
|  | N,2.6450200914,0.,-7.570781069 |
| © | C,-1.1036318386,0.,-12.2929643051 |
|  | C,1.1036318386,0.,-12.2929643051 |
| + | C,-3.9830397822,0,.-7.3026797254 |
|  | C,-2.8749881659,0,.-5.3656722725 |
|  | C,2.8749881659,0.,-5.3656722725 |
| $\cdot$ | C,3.9830397822,0.,-7.3026797254 |
| $0-1$ | C,0.,0.,-13.167228275 |
| - | C,-4.1705610247,0,--5.9087607527 |
| - | C,4.1705610247,0.,-5.9087607527 |
| - | H,-2.1732183065,0.,-12.502199928 |
|  | H,2.1732183065,0.,-12.502199928 |
|  | H,-4.6978362287,0.,-8.1235961284 |
|  | H,-2.5268992704,0.,-4.3343555262 |
| $6$ | H,2.5268992704,0.,-4.3343555262 |
|  | H,4.6978362287,0.,-8.1235961284 |
|  | H,0.,0.,-14.3281221762 |
|  | H,-5.1152255124,0.,-5.3677774477 |
|  | H,5.1152255124,0.,-5.3677774477 |
|  | Au,-1.6564911013,0.,-9.2853007195 |
|  | Au, $0 ., 0 .,-6.3923842803$ |
|  | Au, 1.6564911013,0.,-9.2853007195 |
|  | F, 0,,0.,-15.8361418537 |



MP2 $=-1540.90104623$ NIMAG $=0$ $\mathrm{N}, 0.6791334591,0.0409145135,2.6761106288$ $\mathrm{N},-0.6791501776,0.0408991688,2.6761255902$ $\mathrm{N}, 2.6571328069,0.0409235545,-0.7499190583$ N,1.9780206023,0.0408520272,-1.9262518374 N,-1.9780230269,0.0408557384,-1.9262450601 N,-2.6571486988,0.0409127746,-0.7499170696 C,1.1151320133,0.0559309231,3.9696159772

C,-1.1151166048,0.0559084439,3.9696415395
C,3.9953457447,0.0559952982,-1.0190608908
C,2.8802851891,0.0559033678,-2.9505411115
C,-2.8802765797,0.055923383,-2.9505443855
C,-3.9953570613,0.0559928059,-1.0190786326

|  | C,0.0000179467,0.0630167916,4.8272089768 <br> C,4.1805156178,0.0630737982,-2.4135672066 <br> C,-4.1805122525,0.0630873388,-2.4135866222 <br> H,2.1831228715,0.0569284301,4.1790195581 <br> H,-2.1831024408,0.0568815921,4.1790708547 <br> H,4.7106758671,0.0570321441,-0.1988427799 <br> H,2.5276890563,0.0568408038,-3.9801673074 <br> Н,-2.5276700727,0.0568740461,-3.9801672169 <br> Н,-4.7106962147,0.0570189297,-0.1988687233 <br> H,0.0000308826,0.0672048695,5.9162705407 <br> H,5.1236880471,0.0672933134,-2.9580678348 <br> H,-5.1236785517,0.067313222,-2.9580979009 <br> Au,1.6566973497,0.0049542163,0.9564907548 <br> Au,-0.0000023911,0.0047202939,-1.9132023361 <br> Au,-1.6567541426,0.0049052654,0.9565217335 <br> $\mathrm{Cl}, 0.000000761,-2.3281570539,0.0000498196$ |
| :---: | :---: |
|  | MP2 $=-1540.90658571$ NIMAG $=0$ <br> $\mathrm{N},-0.6800295939,0 .,-2.900904195$ <br> $\mathrm{N}, 0.6800295939,0 .,-2.900904195$ <br> $\mathrm{N},-2.6755074668,0 ., 0.4990747209$ <br> N,-1.974810961,0.,1.6656834373 <br> $\mathrm{N}, 1.974810961,0 ., 1.6656834373$ <br> $\mathrm{N}, 2.6755074668,0,0.4990747209$ <br> C,-1.1152629553,0.,-4.1954744323 <br> C,1.1152629553,0.,-4.1954744323 <br> C,-4.0117139144,0.,0.7916056519 <br> C,-2.8519101834,0.,2.7094948231 <br> C,2.8519101834,0.,2.7094948231 <br> C,4.0117139144,0.,0.7916056519 <br> C,0.,0.,-5.0515590849 <br> C,-4.1605125647,0.,2.1900271864 <br> C,4.1605125647,0.,2.1900271864 <br> Н,-2.1831261166,0.,-4.4057981779 <br> H,2.1831261166,0.,-4.4057981779 <br> Н,-4.7440168782,0.,-0.0144258131 <br> H,-2.4435372761,0.,3.7224037654 <br> H,2.4435372761,0.,3.7224037654 <br> H,4.7440168782,0.,-0.0144258131 <br> Н,0.,0.,-6.1403279546 <br> Н,-5.0929455418,0.,2.7525490093 <br> H,5.0929455418,0.,2.7525490093 <br> Au,-1.6786380996,0.,-1.197140686 <br> Au,0.,0.,1.6962735372 |


|  | $\mathrm{Au}, 1.6786380996,0 .,-1.197140686$ $\mathrm{Cl}, 0 ., 0 ., 4.6521754008$ |
| :---: | :---: |
|  | MP2 $=-1540.89064026$ NIMAG $=0$ |
|  | N,-0.6813723354,0.,-10.9619819163 |
|  | $\mathrm{N}, 0.6813723354,0 .,-10.9619819163$ |
|  | N,-2.6454968029,0,.,-7.5483528014 |
|  | N,-1.9700539529,0,.-6.3680210556 |
|  | N,1.9700539529,0.,-6.3680210556 |
|  | N,2.6454968029,0.,-7.5483528014 |
|  | C,-1.1099880385, $0 .,-12.2642207561$ |
|  | C,1.1099880385,0.,-12.2642207561 |
|  | C,--3.9839844357,0.,-7.2809302459 |
|  | C,-2.8754330233,0.,-5.3441366658 |
|  | C,2.8754330233,0.,-5.3441366658 |
|  | C,3.9839844357,0.,-7.2809302459 |
|  | C,0.,0.,-13.1247662051 |
|  | C,-4.1708466642,0.,-5.8874204229 |
|  | C,4.1708466642,0.,-5.8874204229 |
|  | H,-2.1768670309,0.,-12.4816004725 |
|  | H,2.1768670309,0.,-12.4816004725 |
|  | H,-4.6988958259,0.,-8.1017221205 |
|  | H,-2.5277622086,0.,-4.3127190274 |
|  | H,2.5277622086,0.,-4.3127190274 |
|  | Н,4.6988958259,0.,-8.1017221205 |
|  | H,0.,0.,-14.2276318657 |
|  | Н,-5.1154776823,0.,-5.346509899 |
|  | H,5.1154776823,0,.,-5.346509899 |
|  | Au,-1.6583011531,0.,-9.2604460865 |
|  | Au, $0,0.0,-6.3687095013$ |
|  | Au,1.6583011531,0.,-9.2604460865 |
|  | Cl,0., $0 .,-16.5446860632$ |



|  | C,-2.8804305287,0.0622400209,-2.9507289929 C,--3.9956118529,0.0621969962,-1.0191451916 C,-0.0000132154,0.0712658848,4.8272752646 C,4.1805457366,0.071260564,-2.4136430009 C,-4.1805538903,0.0712298817,-2.4136330946 H,2.1831693482,0.0627609479,4.179370444 H,-2.1831772571,0.0628752128,4.1793053581 Н,4.7110056696,0.0627079819,-0.1989895608 H,2.5278236272,0.0629140782,-3.9803536402 Н,-2.5278435449,0.0628317387,-3.9803603786 H,-4.7109977733,0.0627502617,-0.1989740611 Н,-0.0000285735,0.0774969336,5.9163278347 Н,5.1236910163,0.0775078276,-2.9581719932 H,-5.1237037935,0.077453385,-2.9581546161 Au,1.6546940839,0.0033546417,0.9553364625 Au,0.0000004386,0.0033692737,-1.9106406359 Au,-1.6546275076,0.0034061066,0.9553014204 $\mathrm{Br},-0.0000091593,-2.4715629615,0.0000193774$ |
| :---: | :---: |
|  | MP2 $=-1496.89712782$ NIMAG $=0$ <br> N,-0.6799415778,0.,-2.9041356498 <br> $\mathrm{N}, 0.6799415778,0 .,-2.9041356498$ <br> N,-2.6647602565,0.,0.500187961 <br> N,-1.977698692,0.,1.6752873451 <br> $\mathrm{N}, 1.977698692,0 ., 1.6752873451$ <br> $\mathrm{N}, 2.6647602565,0 ., 0.500187961$ <br> C,-1.1154601618,0.,-4.1984920349 <br> C,1.1154601618,0.,-4.1984920349 <br> C,-4.0046532122,0,,0.7753721996 <br> C,-2.87011039,0.,2.7067754625 <br> C,2.87011039,0.,2.7067754625 <br> C,4.0046532122,0.,0.7753721996 <br> C,0.,0.,-5.0543777982 <br> C,-4.1716473105,0.,2.1711684112 <br> C,4.1716473105,0.,2.1711684112 <br> Н,-2.1832913314,0.,-4.4090257566 <br> H,2.1832913314,0.,-4.4090257566 <br> Н,-4.7259684313,0.,-0.0405062555 <br> Н,-2.4809834614,0.,3.7265672563 <br> Н,2.4809834614,0.,3.7265672563 <br> Н,4.7259684313,0.,-0.0405062555 <br> Н,0.,0.,-6.1431297378 <br> Н,-5.1106122131,0.,2.7225981654 <br> H,5.1106122131,0.,2.7225981654 |


|  | $\mathrm{Au},-1.6696137474,0 .,-1.195647327$ <br> Au,0.,0.,1.720120019 <br> Au,1.6696137474,0.,-1.195647327 <br> $\mathrm{Br}, 0,0 ., 4.8078404413$ |
| :---: | :---: |
|  | MP2 $=-1496.88058761$ NIMAG $=0$ $\mathrm{N},-0.6813253646,0 .,-10.9556529581$ $\mathrm{N}, 0.6813253646,0 .,-10.9556529581$ $\mathrm{N},-2.6456935127,0 .,-7.5422218716$ $\mathrm{N},-1.9700219437,0 .,-6.3619681489$ N,1.9700219437,0.,-6.3619681489 N,2.6456935127,0.,-7.5422218716 C,-1.110692007,0.,-12.2570548574 C,1.110692007,0.,-12.2570548574 С,-3.9841658867,0.,-7.2747882984 С,-2.8753366232,0.,-5.3381525634 C,2.8753366232,0.,-5.3381525634 C,3.9841658867,0.,-7.2747882984 C,0.,0.,-13.1161399088 <br> С,-4.1708017307,0.,-5.8813133964 C,4.1708017307,0.,-5.8813133964 Н,-2.1773302748,0.,-12.4752413468 Н,2.1773302748,0.,-12.4752413468 Н,-4.6992931158,0.,-8.0953920697 H,-2.5277677101,0.,-4.3067023202 H,2.5277677101,0.,-4.3067023202 Н,4.6992931158,0.,-8.0953920697 Н, $0 ., 0 .,-14.2153091476$ Н,-5.1153582886,0.,-5.3403102295 H,5.1153582886,0.,-5.3403102295 Au,-1.6587344432,0.,-9.2539238953 Au,0.,0.,-6.3626603619 <br> $\mathrm{Au}, 1.6587344432,0 .,-9.2539238953$ $\mathrm{Br}, 0 ., 0 .,-16.7223632501$ |



MP2 $=-1280.43876196$ NIMAG $=0$ $\mathrm{N}, 0.680801075,0.0000406471,2.6877643192$ $\mathrm{N},-0.6807698315,0.0000411467,2.687742417$ $\mathrm{N}, 2.6680693575,0.0000407693,-0.7542951074$ $\mathrm{N}, 1.9872696181,0.0000415996,-1.9334423943$ $\mathrm{N},-1.987273836,0.0000420215,-1.9334505207$ N,-2.668059839,0.0000417293,-0.7543011606 C,1.1139576191,-0.0000251536,3.9823463441 C,-1.1139678772,-0.0000286708,3.9823111553

|  | C,4.0057890355,-0.0000232722,-1.0264568545 C, $2.891803457,-0.0000290332,-2.9558839041$ C,-2.8918183103,-0.0000249281,-2.9558823558 C,-4.0057842087,-0.0000232565,-1.0264423616 C,-0.000019002,0.0000029403,4.8460881301 C,4.1968284494,0.000003037,-2.4230593196 C,-4.1968379807,0.0000024247,-2.423042945 H,2.1829850712,-0.0000447475,4.1869902976 Н,-2.1830015169,-0.0000514707,4.1869217983 H,4.7175255824,-0.000041509,-0.2029707301 Н,2.5344902965,-0.0000526033,-3.9840018799 Н,-2.5345141068,-0.0000456594,-3.9840030488 Н,-4.7175124353,-0.0000424794,-0.2029486278 Н,-0.0000362438,-0.0000021423,5.9368029583 H,5.1414087385,-0.0000022734,-2.9684277263 Н,-5.1414244494,-0.0000041071,-2.968400908 $\mathrm{Au}, 1.6672768816,0.000047114,0.9626033234$ Au,-0.0000042749,0.0000481888,-1.9251569303 Au,-1.6672334028,0.0000477198,0.962571627 F,0.0000258279,-1.7671969703,0.0000121021 F,0.0000263054,1.7672389389,0.0000123023 |
| :---: | :---: |
|  | MP2 $=-1280.49543687$ NIMAG $=0$ <br> N,0.8110494397,0.0009357636,2.6314489576 <br> $\mathrm{N},-0.5560072514,0.0005511404,2.5995958816$ <br> $\mathrm{N}, 2.7482441568,0.0004781782,-0.8012985781$ <br> $\mathrm{N}, 2.0680368612,-0.0004804328,-1.9794276147$ <br> $\mathrm{N},-1.8733901846,-0.0009441908,-2.0180940749$ <br> N,-2.5293363916,-0.0005965742,-0.8182648933 <br> C,1.2596909374,0.0008968791,3.9267948815 <br> C,-1.0032576064,0.0003520185,3.8920897097 <br> C,4.0870094962,0.0006729443,-1.0698518248 <br> C,2.9699768079,-0.0006879893,-3.0045698388 <br> C,-2.7708654841,-0.0008564559,-3.0543075284 <br> C,-3.8722920461,-0.0003532781,-1.0771866565 <br> C,0.1109931762,0.0004679965,4.7489572372 <br> C,4.2694786577,-0.0000155611,-2.4650281732 <br> С,-4.0572301868,-0.0005239205,-2.4705928735 <br> H,2.3656089943,0.0012286548,4.2168200694 <br> Н,-2.075143005,0.0001974573,4.0881048577 <br> Н,4.7993215774,0.0013585471,-0.2460967329 <br> H,2.6127145185,-0.0013738005,-4.0333206619 <br> Н,-2.4690294809,-0.0011494178,-4.1570632178 <br> H,-4.5779911728,-0.000200862,-0.2469166115 |


|  | H,0.1059506772,0.0003593825,5.838531812 Н,5.2126563048,-0.0000184226,-3.0095839055 Н,-5.0033506744,-0.0004508993,-3.0110130793 Au,1.7807547389,0.0007475611,0.9225631244 $\mathrm{Au}, 0.0913937432,-0.0007244466,-2.0034927909$ $\mathrm{Au},-1.5334333899,-0.0000342421,0.8853289813$ F,3.8282555425,0.001239914,4.8442881858 <br> F,-2.2808435487,-0.0010759437,-5.7374404209 |
| :---: | :---: |
|  | MP2 $=-1280.49691184$ NIMAG $=0$ $\mathrm{~N}, 0.6797695543,0 ., 2.6247512181$ $\mathrm{~N},-0.6797695543,0 ., 2.6247512181$ $\mathrm{~N}, 2.6530586093,0 .,-0.7840201386$ $\mathrm{~N}, 1.9735077384,0 .,-1.9654095233$ $\mathrm{~N},-1.9735077384,0 .,-1.9654095233$ $\mathrm{~N},-2.6530586093,0 .,-0.7840201386$ $\mathrm{C}, 1.1157371754,0 ., 3.9189321511$ $\mathrm{C},-1.1157371754,0 ., 3.9189321511$ $\mathrm{C}, 3.9987441967,0 .,-1.0627757567$ $\mathrm{C}, 2.8999013703,0 .,-2.9790886579$ $\mathrm{C},-2.8999013703,0 .,-2.9790886579$ $\mathrm{C},-3.9987441967,0 .,-1.0627757567$ $\mathrm{C}, 0 ., 0 ., 4.775532096$ $\mathrm{C}, 4.2083214005,0 .,-2.4540273994$ $\mathrm{C},-4.2083214005,0 .,-2.4540273994$ $\mathrm{H}, 2.1839552952,0 ., 4.1284608808$ $\mathrm{H},-2.1839552952,0 ., 4.1284608808$ $\mathrm{H}, 4.7120422376,0 .,-0.2390412002$ $\mathrm{H}, 2.5496945308,0 .,-4.0109710322$ $\mathrm{H},-2.5496945308,0 .,-4.0109710322$ H,-4.7120422376,0.,-0.2390412002 H,0.,0.,5.8645075721 H,5.2099943509,0.,-2.9981302799 H,-5.2099943509,0.,-2.9981302799 Au,1.6681122205,0.,0.9104484719 Au,0.,0.,-1.967448798 Au,-1.6681122205,0.,0.9104484719 F,6.6800955163,0.,-3.6754241619 F,-6.6800955163,0.,-3.6754241619 |


|  | MP2 $=-2000.54233916$ NIMAG $=0$ <br> N,0.6785309248,0.0003302024,2.6789712236 <br> N,-0.6785344739,0.0003290561,2.6789732484 <br> N,2.659350029,0.0003290934,-0.7518481976 <br> N,1.9808034823,0.0003290921,-1.927103221 <br> $\mathrm{N},-1.9808037444,0.0003291708,-1.9271095307$ <br> $\mathrm{N},-2.6593390742,0.0003286271,-0.7518538834$ <br> C,1.1146007668,-0.0000477272,3.9718196556 <br> C,-1.1146125066,-0.0000481927,3.9718193347 <br> C,3.9970235422,-0.0000502917,-1.0206350747 <br> C,2.8823999683,-0.0000484631,-2.9511844214 <br> C,-2.8824058055,-0.00004449124,-2.9511863222 <br> C,-3.99701388,-0.0000531031,-1.0206309493 <br> C,-0.000006813,-0.0002911325,4.8331485481 <br> C,4.1856395537,-0.0002932144,-2.4165793417 <br> C,-4.1856420839,-0.0002920691,-2.4165735405 <br> H,2.1833068222,-0.0000762689,4.1781341891 <br> Н,-2.1833185108,-0.0000770926,4.1781300793 <br> H,4.7100585622,-0.0000800736,-0.1982735793 <br> H,2.5267143972,-0.0000768117,-3.9798660211 <br> Н,-2.5267266871,-0.0000699783,-3.9798701746 <br> Н,-4.7100409899,-0.0000856077,-0.1982629463 <br> Н,-0.0000071352,-0.0006106709,5.9232601136 <br> H,5.1296989183,-0.0006137176,-2.9616430653 <br> Н,-5.1297062396,-0.0006116459,-2.9616293345 <br> Au,1.6535157977,0.0004485543,0.9546538862 <br> $\mathrm{Au}, 0.0000008864,0.0004476528,-1.9092965694$ <br> Au,-1.653495878,0.0004473604,0.9546445105 <br> Cl,0.000005191,-2.5993979209,-0.0000037783 <br> Cl,0.00000498,2.5995500848,-0.0000048376 |
| :---: | :---: |


|  |  |
| :---: | :---: |


|  | MP2 $=-2000.58945267$ NIMAG= 0 |
| :---: | :---: |
|  | N,0.6798275862,0.,2.6059666934 |
|  | $\mathrm{N},-0.6798275862,0.2 .6059666934$ |
|  | $\mathrm{N}, 2.6524598057,0 .,-0.8032712627$ |
|  | N,1.9725453828,0.,-1.9838947602 |
|  | N,-1.9725453828,0.,-1.9838947602 |
|  | N,-2.6524598057,0.,-0.8032712627 |
| 9 | C,1.1158976055,0.,3.9000387726 |
|  | C,-1.1158976055,0.,3.9000387726 |
|  | C,3.9955995458,0.,-1.0751908367 |
|  | C,2.8903879858,0.,-3.0015818101 |
| a | C,-2.8903879858,0.,-3.0015818101 |
| $f .0-\infty$ | C,-3.9955995458,0.,-1.0751908367 |
|  | C,0.,0.,4.7556351544 |
| $5$ | C,4.1906058329,0.,-2.4654578701 |
| $7$ | C,-4.1906058329,0.,-2.4654578701 |
| 1 | H,2.1839443694,0.,4.1102560926 |
|  | H,-2.1839443694,0.,4.1102560926 |
|  | H,4.7182899512,0,--0.261135622 |
|  | H,2.5434327854,0.,-4.0336615929 |
|  | H,-2.5434327854,0.,-4.0336615929 |
|  | H,-4.7182899512,0,.,-0.261135622 |
|  | H,0.,0.,5.8444029805 |
|  | H,5.1608168895, $0 .,-2.9803102775$ |
|  | H,-5.1608168895,0.,-2.9803102775 |
|  | Au, 1.66689024,0.,0.8941438039 |
|  | Au, 0., $0 .,-1.9861368901$ |
|  | Au,-1.66689024,0,0.09941438039 |
|  | Cl,7.591113127,0.,-3.4628519509 |
|  | Cl,-7.591113127,0.,-3.4628519509 |



MP2 $=-1912.53243794$ NIMAG $=0$ $\mathrm{N}, 0.6783435936,-0.0001340144,2.6788140394$
N,-0.6783394473,-0.0001322153,2.6788112177
N,2.6590856906,-0.0001235768,-0.751954584
N,1.9807566943,-0.000117549,-1.9268792413
N,-1.980761903,-0.0001167982,-1.9268734286
$\mathrm{N},-2.6590977213,-0.0001286461,-0.7519508221$
C,1.114776051,0.000027442,3.9714324148
C,-1.1147699011,0.0000071632,3.9714289798
C,3.9967463756,0.0000469967,-1.0202858381
C,2.8819972877,0.0000229508,-2.9511350362
C,-2.8819930104,-0.0000251285,-2.9511359636

|  | C,-3.9967560911,0.0000871162,-1.0202855144 <br> C,0.0000029875,0.0000943106,4.8322873768 <br> C,4.1849032482,0.0001152348,-2.4161315852 <br> C,-4.1849013853,0.0001102815,-2.4161341614 <br> H,2.1834471119,0.0000512079,4.1778131506 <br> Н,-2.1834406132,0.0000121366,4.1778071788 <br> H,4.7098012946,0.0000735097,-0.1979710099 <br> H,2.5264013141,0.0000275493,-3.9798234914 <br> H,-2.5263922479,-0.0000614881,-3.979822922 <br> Н,-4.7098159221,0.0001539003,-0.197973756 <br> H,0.0000029009,0.000204246,5.9223122338 <br> H,5.1288986643,0.0002296685,-2.9611346486 <br> Н,-5.1288936438,0.0002233463,-2.9611413547 <br> Au,1.6504818999,-0.0001578454,0.9528997361 <br> Au,-0.0000033128,-0.0001470967,-1.9058459253 <br> $\mathrm{Au},-1.6504790816,-0.0001587563,0.952894484$ <br> $\mathrm{Br}, 0.0000001176,-2.7416251275,-0.000019256$ <br> Br,-0.000000951,2.7414411814,-0.00000022727 |
| :---: | :---: |
|  | $\begin{aligned} & \mathrm{MP} 2=-1912.57058889 \mathrm{NIMAG}=0 \\ & \mathrm{~N}, 0.6788265939,0 ., 2.6714444986 \\ & \mathrm{~N},-0.6826812415,0 ., 2.6741653113 \\ & \mathrm{~N}, 2.6498344328,0 .,-0.7433273148 \\ & \mathrm{~N}, 1.9686575543,0 .,-1.9231602773 \\ & \mathrm{~N},-1.9741255036,0 .,-1.9236033245 \\ & \mathrm{~N},-2.6572357143,0 .,-0.7458633578 \\ & \mathrm{C}, 1.128938146,0 ., 3.9583618181 \\ & \mathrm{C},-1.1124373799,0 ., 3.9729870007 \\ & \mathrm{C}, 3.989456589,0 .,-1.0053628925 \\ & \mathrm{C}, 2.8653980994,0 .,-2.9522893071 \\ & \mathrm{C},-2.8635728188,0 .,-2.9568700228 \\ & \mathrm{C},-3.9969263614,0 .,-1.0230944693 \\ & \mathrm{C}, 0.0127954484,0 ., 4.8180176191 \\ & \mathrm{C}, 4.1629379957,0 .,-2.4034733724 \\ & \mathrm{C},-4.1661279299,0 .,-2.420089993 \\ & \mathrm{H}, 2.2089632766,0 ., 4.1282435834 \\ & \mathrm{H},-2.1799410458,0 ., 4.1888723187 \\ & \mathrm{H}, 4.6857744044,0 .,-0.1645603222 \\ & \mathrm{H}, 2.4854006217,0 .,-3.9757195095 \\ & \mathrm{H},-2.4706821779,0 .,-3.9771401053 \\ & \mathrm{H},-4.7176403641,0 .,-0.206551835 \\ & \mathrm{H}, 0.0198746446,0 ., 5.9073987589 \\ & \mathrm{H}, 5.1064469711,0 .,-2.9482085334 \\ & \mathrm{H},-5.1060200732,0 .,-2.9709113267 \end{aligned}$ |


|  | $\mathrm{Au}, 1.6909096052,0,0.9775995718$ Au,-0.0011712613,0.,-1.9531704595 $\mathrm{Au},-1.6658560965,0 ., 0.9617824657$ Br,4.6071927542,0.,2.8308873143 Br,-0.1480239522,0.,-5.4053896224 |
| :---: | :---: |
|  | $\begin{aligned} & \mathrm{MP} 2=-1912.57112067 \mathrm{NIMAG}=0 \\ & \mathrm{~N}, 0.6798731457,0 ., 2.5800906973 \\ & \mathrm{~N},-0.6798731457,0 ., 2.5800906973 \\ & \mathrm{~N}, 2.6542162787,0 .,-0.828334765 \\ & \mathrm{~N}, 1.9721604397,0 .,-2.0077635252 \\ & \mathrm{~N},-1.9721604397,0 .,-2.0077635252 \\ & \mathrm{~N},-2.6542162787,0 .,-0.828334765 \\ & \mathrm{C}, 1.1159287103,0 ., 3.8741531808 \\ & \mathrm{C},-1.1159287103,0 ., 3.8741531808 \\ & \mathrm{C}, 3.9965665053,0 .,-1.100971359 \\ & \mathrm{C}, 2.8871191642,0 .,-3.0274678956 \\ & \mathrm{C},-2.8871191642,0 .,-3.0274678956 \\ & \mathrm{C},-3.9965665053,0 .,-1.100971359 \\ & \mathrm{C}, 0 ., 0 ., 4.7295617914 \\ & \mathrm{C}, 4.1867672155,0 .,-2.491476628 \\ & \mathrm{C},-4.1867672155,0 .,-2.491476628 \\ & \mathrm{H}, 2.1839667005,0 ., 4.084443362 \\ & \mathrm{H},-2.1839667005,0 ., 4.084443362 \\ & \mathrm{H}, 4.7241893787,0 .,-0.2914294956 \\ & \mathrm{H}, 2.5379982211,0 .,-4.0587453654 \\ & \mathrm{H},-2.5379982211,0 .,-4.0587453654 \\ & \mathrm{H},-4.7241893787,0 .,-0.2914294956 \\ & \mathrm{H}, 0 ., 0 ., 5.8182948907 \\ & \mathrm{H}, 5.1560172542,0 .,-3.0006458446 \\ & \mathrm{H},-5.1560172542,0 .,-3.0006458446 \\ & \text { Au, 1.6681040204,0.,0.8694980197} \\ & \text { Au, } 0 ., 0 .,-2.0089299144 \\ & \text { Au,-1.6681040204,0.,0.8694980197 } \\ & \text { Br,7.8494902795,0.,-3.1208137654 } \\ & \text { Br,-7.8494902795,0.,-3.1208137654 } \end{aligned}$ |


|  | MP2 $=-1380.09592555$ NIMAG $=0$ |
| :---: | :---: |
|  | X |
|  | X,1,r21 |
|  | X,1,r21,2,120. |
|  | X,1,r21,2,120.,3,180.,0 |
|  | N,2,r52,1,90.,3,0.,0 |
|  | N,2,r52,1,90.,4,0.,0 |
|  | N,3,r52,1,90.,2,0.,0 |
|  | N,3,r52,1,90.,4,0.,0 |
|  | N,4,r52,1,90.,3,0.,0 |
|  | N,4,r52,1,90.,2,0.,0 |
|  | C,5,r115,2,a1152,1,180.,0 |
|  | C,6,r115,2,a1152,1,180.,0 |
|  | C,7,r115,3,a1152,1,180.,0 |
|  | C,8,r115,3,a1152,1,180.,0 |
| + | C,9,r115,4,a1152,1,180.,0 |
| ! | C,10,r115,4,a1152,1,180.,0 |
|  | C,1,r171,3,120.,2,0.,0 |
|  | C,1,r171,4,120.,3,0.,0 |
| of. | C,1,r171,2,120.,4,0.,0 |
| $\downarrow$ | H,11,r2011,5,a20115,2,180.,0 |
|  | H,12,r2011,6,a20115,2,180.,0 |
| ${ }_{y}$ | H,13,r2011,7,a20115,3,180.,0 |
|  | H,14,r2011,8,a20115,3,180.,0 |
|  | H,15,r2011,9,a20115,4,180.,0 |
|  | H,16,r2011,10,a20115,4,180.,0 |
|  | H,1,r261,3,120.,2,0.,0 |
| に. | H,1,r261,4,120.,3,0.,0 |
|  | H,1,r261,2,120.,4,0.,0 |
|  | Au,1,r291,3,60.,2,0.,0 |
|  | Au,1,r291,4,60.,3,0.,0 |
|  | Au,1,r291,2,60.,4,0.,0 |
|  | F,1,rf,29,60.,2,180.,0 |
|  | F,1,rf,30,60.,3,180.,0 |
|  | F,1,rf,31,60.,4,180.,0 |
|  | r21 $=2.67223497$ |
|  | r52 $=0.68119758$ |
|  | r115=1.37313143 |
|  | $\mathrm{r} 171=4.8522309$ |
|  | r2011=1.08955811 |
|  | r261=5.97840667 |
|  | r291=1.9254901 |


|  | $\begin{aligned} & \mathrm{a} 1152=107.98694139 \\ & \text { a20115 }=119.02515627 \\ & \mathrm{rf}=7.71367068 \end{aligned}$ |
| :---: | :---: |
|  | $\mathrm{MP} 2=-2460.24657873$ NIMAG $=0$ $\mathrm{~N}, 0.6809545795,0 ., 2.6708887047$ $\mathrm{~N},-0.6809545795,0 ., 2.6708887047$ $\mathrm{~N}, 2.6535343801,0 .,-0.7457160323$ $\mathrm{~N}, 1.9725707821,0 .,-1.9251550129$ $\mathrm{~N},-1.9725707821,0 .,-1.9251550129$ $\mathrm{~N},-2.6535343801,0 .,-0.7457160323$ $\mathrm{C}, 1.1104970093,0 ., 3.9718823012$ $\mathrm{C},-1.1104970093,0 ., 3.9718823012$ $\mathrm{C}, 3.9949963361,0 .,-1.0242276463$ $\mathrm{C}, 2.884482493,0 .,-2.9476558113$ $\mathrm{C},-2.884482493,0 .,-2.9476558113$ $\mathrm{C},-3.9949963361,0 .,-1.0242276463$ $\mathrm{C}, 0 ., 0 ., 4.8345613364$ $\mathrm{C}, 4.1868381436,0 .,-2.4172886348$ $\mathrm{C},-4.1868381436,0 .,-2.4172886348$ $\mathrm{H}, 2.1779046615,0 ., 4.1862413399$ $\mathrm{H},-2.1779046615,0 ., 4.1862413399$ $\mathrm{H}, 4.7143456034,0 .,-0.2070098031$ $\mathrm{H}, 2.5364101413,0 .,-3.9792348591$ $\mathrm{H},-2.5364101413,0 .,-3.9792348591$ $\mathrm{H},-4.7143456034,0 .,-0.2070098031$ $\mathrm{H}, 0 ., 0 ., 5.931778746$ $\mathrm{H}, 5.1370516344,0 .,-2.9659053312$ $\mathrm{H},-5.1370516344,0 .,-2.9659053312$ Au,1.6666696574,0.,0.9622554284 Au,0.,0.,-1.9244509373 Au,-1.6666696574,0.,0.9622554284 $\mathrm{Cl}, 7.4330396688,0 .,-4.2915000533$ $\mathrm{Cl},-7.4330396688,0 .,-4.2915000533$ $\mathrm{Cl}, 0 ., 0 ., 8.5829626372$ |


|  | $\begin{aligned} & \mathrm{MP} 2=-2328.22079785 \mathrm{NIMAG}=0 \\ & \mathrm{~N}, 0.6809022065,0 ., 2.6706431794 \\ & \mathrm{~N},-0.6809022065,0 ., 2.6706431794 \\ & \mathrm{~N}, 2.6532521419,0 .,-0.7456156703 \\ & \mathrm{~N}, 1.972361616,0 .,-1.9249712234 \\ & \mathrm{~N},-1.972361616,0 .,-1.9249712234 \\ & \mathrm{~N},-2.6532521419,0 .,-0.7456156703 \\ & \mathrm{C}, 1.111158652,0 ., 3.9709343812 \\ & \mathrm{C},-1.111158652,0 ., 3.9709343812 \\ & \mathrm{C}, 3.9944678786,0 .,-1.0231373157 \\ & \mathrm{C}, 2.8833283452,0 .,-2.9477237733 \\ & \mathrm{C},-2.8833283452,0 .,-2.9477237733 \\ & \mathrm{C},-3.9944678786,0 .,-1.0231373157 \\ & \mathrm{C}, 0 ., 0 ., 4.832264871 \\ & \mathrm{C}, 4.1848387154,0 .,-2.416090735 \\ & \mathrm{C},-4.1848387154,0 .,-2.416090735 \\ & \mathrm{H}, 2.178382374,0 ., 4.1858492613 \\ & \mathrm{H},-2.178382374,0 ., 4.1858492613 \\ & \mathrm{H}, 4.7141934085,0 .,-0.2063440108 \\ & \mathrm{H}, 2.535852057,0 .,-3.9794301828 \\ & \mathrm{H},-2.535852057,0 .,-3.9794301828 \\ & \mathrm{H},-4.7141934085,0 .,-0.2063440108 \\ & \mathrm{H}, 0 ., 0 ., 5.927579303 \\ & \mathrm{H}, 5.1334136388,0 .,-2.9637394148 \\ & \mathrm{H},-5.1334136388,0 .,-2.9637394148 \\ & \mathrm{Au}, 1.6665568846,0 ., 0.9622098837 \\ & \mathrm{Au}, 0 ., 0 .,-1.9243494063 \\ & \mathrm{Au},-1.6665568846,0 ., 0.9622098837 \\ & \mathrm{Br}, 7.613167262,0 .,-4.3959369323 \\ & \mathrm{Br},-7.613167262,0 .,-4.3959369323 \\ & \mathrm{Br}, 0 ., 0 ., 8.7912113296 \\ & \hline \end{aligned}$ |
| :---: | :---: |

Table S2. Molecular graph, electronic energy and geometry of the (Pz-Ag) $)_{3} \mathrm{X}^{-} \mathrm{n}$ complexes.

|  | MP2 $=-1114.42179833$ NIMAG $=0$ |
| :---: | :---: |
|  | X |
|  | X,1,r21 |
|  | X,1,r21,2,120. |
|  | X,1,r21,2,120.,3,180.,0 |
|  | N,2,r52,1,90.,3,0.,0 |
|  | N,2,r52,1,90.,4,0.,0 |
|  | N,3,r52,1,90.,2,0.,0 |
|  | N,3,r52,1,90.,4,0.,0 |
|  | N,4,r52,1,90.,3,0.,0 |
|  | N,4,r52,1,90.,2,0.,0 |
|  | C,5,r115,2,a1152,1,180.,0 |
|  | C,6,r115,2,a1152,1,180.,0 |
|  | C,7,r115,3,a1152,1,180.,0 |
|  | C,8,r115,3,a1152,1,180.,0 |
|  | C,9,r115,4,a1152,1,180.,0 |
|  | C,10,r115,4,a1152,1,180.,0 |
|  | C,1,r171,3,120.,2,0.,0 |
|  | C,1,r171,4,120.,3,0.,0 |
|  | C,1,r171,2,120.,4,0., 0 |
|  | H,11,r2011,5,a20115,2,180.,0 |
|  | H,12,r2011,6,a20115,2,180.,0 |
|  | H,13,r2011,7,a20115,3,180.,0 |
|  | H,14,r2011,8,a20115,3,180.,0 |
|  | H,15,r2011,9,a20115,4,180.,0 |
|  | H,16,r2011,10,a20115,4,180.,0 |
|  | H,1,r261,3,120.,2,0.,0 |
|  | H,1,r261,4,120.,3,0., 0 |
|  | H,1,r261,2,120.,4,0., 0 |
|  | Ag,1,r291,3,60.,2,0.,0 |
|  | Ag,1,r291,4,60.,3,0.,0 |
|  | Ag,1,r291,2,60.,4,0., 0 |
|  | r21=2.7498381 |
|  | r52 $=0.68417589$ |
|  | r115=1.36645246 |
|  | $\mathrm{r} 171=4.90601527$ |
|  | r2011=1.08948985 |
|  | r261=5.99465491 |
|  | r291=1.97902891 |
|  | a1152=108.26155634 |
|  | a20115=120.12601866 |


|  | $\mathrm{MP2}=-1214.16221409$ NIMAG=0 |
| :---: | :---: |
|  | N,0.6845284454,2.8042020019,0.04217044 |
|  | 18 |
|  | N,- |
|  | 0.684526555,2.8042021985,0.0421715786 |
|  | N,2.7707743953,- |
|  | 0.8092817168,0.0421704776 |
|  | N,2.0862473603,- |
|  | 1.994918628,0.0421709719 |
|  | N,-2.0862471865,- |
|  | $1.9949205114,0.0421687052$ |
|  | N,-2.7707745391,- |
|  | 0.8092833154,0.0421703206 |
|  | C,1.1110672261,4.0981657838,0.137400929 |
|  | 9 |
|  | C,- |
|  | 1.1110666698,4.0981647808,0.137418986 |
|  | C,4.1046491968,- |
| ${ }_{4}$ | $1.0868701725,0.1374066072$ |
|  | C,2.9935817886,- |
| ${ }^{\text {a }}$ | $3.0112944084,0.1374181977$ |
|  | C,-2.9935828094,- |
| OH | $3.011295924,0.1374074125$ |
|  | C,-4.1046495614,- |
|  | 1.086870289,0.1374051493 |
|  | C,0.0000001169,4.9617570267,0.197524789 |
|  | 9 |
|  | C,4.2970081392,- |
|  | 2.4808783707,0.1975225257 |
|  | C,-4.2970086809,- |
|  | 2.4808786975,0.1975172272 |
|  | H,2.1784734139,4.3185487358,0.15616053 |
|  |  |
|  | H,- |
|  | 2.1784728878,4.3185464551,0.156196709 |
|  | H,4.8292091753,- |
|  | 0.2726606238,0.156170899 |
|  | H,2.6507349467,- |
|  | $4.0458862111,0.1561942778$ |
|  | H,-2.6507367519,- |
|  | 4.045888069,0.1561776038 |


|  |  |
| :---: | :---: |
|  | $\begin{aligned} & \mathrm{MP2}=-1214.14614086 \mathrm{NIMAG}=0 \\ & \mathrm{~N},-0.6834987362,0 .,-2.9761170683 \\ & \mathrm{~N}, 0.6834987362,0 .,-2.9761170683 \\ & \mathrm{~N},-2.821161438,0 ., 0.5078527881 \\ & \mathrm{~N},-2.0678216748,0 ., 1.6492588191 \\ & \mathrm{~N}, 2.0678216748,0 ., 1.6492588191 \\ & \mathrm{~N}, 2.821161438,0 ., 0.5078527881 \\ & \mathrm{C},-1.1115199447,0 .,-4.2736926823 \\ & \mathrm{C}, 1.1115199447,0 .,-4.2736926823 \\ & \mathrm{C},-4.1441178715,0 ., 0.8617716116 \\ & \mathrm{C},-2.9060491826,0 ., 2.7228451794 \\ & \mathrm{C}, 2.9060491826,0 ., 2.7228451794 \\ & \mathrm{C}, 4.1441178715,0 ., 0.8617716116 \\ & \mathrm{C}, 0 ., 0 .,-5.135767117 \\ & \mathrm{C},-4.2407397777,0 ., 2.2665202801 \\ & \mathrm{C}, 4.2407397777,0 ., 2.2665202801 \\ & \mathrm{H},-2.178578322,0 .,-4.4944663742 \\ & \mathrm{H}, 2.178578322,0 .,-4.4944663742 \\ & \mathrm{H},-4.9188089716,0 ., 0.0942224103 \\ & \mathrm{H},-2.4553216712,0 ., 3.7178573913 \\ & \mathrm{H}, 2.4553216712,0 ., 3.7178573913 \\ & \mathrm{H}, 4.9188089716,0 ., 0.0942224103 \\ & \mathrm{H}, 0 ., 0 .,-6.2249525323 \\ & \mathrm{H},-5.1509032781,0 ., 2.8659655643 \\ & \mathrm{H}, 5.1509032781,0 ., 2.8659655643 \\ & \mathrm{Ag},-1.7507342177,0 .,-1.2233459218 \\ & \mathrm{Ag}, 0 ., 0 ., 1.829050381 \\ & \mathrm{Ag}, 1.7507342177,0 .,-1.2233459218 \end{aligned}$ |


|  | F,0.,0.,4.0850777521 |
| :---: | :---: |
|  | $\begin{aligned} & \mathrm{MP} 2=-1214.11580417 \mathrm{NIMAG}=0 \\ & \mathrm{~N},-0.6862934234,0 .,-11.0536548133 \\ & \mathrm{~N}, 0.6862934234,0 .,-11.0536548133 \\ & \mathrm{~N},-2.7227886354,0 .,-7.5330468534 \\ & \mathrm{~N},-2.0413937235,0 .,-6.3472561119 \\ & \mathrm{~N}, 2.0413937235,0 .,-6.3472561119 \\ & \mathrm{~N}, 2.7227886354,0 .,-7.5330468534 \\ & \mathrm{C},-1.1004084604,0 .,-12.3648142217 \\ & \mathrm{C}, 1.1004084604,0 .,-12.3648142217 \\ & \mathrm{C},-4.0593208349,0 .,-7.255584776 \\ & \mathrm{C},-2.950887713,0 .,-5.3265221376 \\ & \mathrm{C}, 2.950887713,0 .,-5.3265221376 \\ & \mathrm{C}, 4.0593208349,0,--7.255584776 \\ & \mathrm{C}, 0 ., 0 .,-13.2433493619 \\ & \mathrm{C},-4.2505103053,0 .,-5.8617984367 \\ & \mathrm{C}, 4.2505103053,0 .,-5.8617984367 \\ & \mathrm{H},-2.169220503,0 .,-12.5841318783 \\ & \mathrm{H}, 2.169220503,0 .,-12.5841318783 \\ & \mathrm{H},-4.7838428552,0 .,-8.0693241122 \\ & \mathrm{H},-2.6108541603,0 .,-4.2912872004 \\ & \mathrm{H}, 2.6108541603,0 .,-4.2912872004 \\ & \mathrm{H}, 4.7838428552,0 .,-8.0693241122 \\ & \mathrm{H}, 0 ., 0 .,-14.394599871 \\ & \mathrm{H},-5.1945262767,0 .,-5.3190206376 \\ & \mathrm{H}, 5.1945262767,0 .,-5.3190206376 \\ & \mathrm{Ag},-1.7090763326,0 .,-9.3135118754 \\ & \mathrm{Ag}, 0 ., 0 .,-6.3559214431 \\ & \mathrm{Ag}, 1.7090763326,0 .,-9.3135118754 \\ & \mathrm{~F}, 0 ., 0 .,-15.9481424453 \end{aligned}$ |


|  | $\mathrm{MP} 2=-1574.19903106 \mathrm{NIMAG}=0$ <br> $\mathrm{~N}, 0.6839192464,2.8001336842,0.024029476$ <br> 5 |
| :--- | :--- |
| $\mathrm{~N},-$ |  |
| $0.6839155829,2.8001290572,0.0240455591$ |  |
| $\mathrm{~N}, 2.7669445954,-$ |  |
| $0.8077740859,0.0240258614$ |  |
| $\mathrm{~N}, 2.0830253936,-$ |  |
| $1.9923527544,0.0240288953$ |  |
| $\mathrm{~N},-2.0830263646,-$ |  |
| $1.9923553868,0.0240354405$ |  |



|  | $\begin{aligned} & \text { Ag,-1.6550545057,0.9555442535,-- } \\ & 0.1978173302 \\ & \text { Cl,-0.0000071331,0.0000019217,-- } \\ & \text { 2.1860826093 } \end{aligned}$ |
| :---: | :---: |
|  | MP2 $=-1574.18904016$ NIMAG $=0$ $\mathrm{N},-0.6833251219,0 .,-2.9692456622$ <br> $\mathrm{N}, 0.6833251219,0 .,-2.9692456622$ <br> $\mathrm{N},-2.7638998472,0,0.5359922855$ <br> $\mathrm{N},-2.0872335055,0 ., 1.7258839995$ <br> $\mathrm{N}, 2.0872335055,0.1 .7258839995$ <br> $\mathrm{N}, 2.7638998472,0 ., 0.5359922855$ <br> C,-1.112178376,0.,-4.2662456945 <br> C,1.112178376,0.,-4.2662456945 <br> C,-4.1088191725,0.,0.7959001435 <br> C,-3.0050224915,0.,2.7344188175 <br> C,3.0050224915,0.,2.7344188175 <br> С,4.1088191725,0.,0.7959001435 <br> C,0.,0.,-5.1275182469 <br> С,-4.3044372289,0.,2.1885259553 <br> C,4.3044372289,0.,2.1885259553 <br> Н,-2.1791341243,0.,-4.4873262999 <br> H,2.1791341243,0.,-4.4873262999 <br> Н,-4.8267648508,0.,-0.0250595036 <br> Н,-2.6444070248,0.,3.7643505735 <br> Н,2.6444070248,0.,3.7643505735 <br> H,4.8267648508,0.,-0.0250595036 <br> Н,0.,0.,-6.2166286351 <br> Н,-5.2528205387,0.,2.7250549727 <br> H,5.2528205387,0.,2.7250549727 <br> Ag,-1.7113395525,0.,-1.1978890657 <br> Ag,0.,0.,2.0318295468 <br> Ag,1.7113395525,0.,-1.1978890657 <br> Cl,0.,0.,4.6543487698 |


|  | MP2 $=-1574.15919944$ NIMAG= 0 |
| :---: | :---: |
|  | N,-0.6856840736,0.,-11.0328638744 |
|  | $\mathrm{N}, 0.6856840736,0 .,-11.0328638744$ |
|  | N,-2.7225595204,0.,-7.5087480286 |
|  | N,-2.0408672471,0.,-6.3229482327 |
|  | $\mathrm{N}, 2.0408672471,0 .,-6.3229482327$ |
|  | $\mathrm{N}, 2.7225595204,0 .,-7.5087480286$ |
| 9 | C,-1.1064446174,0.,-12.3381959093 |
|  | C,1.1064446174,0.,-12.3381959093 |
|  | C,-4.0594712743,0.,-7.2318026651 |
| 4 | C,-2.9508274138,0, -5.302840778 |
| $\infty$ | C,2.9508274138,0.,-5.302840778 |
|  | C,4.0594712743,0.,-7.2318026651 |
|  | C,0., $0 .,-13.2039544404$ |
| - | C,-4.2502519215,0.,-5.8383534486 |
| - | C,4.2502519215,0.,-5.8383534486 |
|  | H,-2.1724918723,0.,-12.5653311538 |
| $0$ | H,2.1724918723,0.,-12.5653311538 |
|  | Н,-4.7841969491,0.,-8.0453467611 |
|  | Н,-2.6113232884,0.,-4.2674717821 |
|  | H,2.6113232884,0.,-4.2674717821 |
|  | Н,4.7841969491,0.,-8.0453467611 |
|  | H,0., $0 .,-14.3051284283$ |
|  | H,-5.1942445204,0.,-5.2956972788 |
|  | H,5.1942445204,0.,-5.2956972788 |
|  | Ag,-1.7113574517,0.,-9.2879941689 |
|  | Ag,0., $0 .,-6.3260491668$ |
|  | Ag,1.7113574517,0,.-9.2879941689 |
|  | Cl,0.,0.,-16.6715963889 |


|  | MP2 $=-1530.19018428$ NIMAG $=0$ |
| :---: | :---: |
|  | N,0.6838514134,-0.0746029469,2.7998313808 |
|  | N,-0.6838538219,-0.0746031547,2.799832474 |
|  | N,2.7666522175,-0.0746016052,-0.8076827988 |
|  | N,2.0827996199,-0.0745973849,-1.9921502441 |
|  | $\mathrm{N},-2.0827993148,-0.0745970385,-1.9921487977$ |
|  | N,-2.7666528484,-0.0746007975,-0.8076817176 |
|  | C,1.1115985496,0.0917318681,4.0861026149 |
|  | C,-1.1115983037,0.0917276911,4.0861050942 |
|  | C,4.0944672405,0.0917501615,-1.0803781579 |
|  | C,2.9828729653,0.0917201855,-3.0057256805 |
|  | C,-2.9828712746,0.0917271656,-3.0057244436 |
|  | C,-4.094468064,0.0917466948,-1.0803786672 |


|  | C,0.0000008919,0.1989460471,4.9444537249 <br> C,4.2820231192,0.198951225,-2.47222652 <br> C,-4.2820225653,0.1989507437,-2.4722269151 <br> H,2.1789512697,0.1204163544,4.3059167202 <br> H,-2.1789506144,0.1204079026,4.3059215127 <br> H,4.8185069626,0.1204474483,-0.2659300283 <br> H,2.6395643335,0.1203887801,-4.039988815 <br> Н,-2.6395612287,0.1204015176,-4.0399869204 <br> H,-4.8185089623,0.1204396003,-0.2659314376 <br> H,0.0000019028,0.3300717882,6.0264628105 <br> H,5.2190706387,0.3300775574,-3.0132305794 <br> H,-5.219069767,0.3300760113,-3.0132318126 <br> Ag,1.6486505574,-0.3206982665,0.9518486223 <br> Ag,0.0000001653,-0.3206936447,-1.9036994699 <br> Ag,-1.6486539607,-0.3206968676,0.9518502211 <br> Br,-0.0000011215,-2.4502870355,-0.0000021695 |
| :---: | :---: |
|  | MP2 $=-1530.17909977$ NIMAG $=0$ <br> $\mathrm{N},-0.6832654207,0 .,-2.972035821$ <br> $\mathrm{N}, 0.6832654207,0 .,-2.972035821$ <br> $\mathrm{N},-2.7479078067,0 ., 0.5396675271$ <br> $\mathrm{N},-2.0920254668,0,1.7414005827$ <br> $\mathrm{N}, 2.0920254668,0 ., 1.7414005827$ <br> $\mathrm{N}, 2.7479078067,0 ., 0.5396675271$ <br> C,-1.1123713467,0.,-4.2688724104 <br> C,1.1123713467,0.,-4.2688724104 <br> C,-4.0975947407,0.,0.7745819789 <br> C,-3.0300705368,0.,2.7316974133 <br> C,3.0300705368,0.,2.7316974133 <br> C,4.0975947407,0.,0.7745819789 <br> C,0.,0.,-5.1299365448 <br> C,-4.3192635575,0.,2.1628392081 <br> C,4.3192635575,0.,2.1628392081 <br> H,-2.1792972672,0.,-4.4900212035 <br> H,2.1792972672,0.,-4.4900212035 <br> Н,-4.7999855152,0,,-0.0597674736 <br> Н,-2.6934849008,0.,3.7693379561 <br> H,2.6934849008,0.,3.7693379561 <br> Н,4.7999855152,0.,-0.0597674736 <br> H,0.,0.,-6.2190360851 <br> Н,-5.2770275092,0.,2.682338107 <br> H,5.2770275092,0.,2.682338107 <br> Ag,-1.6990965176,0.,-1.1947430262 <br> Ag,0.,0.,2.0923742588 |


|  | Ag,1.6990965176,0.,-1.1947430262 <br> $\mathrm{Br}, 0,0 ., 4.8145051728$ |
| :---: | :---: |
|  | MP2 $=-1530.14938477$ NIMAG $=0$ <br> N,-0.6856232851,0.,-11.0269202899 <br> $\mathrm{N}, 0.6856232851,0 .,-11.0269202899$ <br> $\mathrm{N},-2.7225435465,0,-,-7.5023755717$ <br> $\mathrm{N},-2.0408323992,0,-,-6.3165210514$ <br> $\mathrm{N}, 2.0408323992,0 .,-6.3165210514$ <br> $\mathrm{N}, 2.7225435465,0 .,-7.5023755717$ <br> C,-1.1071291941,0.,-12.3314858688 <br> C,1.1071291941,0.,-12.3314858688 <br> C,-4.0595196231,0.,-7.2255166244 <br> C,--2.9508719393,0.,-5.2965539889 <br> C,2.9508719393,0.,-5.2965539889 <br> C,4.0595196231,0.,-7.2255166244 <br> C,0.,0.,-13.1958470574 <br> C,-4.2502648684,0.,-5.8321289678 <br> C,4.2502648684,0.,-5.8321289678 <br> H,-2.1729415999,0.,-12.5592955383 <br> H,2.1729415999,0.,-12.5592955383 <br> Н,-4.7843038795,0.,-8.0390117519 <br> H,-2.6114527296,0.,-4.2611650215 <br> Н,2.6114527296,0.,-4.2611650215 <br> Н,4.7843038795,0.,-8.0390117519 <br> H,0.,0.,-14.2938450907 <br> Н,-5.1942538977,0.,-5.2894915585 <br> H,5.1942538977,0.,-5.2894915585 <br> Ag,-1.71166461,0.,-9.2813016475 <br> Ag,0.,0.,-6.3192655303 <br> Ag,1.71166461,0.,-9. 2813016475 <br> $\mathrm{Br}, 0 ., 0 .,-16.8494231353$ |


|  | MP2 $=-1313.77137985$ NIMAG= 0 $X$ $X, 1, r 21$ $X, 1, r 21,2,120$. $X, 1, r 21,2,120 ., 3,180 ., 0$ $\mathrm{~N}, 2, r 52,1,90 ., 3,0 ., 0$ $\mathrm{~N}, 2, r 52,1,90 ., 4,0 ., 0$ $\mathrm{~N}, 3, \mathrm{r} 52,1,90 ., 2,0 ., 0$ $\mathrm{~N}, 3, \mathrm{r} 52,1,90 ., 4,0 ., 0$ $\mathrm{~N}, 4, \mathrm{r} 52,1,90 ., 3,0 ., 0$ |
| :---: | :---: |



|  | MP2 $=-1313.78379123$ NIMAG $=0$ |
| :---: | :---: |
|  | N,0.6340192821,0.,2.7693317219 |
|  | N,-0.7337615116,0.,2.7813064002 |
|  | N,2.7849830503,0.,-0.816363517 |
|  | N,2.0994830696,0.,-2.0036843122 |
|  | N,-2.0813019816,0.,-1.9337426657 |
|  | N,-2.7755627541,0.,-0.7551970908 |
|  | C,1.0799539837,0.,4.0569536436 |
| ${ }_{0}^{4}$ | C,-1.155372962,0.,4.0851811306 |
|  | C,4.123013411,0.,-1.0936246373 |
| 0 | C,3.0086134236,0.,-3.0238220354 |
| - | C,-2.9734479254,0.,-2.9637444066 |
|  | C,-4.1155571191,0.,-1.0420082294 |
|  | C,-0.0285365756,0., 4.9322596728 |
| ?..... | C,4.3150572906,0.,-2.4912994883 |
|  | C,-4.2857304625,0.,-2.4414164371 |
|  | H,2.1655580465,0.,4.1976493486 |
|  | Н,-2.2219152569,0., 4.3163401187 |
|  | H,4.8325014489,0.,-0.2642845155 |
|  | H,2.6451278287,0.,-4.0529267608 |
| $5$ | Н,-2.5524919488,0.,-3.974252956 |
|  | Н,-4.8490178227,0.,-0.2339350018 |
|  | Н,-0.0210822566,0.,6.0232208091 |
|  | Н,5.2600272911,0.,-3.0368781725 |
|  | Н,-5.2268033616,0.,-2.9933526347 |
|  | Ag,1.9808205748,0.,1.1228144764 |
|  | Ag,0.0180244271,0.,-2.2768481764 |
|  | Ag,-1.7284735485,0.,0.9979346685 |
|  | F,3.7186453294,0.,2.6696607397 |
|  | F,-0.4526713554,0.,-4.5552716928 |


|  | MP2 $=-1313.76077782$ NIMAG $=0$ <br> $\mathrm{N}, 0.6834719946,0 ., 2.706992012$ <br> $\mathrm{N},-0.6834719946,0 ., 2.706992012$ <br> $\mathrm{N}, 2.7117133194,0 .,-0.8226119284$ <br> N,2.0369437493,0.,-2.0167850507 <br> $\mathrm{N},-2.0369437493,0 .,-2.0167850507$ <br> N,-2.7117133194,0.,-0.8226119284 <br> C,1.1125748895,0.,4.0036159513 <br> C,-1.1125748895,0.,4.0036159513 <br> C,4.0581026893,0.,-1.0997043486 <br> C,2.9770234624,0.,-3.0187282969 <br> C,-2.9770234624,0.,-3.0187282969 <br> C,-4.0581026893,0.,-1.0997043486 <br> C,0.,0.,4.8652668149 <br> C,4.2836377419,0.,-2.4888538381 <br> C,-4.2836377419,0.,-2.4888538381 <br> H,2.1798587122,0.,4.2235837635 <br> H,-2.1798587122,0.,4.2235837635 <br> Н,4.7739184331,0.,-0.2763690913 <br> H,2.6434227894,0.,-4.0573978808 <br> Н,-2.6434227894,0.,-4.0573978808 <br> Н,-4.7739184331,0.,-0.2763690913 <br> Н,0.,0.,5.9545732176 <br> Н,5.2843267048,0.,-3.0222652324 <br> Н,-5.2843267048,0.,-3.0222652324 <br> Ag,1.7007952942,0.,0.9270998121 <br> Ag,0.,0.,-2.0434036517 <br> Ag,-1.7007952942,0.,0.9270998121 <br> F,6.8010654903,0.,-3.6967940582 <br> F,-6.8010654903,0.,-3.6967940582 |
| :---: | :---: |




|  | MP2 $=-2033.87713681$ NIMAG $=0$ $\mathrm{N}, 0.6692784101,0 ., 2.8148164179$ N,-0.6975983867,0.,2.7583331078 $\mathrm{N}, 2.7525543877,0 .,-0.7973134508$ $\mathrm{N}, 2.0667708971,0 .,-1.9851252996$ $\mathrm{N},-2.1030633199,0,-,-1.9870203143$ $\mathrm{N},-2.7375857368,0 .,-0.7750286294$ C,1.0424933976,0.,4.1261904613 C,-1.1870329475,0.,4.0374879226 C,4.0914462872,0.,-1.0735738859 C,2.9754654016,0,,-3.00650948 C,--3.0521390615,0.,-2.9659209963 C,-4.0900835822,0.,-0.9907432736 C,-0.1080451725,0.,4.9423995865 C,4.2793302699,0.,-2.4706724833 C,-4.3342661838,0.,-2.3776299291 H,2.1089799019,0.,4.3584665011 Н,-2.2640682671,0.,4.2113899085 Н,4.7986706896,0.,-0.2421162576 H,2.6090141746,0.,-4.0347125927 Н,-2.7200527605,0.,-4.0056634216 Н,-4.7792047796,0.,-0.1449543191 Н,-0.1542858387,0.,6.0318495023 Н,5.2240225345,0.,-3.0160908165 H,-5.3008778201,0.,-2.8823092954 Ag,1.980615552,0.,1.1509989694 Ag,-0.0064865712,0.,-2.2907628679 Ag,-1.6527433727,0.,0.9542118311 $\mathrm{Cl}, 4.2480339112,0 ., 2.6778167723$ $\mathrm{Cl},-0.1950403959,0, .,-5.0178136694$ |
| :---: | :---: |
|  | MP2 $=-2033.85619152$ NIMAG $=0$ <br> N,0.6836020158,0.,2.6864675021 <br> N,-0.6836020158,0.,2.6864675021 <br> $\mathrm{N}, 2.7130971773,0 .,-0.8454242555$ <br> $\mathrm{N}, 2.0379369488,0 .,-2.0384224112$ <br> $\mathrm{N},-2.0379369488,0 .,-2.0384224112$ <br> $\mathrm{N},-2.7130971773,0 .,-0.8454242555$ <br> C,1.112651153,0.,3.9831782774 <br> C,-1.112651153,0.,3.9831782774 <br> С,4.0569240634,0.,-1.1156322219 <br> C,2.9696968284,0.,-3.0444022067 <br> C,-2.9696968284,0.,-3.0444022067 <br> С,-4.0569240634,0.,-1.1156322219 |



|  | ```MP2 \(=-1945.84431316\) NIMAG \(=0\) N,0.6836420484,0.0000855586,2.86950194 83 N,- \(0.6836387761,0.0000858494,2.869500323\) N,2.8268793284,0.0000837422,- 0.8427016069 N,2.1432406546,0.0000808228,- 2.0268030038 N,-2.143241689,0.0000802372,- 2.0268015385 N,-2.8268805375,0.0000857215,- 0.8427015024 C,1.1110670304,- \(0.0000194003,4.1659217533\) C,-1.1110658242,- \(0.0000165907,4.1659191363\) C,4.1633246362,-0.0000199535,- 1.1207476111 C,3.0522610253,-0.0000185799,- 3.0451732505 C,-3.0522612772,-0.0000144392,-- 3.0451722173 C,-4.1633260245,-0.000023942,- 1.1207472898``` |
| :---: | :---: |


|  | $\mathrm{C},-0.0000003046,-$ |
| :--- | :--- |
|  | $0.0000947432,5.0370626659$ |
|  | $\mathrm{C}, 4.3622246972,-0.0000947999,-$ |
|  | 2.5185303202 |
|  | $\mathrm{C},-4.3622253369,-0.0000950881,-$ |
|  | 2.5185300577 |
|  | $\mathrm{H}, 2.1796010895,-$ |
|  | $0.0000356994,4.3868121971$ |
|  | $\mathrm{H},-2.1796002296,-$ |
|  | $0.0000304713,4.3868076082$ |
|  | $\mathrm{H}, 4.8888864843,-0.000034738,-$ |
|  | 0.3058135058 |
|  | $\mathrm{H}, 2.709291218,-0.0000333034,-$ |
| 4.080996256 |  |
|  | $\mathrm{H},-2.7092910098,-0.0000263941,-$ |
| 4.0809950713 |  |
|  | $\mathrm{H},-4.8888882212,-0.0000417024,-$ |
|  | 0.3058134537 |
|  | $\mathrm{H},-0.000001324,-$ |
|  | $0.000186619,6.1287500875$ |
|  | $\mathrm{H}, 5.307654564,-0.0001851804,-$ |
| 3.0643725486 |  |
|  | $\mathrm{H},-5.307654891,-0.0001859255,-$ |
| 3.0643727697 |  |


|  | $\mathrm{MP} 2=-1945.85929588$ NIMAG=0 |
| :---: | :---: |
|  | N,0.6770060969,0.,2.8261660211 |
|  | N,-0.6890223722,0.,2.7509393189 |
|  | N,2.7500529682,0.,-0.7954035307 |
|  | N,2.0638661479,0.,-1.9839139669 |
|  | N,-2.1090285212,0.,-1.999387489 |
|  | N,-2.7268945206,0.,-0.7787587814 |
|  | C,1.0301882945,0.,4.1433774874 |
|  | C,-1.1969830942,0.,4.0226829313 |
|  | C,4.0891032452,0.,-1.0728660453 |
|  | C,2.9736808727,0.,-3.0048342664 |
|  | C,-3.0731760144,0.,-2.9638579774 |
|  | C,-4.082237157,0.,-0.9747236982 |
|  | C,-0.1315191742,0.,4.9428907954 |
|  | C,4.2768110622,0.,-2.469218018 |
|  | C,-4.3464285841,0.,-2.3575464518 |
|  | H,2.0913615726,0.,4.3966365256 |
| $3$ | H,-2.2764225464,0.,4.1807053333 |
|  | H,4.7985993818,0.,-0.243754698 |
|  | H,2.6103974517,0.,-4.0338316182 |
|  | H,-2.7619181361,0.,-4.0094905132 |
|  | Н,-4.7588082976,0.,-0.1189129118 |
|  | H,-0.1926751989,0.,6.0314838369 |
|  | H,5.2213702236,0.,-3.0145595041 |
|  | H,-5.3197558247,0.,-2.8488803016 |
|  | Ag,1.9929156,0.,1.1618628371 |
|  | Ag,-0.0097449327,0.,-2.3068469558 |
|  | Ag,-1.6338418257,0.,0.9432990179 |
|  | Br,4.3727292982,0.,2.7272745535 |
|  | Br,-0.1755243973,0.,-5.1505319329 |



|  | $\mathrm{MP} 2=-1413.33410188$ NIMAG=0 |
| :---: | :---: |
|  | N,2.0770234505,2.0065051895,0. |
|  | N,2.7877750217,0.8339166705,0. |
|  | N,-2.1161906449,1.9970951658,0. |
|  | $\mathrm{N},-2.7766291359,0.7955427971,0$. |
|  | N,-0.6717914492,-2.8312640559,0. |
|  | N,0.6990362856,-2.802046163,0. |
|  | C,2.9567938161,3.0509702582,0. |
| ${ }^{(1)}$ | C,4.1193772809,1.1409895713,0. |
|  | C,-3.0475670163,2.997120365,0. |
|  | C,-4.1210150428,1.035593887,0. |
| $\}$ | C,-1.0716693873,-4.1380015281,0. |
| 0 | C,1.1637496209,-4.0861920796,0. |
|  | C,4.2774018335,2.5458760107,0. |
|  | C,-4.3434058262,2.4318904064,0. |
|  | C,0.0659988538,-4.9772860986,0. |
|  | $\mathrm{H}, 2.5400814212,4.0618687343,0$. |
|  | H,4.8424027577,0.3223866829,0. |
|  | H,-2.6997122779,4.0324017526,0. |
| c. | H,-4.7881785659,0.1693542652,0. |
|  | H,-2.1420618506,-4.3550362123,0. |
| 若 : | Н,2.2475968949,-4.2304810244,0. |
|  | H,5.2114791522,3.1129020416,0. |
|  | H,-5.301392823,2.9576608309,0. |
|  | H,0.0897529614,-6.0697788229,0. |
|  | Ag,-0.0230337063,2.3036672882,0. |
|  | Ag,-1.9844364922,-1.172171348,0. |
|  | Ag,2.0068671051,-1.1321019238,0. |
|  | F,0.1654123113,4.7070373474,0. |
|  | F,-4.1612152342,-2.2089746233,0. |
|  | F,3.9925506858,-2.4994433848,0. |


|  | MP2 $=-1413.35860701$ NIMAG $=0$ |
| :---: | :---: |
|  | X |
|  | X,1,r21 |
|  | X,1,r21,2,120. |
|  | X,1,r21,2,120.,3,180.,0 |
|  | N,2,r52,1,90.,3,0.,0 |
|  | N,2,r52,1,90.,4,0.,0 |
|  | N,3,r52,1,90.,2,0.,0 |
|  | N,3,r52,1,90.,4,0.,0 |
|  | N,4,r52,1,90.,3,0.,0 |
|  | N,4,r52,1,90.,2,0.,0 |
|  | C,5,r115,2,a1152,1,180.,0 |
|  | C,6,r115,2,a1152,1,180.,0 |
|  | C,7,r115,3,a1152,1,180.,0 |
|  | C,8,r115,3,a1152,1,180.,0 |
| © | C,9,r115,4,a1152,1,180.,0 |
| ! | C,10,r115,4,a1152,1,180.,0 |
| \% | C,1,r171,3,120.,2,0.,0 |
| 9 | C,1,r171,4,120.,3,0.,0 |
| of | C,1,r171,2,120.,4,0.,0 |
| $1$ | H,11,r2011,5,a20115,2,180.,0 |
|  | H,12,r2011,6,a20115,2,180.,0 |
|  | H,13,r2011,7,a20115,3,180.,0 |
|  | H,14,r2011,8,a20115,3,180.,0 |
|  | H,15,r2011,9,a20115,4,180.,0 |
|  | H,16,r2011,10,a20115,4,180.,0 |
|  | H,1,r261,3,120.,2,0.,0 |
|  | H,1,r261,4,120.,3,0.,0 |
|  | H,1,r261,2,120.,4,0.,0 |
|  | Ag,1,r291,3,60.,2,0.,0 |
|  | Ag,1,r291,4,60.,3,0.,0 |
|  | Ag,1,r291,2,60.,4,0.,0 |
|  | F,1,rf,29,60.,2,180.,0 |
|  | F,1,rf,30,60.,3,180.,0 |
|  | F,1,rf,31,60.,4,180.,0 |
|  | r21=2.74942384 |
|  | r52 $=0.68545748$ |
|  | $\mathrm{r} 115=1.37361623$ |
|  | $\mathrm{r} 171=4.93672313$ |
|  | r2011 $=1.09087501$ |
|  | $\mathrm{r} 261=6.05920163$ |
|  | r291=1.97479365 |


|  | a1152=107.65730918 <br> a20115 $=119.23117844$ <br> rf $=7.83637357$ |
| :--- | :--- |


|  | $\text { MP2 }=-2493.49098353 \text { NIMAG= }$ |
| :---: | :---: |
|  | 0 |
|  | X |
|  | X,1,r21 |
|  | X,1,r21,2,120. |
|  | X,1,r21,2,120.,3,180.,0 |
|  | N,2,r52,1,90.,3,0.,0 |
|  | N,2,r52,1,90.,4,0.,0 |
|  | N,3,r52,1,90.,2,0.,0 |
|  | N,3,r52,1,90.,4,0.,0 |
|  | N,4,r52,1,90.,3,0.,0 |
|  | N,4,r52,1,90.,2,0.,0 |
| 0 | C,5,r115,2,a1152,1,180.,0 |
|  | C,6,r115,2,a1152,1,180.,0 |
|  | C,7,r115,3,a1152,1,180.,0 |
|  | C,8,r115,3,a1152,1,180.,0 |
| C.. | C,9,r115,4,a1152,1,180.,0 |
| $\cdots$ | C,10,r115,4,a1152,1,180.,0 |
|  | C,1,r171,3,120.,2,0.,0 |
|  | C,1,r171,4,120.,3,0.,0 |
| $2$ | C,1,r171,2,120.,4,0.,0 |
|  | H,11,r2011,5,a20115,2,180.,0 |
|  | H,12,r2011,6,a20115,2,180.,0 |
|  | H,13,r2011,7,a20115,3,180.,0 |
|  | H,14,r2011,8,a20115,3,180.,0 |
| -... • •- - | H,15,r2011,9,a20115,4,180.,0 |
| $\cdots: \ldots . .$ | H,16,r2011,10,a20115,4,180.,0 |
|  | H,1,r261,3,120.,2,0.,0 |
|  | H,1,r261,4,120.,3,0.,0 |
|  | H,1,r261,2,120.,4,0.,0 |
|  | Ag,1,r291,3,60.,2,0.,0 |
|  | Ag,1,r291,4,60.,3,0.,0 |
|  | Ag,1,r291,2,60.,4,0.,0 |
|  | $\mathrm{Cl}, 1, \mathrm{rf}, 3,60 ., 2,0 ., 0$ |
|  | $\mathrm{Cl}, 1, \mathrm{rf}, 4,60 ., 3,0 ., 0$ |
|  | $\mathrm{Cl}, 1, \mathrm{rf}, 2,60 ., 4,0 ., 0$ |
|  | r21-2.79397013 |
|  | r52=0.68571669 |


|  | $\begin{aligned} & \mathrm{r} 115=1.36612675 \\ & \mathrm{r} 171=4.95001333 \\ & \mathrm{r} 2011=1.09202493 \\ & \mathrm{r} 261=6.04151947 \\ & \mathrm{r} 291=2.19264029 \\ & \mathrm{a} 1152=108.47621532 \\ & \mathrm{a} 20115=118.51123295 \\ & \mathrm{rf}=5.21805156 \end{aligned}$ |
| :---: | :---: |
|  | $\begin{aligned} & \text { MP2= -2493.51272106 NIMAG= } \\ & 0 \\ & \mathrm{~N}, 0.6851598509,0 ., 2.7501859923 \\ & \mathrm{~N},-0.6851598509,0 ., 2.7501859923 \\ & \mathrm{~N}, 2.7243117377,0 .,-0.781722259 \\ & \mathrm{~N}, 2.0391442088,0 .,-1.968445031 \\ & \mathrm{~N},-2.0391442088,0 .,-1.968445031 \\ & \mathrm{~N},-2.7243117377,0 .,-0.781722259 \\ & \mathrm{C}, 1.1072561745,0 ., 4.0540494066 \\ & \mathrm{C},-1.1072561745,0 ., 4.0540494066 \\ & \mathrm{C}, 4.0645351664,0 .,-1.0681191336 \\ & \mathrm{C}, 2.9572600363,0 .,-2.9859358616 \\ & \mathrm{C},-2.9572600363,0 .,- \\ & 2.9859358616 \\ & \mathrm{C},-4.0645351664,0 .,- \\ & 1.0681191336 \\ & \mathrm{C}, 0 ., 0 ., 4.9215300289 \\ & \mathrm{C}, 4.2621530781,0 .,-2.460775003 \\ & \mathrm{C},-4.2621530781,0 .,-2.460775003 \\ & \mathrm{H}, 2.1738111543,0 ., 4.2785608512 \\ & \mathrm{H},-2.1738111543,0 ., 4.2785608512 \\ & \mathrm{H}, 4.7922521737,0 .,-0.2567172315 \\ & \mathrm{H}, 2.6184028184,0 .,-4.0218514866 \\ & \mathrm{H},-2.6184028184,0 .,- \\ & 4.0218514866 \\ & \mathrm{H},-4.7922521737,0 .,- \\ & 0.2567172315 \\ & \mathrm{H}, 0 ., 0 ., 6.0179285632 \\ & \mathrm{H}, 5.2116562812,0 .,-3.0089840097 \\ & \mathrm{H},-5.2116562812,0 .,- \\ & 3.0089840097 \\ & \mathrm{Ag}, 1.7123650959,0 ., 0.988634192 \\ & 6 \\ & \mathrm{Ag}, 0 ., 0 .,-1.977205477 \\ & \hline \end{aligned}$ |


|  | Ag,- |
| :--- | :--- |
|  | $1.7123650959,0 ., 0.9886341926$ |
|  | $\mathrm{Cl}, 7.584478187,0,-4.3789157976$ |
|  | $\mathrm{Cl},-7.584478187,0 .,-4.3789157976$ |
|  | $\mathrm{Cl}, 0 ., 0 ., 8.7578186132$ |


|  | MP2 $=-2361.46823649$ NIMAG $=0$ |
| :---: | :---: |
|  | X |
|  | X,1,r21 |
|  | X,1,r21,2,120. |
|  | X,1,r21,2,120.,3,180.,0 |
|  | N,2,r52,1,90.,3,0., 0 |
|  | N,2,r52,1,90.,4,0., 0 |
|  | N,3,r52,1,90.,2,0.,0 |
|  | N,3,r52,1,90.,4,0.,0 |
|  | N,4,r52,1,90.,3,0., 0 |
|  | N,4,r52,1,90.,2,0.,0 |
| $\theta$ | C,5,r115,2,a1152,1,180.,0 |
|  | C,6,r115,2,a1152,1,180.,0 |
|  | C,7,r115,3,a1152,1,180.,0 |
|  | C,8,r115,3,a1152,1,180.,0 |
| ¢0 - - - - | C,9,r115,4,a1152,1,180.,0 |
| $\cdots$ | C,10,r115,4,a1152,1,180.,0 |
|  | C,1,r171,3,120.,2,0.,0 |
|  | C,1,r171,4,120.,3,0.,0 |
|  | C,1,r171,2,120.,4,0.,0 |
|  | H,11,r2011,5,a20115,2,180.,0 |
|  | H,12,r2011,6,a20115,2,180.,0 |
|  | H,13,r2011,7,a20115,3,180.,0 |
|  | H,14,r2011,8,a20115,3,180.,0 |
| $\because$ | H,15,r2011,9, a $20115,4,180.0$ |
| - | H,16,r2011,10,a20115,4,180.,0 |
|  | H,1,r261,3,120.,2,0.,0 |
|  | H,1,r261,4,120.,3,0.,0 |
|  | H,1,r261,2,120.,4,0.,0 |
|  | Ag,1,r291,3,60.,2,0.,0 |
|  | Ag,1,r291,4,60.,3,0.,0 |
|  | Ag,1,r291,2,60.,4,0.,0 |
|  | Br,1,rf,3,60.,2,0.,0 |
|  | Br,1,rf,4,60.,3,0.,0 |
|  | Br,1,rf,2,60.,4,0.,0 |
|  | r21-2.78777393 |


|  | $\begin{aligned} & \text { r52=0.68572162 } \\ & \text { r115 }=1.36626381 \\ & \text { r171 }=4.94273653 \\ & \text { r2011 }=1.09169169 \\ & \text { r261 }=6.03388486 \\ & \text { r291 }=2.16154697 \\ & \text { a1152 }=108.47041342 \\ & \text { a20115 }=118.71279244 \\ & \text { rf=5.3999374 } \end{aligned}$ |
| :---: | :---: |
|  | $\begin{aligned} & \mathrm{MP} 2=-2361.48741177 \mathrm{NIMAG}=0 \\ & \mathrm{~N}, 0.6850495639,0 ., 2.7503041832 \\ & \mathrm{~N},-0.6850495639,0 ., 2.7503041832 \\ & \mathrm{~N}, 2.7243518812,0 .,-0.7818772151 \\ & \mathrm{~N}, 2.0393017978,0 .,-1.9684153026 \\ & \mathrm{~N},-2.0393017978,0 .,-1.9684153026 \\ & \mathrm{~N},-2.7243518812,0 .,-0.7818772151 \\ & \mathrm{C}, 1.1079138977,0 ., 4.0534702125 \\ & \mathrm{C},-1.1079138977,0 ., 4.0534702125 \\ & \mathrm{C}, 4.0643589206,0 .,-1.0672503843 \\ & \mathrm{C}, 2.9564411232,0 .,-2.9862122949 \\ & \mathrm{C},-2.9564411232,0 .,-2.9862122949 \\ & \mathrm{C},-4.0643589206,0 .,-1.0672503843 \\ & \mathrm{C}, 0 ., 0 ., 4.9196369031 \\ & \mathrm{C}, 4.26052172,0 .,-2.459816028 \\ & \mathrm{C},-4.26052172,0 .,-2.459816028 \\ & \mathrm{H}, 2.1742791756,0 ., 4.2784256277 \\ & \mathrm{H},-2.1742791756,0 ., 4.2784256277 \\ & \mathrm{H}, 4.7923598312,0 .,-0.2562296466 \\ & \mathrm{H}, 2.6180733793,0 .,-4.0221887626 \\ & \mathrm{H},-2.6180733793,0 .,-4.0221887626 \\ & \mathrm{H},-4.7923598312,0 .,-0.2562296466 \\ & \mathrm{H}, 0 ., 0 ., 6.0143474095 \\ & \mathrm{H}, 5.2085675349,0 .,-3.0071732989 \\ & \mathrm{H},-5.2085675349,0 .,-3.0071732989 \\ & \mathrm{Ag}, 1.7127257571,0 ., 0.9888475796 \\ & \mathrm{Ag}, 0 ., 0 .,-1.9776712736 \\ & \mathrm{Ag},-1.7127257571,0 ., 0.9888475796 \\ & \mathrm{Br}, 7.779709616,0 .,-4.4916761175 \\ & \mathrm{Br},-7.779709616,0 .,-4.4916761175 \\ & \mathrm{Br}, 0 ., 0 ., 8.9832708121 \\ & \hline \end{aligned}$ |

Table S3. Molecular graph, electronic energy and geometry of the $(\mathrm{Pz}-\mathrm{Cu})_{3}: \mathrm{X}^{-n}$ complexes.

|  | MP2 $=-1265.30943599$ NIMAG $=0$ |
| :---: | :---: |
|  | X |
|  | X,1,r21 |
|  | X,1,r21,2,120. |
|  | X,1,r21,2,120.,3,180.,0 |
|  | N,2,r52,1,90.,3,0.,0 |
|  | N,2,r52,1,90.,4,0.,0 |
|  | N,3,r52,1,90.,2,0.,0 |
|  | N,3,r52,1,90.,4,0.,0 |
|  | N,4,r52,1,90.,3,0.,0 |
|  | N,4,r52,1,90.,2,0.,0 |
|  | C,5,r115,2,a1152,1,180.,0 |
|  | C,6,r115,2,a1152,1,180.,0 |
|  | C,7,r115,3,a1152,1,180.,0 |
|  | C,8,r115,3,a1152,1,180.,0 |
| ${ }^{4}$ | C,9,r115,4,a1152,1,180.,0 |
|  | C,10,r115,4,a1152,1,180.,0 |
| - $0 \rightarrow-\mathrm{H}$ | C,1,r171,3,120.,2,0.,0 |
|  | C,1,r171,4,120.,3,0.,0 |
|  | C,1,r171,2,120.,4,0.,0 |
|  | H,11,r2011,5,a20115,2,180.,0 |
| - . | H,12,r2011,6,a20115,2,180.,0 |
|  | H,13,r2011,7,a20115,3,180.,0 |
|  | H,14,r2011,8,a20115,3,180.,0 |
|  | H,15,r2011,9,a20115,4,180.,0 |
| $1$ | H,16,r2011,10,a20115,4,180.,0 |
|  | H,1,r261,3,120.,2,0.,0 |
|  | H,1,r261,4,120.,3,0.,0 |
|  | H,1,r261,2,120.,4,0.,0 |
|  | $\mathrm{Cu}, 1, \mathrm{r} 291,3,60 ., 2,0.0$ |
|  | $\mathrm{Cu}, 1, \mathrm{r} 291,4,60.3,0 ., 0$ |
|  | $\mathrm{Cu}, 1, \mathrm{r} 291,2,60.4,0 ., 0$ |
|  | r21=2.49391542 |
|  | r52 $=0.68517656$ |
|  | r115=1.36634178 |
|  | $\mathrm{r} 171=4.64884563$ |
|  | r2011=1.08892227 |
|  | r261=5.73710754 |
|  | r291=1.85459423 |
|  | a1152=108.21748163 |
|  | a20115=120.11537875 |



|  | $\mathrm{H},-4.9883612942,-$ $2.8801457192,0.2708904207$ $\mathrm{Cu}, 1.5696330879,0.906253833,-$ 0.102368143 $\mathrm{Cu},-0.0000129908,-1.8125702477,-$ 0.1024046546 $\mathrm{Cu},-1.5698380526,0.9063165117,-$ 0.1023856193 $\mathrm{~F},-0.0000628182,0.0000214356,-$ 1.2313911312 |
| :---: | :---: |
|  | $\begin{aligned} & \mathrm{MP} 2=-1365.04081154 \mathrm{NIMAG}=0 \\ & \mathrm{~N},-0.6843596385,0 .,-2.6945780783 \\ & \mathrm{~N}, 0.6843596385,0 .,-2.6945780783 \\ & \mathrm{~N},-2.5563172697,0 ., 0.4248884925 \\ & \mathrm{~N},-1.8303680365,0 ., 1.586102275 \\ & \mathrm{~N}, 1.8303680365,0 ., 1.586102275 \\ & \mathrm{~N}, 2.5563172697,0 ., 0.4248884925 \\ & \mathrm{C},-1.1120075647,0 .,-3.9920762603 \\ & \mathrm{C}, 1.1120075647,0 .,-3.9920762603 \\ & \mathrm{C},-3.8877630448,0 ., 0.7433775147 \\ & \mathrm{C},-2.7008930959,0 ., 2.6353328471 \\ & \mathrm{C}, 2.7008930959,0 ., 2.6353328471 \\ & \mathrm{C}, 3.8877630448,0 ., 0.7433775147 \\ & \mathrm{C}, 0 ., 0 .,-4.8525783728 \\ & \mathrm{C},-4.0213397566,0 ., 2.1439512732 \\ & \mathrm{C}, 4.0213397566,0 ., 2.1439512732 \\ & \mathrm{H},-2.1783817174,0 .,-4.2126404155 \\ & \mathrm{H}, 2.1783817174,0 .,-4.2126404155 \\ & \mathrm{H},-4.6403662067,0 .,-0.0451031743 \\ & \mathrm{H},-2.2741711033,0 ., 3.6389095102 \\ & \mathrm{H}, 2.2741711033,0 ., 3.6389095102 \\ & \mathrm{H}, 4.6403662067,0 .,-0.0451031743 \\ & \mathrm{H}, 0 ., 0 .,-5.9415104408 \\ & \mathrm{H},-4.9466073638,0 ., 2.7193073255 \\ & \mathrm{H}, 4.9466073638,0 ., 2.7193073255 \\ & \mathrm{Cu},-1.6159896501,0 .,-1.1266289386 \\ & \mathrm{Cu}, 0 ., 0 ., 1.763661584 \\ & \mathrm{Cu}, 1.6159896501,0 .,-1.1266289386 \\ & \mathrm{~F}, 0 ., 0 ., 3.7794949636 \end{aligned}$ |



|  | $\mathrm{MP} 2=-1725.07834839 \mathrm{NIMAG}=0$ |
| :--- | :--- |
| $\mathrm{~N}, 0.6855128138,2.5150704687,-$ |  |
| 0.0163992513 |  |
| $\mathrm{~N},-0.6855251099,2.5150421796,-$ |  |
| 0.0164166807 |  |
| $\mathrm{~N}, 2.5209067205,-0.6638627454,-$ |  |
| 0.0164221605 |  |
| $\mathrm{~N}, 1.8353617657,-1.851192956,-$ |  |
| 0.0163991263 |  |




|  | MP2 $=-1725.04771008$ NIMAG $=0$ |
| :---: | :---: |
|  | N,-0.6870325399,0.,-10.790425632 |
|  | N,0.6870325399,0.,-10.790425632 |
|  | N,-2.4981865692,0.,-7.6440384859 |
|  | N,-1.8178503724,0.,-6.4551119499 |
|  | N,1.8178503724,0.,-6.4551119499 |
|  | N,2.4981865692,0.,-7.6440384859 |
| 9 | C,-1.1060969794,0.,-12.0960771275 |
|  | C,1.1060969794,0.,-12.0960771275 |
|  | C,-3.8353234421,0.,-7.3692525211 |
| $5$ | C,-2.7309738311,0.,-5.4377094503 |
| $a$ | C,2.7309738311,0.,-5.4377094503 |
| c) comb | C,3.8353234421,0.,-7.3692525211 |
|  | C,0.,0.,-12.9609294259 |
|  | C,-4.0277667659,0.,-5.9767406202 |
|  | C,4.0277667659,0.,-5.9767406202 |
|  | Н,-2.1713200717,0.,-12.3246215867 |
|  | H,2.1713200717,0.,-12.3246215867 |
|  | Н,-4.55813137,0.,-8.1837287593 |
|  | Н,-2.394365026,0.,-4.4020370526 |
|  | H,2.394365026,0.,-4.4020370526 |
|  | H,4.55813137,0.,-8.1837287593 |
|  | Н,0.,0.,-14.0619893265 |
|  | Н,-4.9726854107,0.,-5.4364145387 |
|  | Н,4.9726854107,0.,-5.4364145387 |
|  | $\mathrm{Cu},-1.6020043835,0 .,-9.2302271682$ |
|  | $\mathrm{Cu}, 0 ., 0 .,-6.4470263381$ |
|  | $\mathrm{Cu}, 1.6020043835,0 .,-9.2302271682$ |
|  | $\mathrm{Cl}, 0 ., 0 .,-16.4192017066$ |


|  | $\mathrm{MP} 2=-1681.06662494 \mathrm{NIMAG}=0$ <br> $\mathrm{~N}, 0.6850400295,-$ <br> $0.1101182553,2.5133088822$ <br> $\mathrm{~N},-0.6850889835,-$ <br> $0.1101440945,2.5133342746$ <br> $\mathrm{~N}, 2.5191687567,-0.1101320505,-$ <br> 0.6633909732 <br> $\mathrm{~N}, 1.8341193884,-0.1101203042,-$ <br> 1.8499536979 <br> $\mathrm{~N},-1.8341003149,-0.1100912801,-$ <br> 1.8499527345 <br> $\mathrm{~N},-2.5191546542,-0.1101125597,-$ <br> 0.6633773526 |
| :--- | :--- |



|  | MP2 $=-1681.06247072$ NIMAG $=0$ |
| :---: | :---: |
|  | N,-0.6839129762,0.,-2.7091083677 |
|  | N,0.6839129762,0.,-2.7091083677 |
|  | N,-2.4697199599,0.,0.4487525566 |
|  | N,-1.8459707228,0.,1.671739356 |
|  | N,1.8459707228,0.,1.671739356 |
|  | N,2.4697199599,0.,0.4487525566 |
|  | C,-1.113201974,0.,-4.0054672217 |
|  | C,1.113201974,0.,-4.0054672217 |
| + | C,-3.8257128408,0.,0.6438020175 |
| - | C,-2.8190847386,0.,2.6300074155 |
| c | C,2.8190847386,0.,2.6300074155 |
|  | C,3.8257128408,0.,0.6438020175 |
|  | C,0.,0.,-4.86466821 |
|  | C,-4.0883477706,0.,2.0227594208 |
| $i_{t}$ | C,4.0883477706,0.,2.0227594208 |
|  | H,-2.1794123351,0.,-4.226719722 |
|  | H,2.1794123351,0.,-4.226719722 |
|  | Н,-4.5011673301,0.,-0.2118372021 |
|  | H,-2.5185260383,0.,3.6766480173 |
|  | H,2.5185260383,0.,3.6766480173 |
|  | H,4.5011673301,0.,-0.2118372021 |
|  | H,0.,0.,-5.9534556105 |
|  | H,-5.0600874531,0.,2.5148664302 |
|  | H,5.0600874531,0.,2.5148664302 |
|  | $\mathrm{Cu},-1.5572171373,0 .,-1.1123627598$ |
|  | $\mathrm{Cu}, 0 ., 0 ., 1.9740946813$ |
|  | $\mathrm{Cu}, 1.5572171373,0 .,-1.1123627598$ |
|  | Br,0.,0.,4.5486217363 |


|  | $\begin{aligned} & \mathrm{MP} 2=-1681.03783540 \text { NIMAG }=0 \\ & \mathrm{~N},-0.6868875416,0 .,-10.7843400592 \\ & \mathrm{~N}, 0.6868875416,0 .,-10.7843400592 \\ & \mathrm{~N},-2.4986172386,0 .,-7.6378798611 \\ & \mathrm{~N},-1.8179093903,0 .,-6.4491386349 \\ & \mathrm{~N}, 1.8179093903,0 .,-6.4491386349 \\ & \mathrm{~N}, 2.4986172386,0 .,-7.6378798611 \\ & \mathrm{C},-1.1068506079,0 .,-12.0892274237 \\ & \mathrm{C}, 1.1068506079,0 .,-12.0892274237 \\ & \mathrm{C},-3.835790008,0 .,-7.3628324554 \\ & \mathrm{C},-2.7308856168,0 .,-5.4316056356 \\ & \mathrm{C}, 2.7308856168,0 .,-5.4316056356 \\ & \mathrm{C}, 3.835790008,0 .,-7.3628324554 \\ & \mathrm{C}, 0 ., 0 .,-12.9525787217 \\ & \mathrm{C},-4.0277723418,0 .,-5.97036245 \\ & \mathrm{C}, 4.0277723418,0 .,-5.97036245 \\ & \mathrm{H},-2.1718351127,0 .,-12.3184215305 \\ & \mathrm{H}, 2.1718351127,0 .,-12.3184215305 \\ & \mathrm{H},-4.5588709084,0 .,-8.1770696907 \\ & \mathrm{H},-2.3941291424,0 .,-4.3959897279 \\ & \mathrm{H}, 2.3941291424,0 .,-4.3959897279 \\ & \mathrm{H}, 4.5588709084,0 .,-8.1770696907 \\ & \mathrm{H}, 0 ., 0 .,-14.0503572796 \\ & \mathrm{H},-4.9725520185,0 .,-5.4298067155 \\ & \mathrm{H}, 4.9725520185,0 .,-5.4298067155 \\ & \mathrm{Cu},-1.6026166437,0 .,-9.223906773 \\ & \mathrm{Cu}, 0 ., 0 .,-6.4404417938 \\ & \mathrm{Cu}, 1.6026166437,0 .,-9.223906773 \\ & \text { Br,0.,0.,-16.5973768637} \end{aligned}$ |
| :---: | :---: |




|  | $\mathrm{MP} 2=-1464.67268461$ NIMAG $=0$ |
| :---: | :---: |
|  | N,0.6867279058,0.,2.5179912093 |
|  | N,-0.6825049132,0.,2.500369 |
|  | N,2.5117690541,0.,-0.6574584142 |
|  | N,1.8252602157,0.,-1.8465266022 |
|  | N,-1.8372804008,0.,-1.8537194166 |
|  | N,-2.5066355295,0.,-0.6591179071 |
|  | C,1.1006344469,0.,3.8164786151 |
|  | C,-1.1327118858,0.,3.7944577166 |
| $1$ | C,3.8504478917,0.,-0.9330566956 |
|  | C,2.7332747475,0.,-2.8680573423 |
|  | C,-2.7548502102,0.,-2.861416699 |
|  | C,-3.852452719,0.,-0.9162715902 |
|  | C,-0.0257314844, $0 ., 4.6663883114$ |
|  | C,4.037921737,0.,-2.3312952018 |
|  | C,-4.0540765637,0.,-2.3109100367 |
|  | H,2.1783254272,0.,3.9893293367 |
|  | H,-2.2035044489,0.,4.0008596095 |
| - 0 - -0 | H,4.5434671965,0.,-0.0905160651 |
|  | H,2.3501228101,0.,-3.8894999809 |
| $\$$ | H,-2.365697836,0.,-3.8811498261 |
|  | H,-4.5665982832,0.,-0.0921389748 |
|  | H,-0.0421725102,0.,5.7570279473 |
|  | H,4.9831465557,0.,-2.8770210052 |
|  | H,-5.0068187077,0.,-2.8419915086 |
|  | Cu,1.8143024254,0.,1.0509451009 |
|  | $\mathrm{Cu},-0.0029939426,0 .,-2.096704541$ |
|  | Cu,-1.5507032994,0.,0.8952989673 |
|  | F,3.5592554765,0.,2.2003778423 |
|  | F,-0.1259553711,0.,-4.1825945824 |


|  | MP2 $=-1464.64906893$ NIMAG $=0$ |
| :---: | :---: |
|  | N,0.6844123785,0.,2.4433849046 |
|  | N,-0.6844123785,0.,2.4433849046 |
|  | N,2.5002460766,0.,-0.6997477987 |
|  | N,1.818912451,0.,-1.8931441253 |
|  | N,-1.818912451,0.,-1.8931441253 |
|  | $\mathrm{N},-2.5002460766,0 .,-0.6997477987$ |
|  | C,1.1127954752,0.,3.7403016669 |
| ¢ | C,-1.1127954752,0.,3.7403016669 |
| ! | C,3.8448249593,0.,-0.9850728636 |
| 4 | C,2.7548468699,0.,-2.8983373141 |
| c | C,-2.7548468699,0.,-2.8983373141 |
| of $0-\infty$ | C,-3.8448249593,0.,-0.9850728636 |
|  | C,0.,0.,4.6002711458 |
|  | C,4.0632156604,0.,-2.3743463307 |
|  | С,-4.0632156604,0.,-2.3743463307 |
|  | H,2.1794343494,0.,3.9601717331 |
|  | Н,-2.1794343494,0.,3.9601717331 |
|  | H,4.565711037,0.,-0.1669647838 |
| $a$ | H,2.4175714148,0.,-3.9352140873 |
| $9$ | H,-2.4175714148,0.,-3.9352140873 |
|  | H,-4.565711037,0.,-0.1669647838 |
|  | Н,0.,0.,5.6892173764 |
|  | H,5.0618506598,0.,-2.9107254496 |
|  | H,-5.0618506598,0.,-2.9107254496 |
|  | $\mathrm{Cu}, 1.6011623667,0 ., 0.8671410811$ |
|  | $\mathrm{Cu}, 0 ., 0 .,-1.9164068818$ |
|  | $\mathrm{Cu},-1.6011623667,0 ., 0.8671410811$ |
|  | F,6.5781771841,0.,-3.583991933 |
|  | F,-6.5781771841,0.,-3.583991933 |




|  | MP2 $=-2184.75417433$ NIMAG $=0$ <br> $\mathrm{N}, 0.7106717196,0 ., 2.5552085806$ <br> $\mathrm{N},-0.6575304768,0 ., 2.476269808$ <br> $\mathrm{N}, 2.510318538,0 .,-0.65385345$ <br> $\mathrm{N}, 1.821412967,0, \mathrm{o},-1.8470729005$ <br> $\mathrm{N},-1.8575396829,0,-,-1.8930640532$ <br> $\mathrm{N},-2.4732777987,0,--0.6686968074$ <br> C,1.0581217499,0.,3.8750016858 <br> C,-1.169216918,0.,3.7461131759 <br> C,3.8495251073,0.,-0.9344670254 <br> C,2.7340347366,0.,-2.8665530227 <br> C,-2.8267890246,0.,-2.8538611586 <br> C,-3.8288376348,0,,-0.8604850344 <br> C,-0.1065249215,0.,4.6680635264 <br> C,4.0340888282,0.,-2.3290822709 <br> C,-4.0959240611,0.,-2.2417784751 <br> H,2.1187047465,0.,4.1262126374 <br> Н,-2.2486923008,0.,3.8988780029 <br> H,4.554198113,0.,-0.1030664731 <br> H,2.3663572405,0.,-3.8925180232 <br> Н,-2.5140525921,0.,--3.8979584523 <br> Н,-4.5008735472,0.,-0.0020143437 <br> Н,-0.1703945117,0.,5.7563332671 <br> Н,4.9785630358,0.,-2.8743747089 <br> Н,-5.0703280978,0.,-2.7306006578 <br> $\mathrm{Cu}, 1.8178413009,0,1.0623716145$ <br> $\mathrm{Cu},-0.011120156,0, .,-2.1054825539$ <br> $\mathrm{Cu},-1.5031726613,0,0.08678571406$ <br> $\mathrm{Cl}, 4.053175986,0,2.4655466819$ |
| :---: | :---: |
|  | MP2 $=-2184.74426696$ NIMAG $=0$ N,0.6845829697,0.,2.4234402938 N,-0.6845829697,0.,2.4234402938 $\mathrm{N}, 2.499640814,0 .,-0.7222221747$ N,1.8187363245,0.,-1.9148471021 $\mathrm{N},-1.8187363245,0 .,-1.9148471021$ N,-2.499640814,0.,-0.7222221747 C,1.1128299442,0.,3.7204594977 C,-1.1128299442,0.,3.7204594977 C,3.842013863,0.,-0.9994484106 C,2.7471323694,0.,-2.9234615078 C,-2.7471323694,0.,-2.9234615078 C,-3.842013863,0.,-0.9994484106 C,0.,0.,4.5795374915 |


|  | C,4.0472053496,0.,-2.3877562736 |
| :--- | :--- |
|  | C,-4.0472053496,0.,-2.3877562736 |
|  | $\mathrm{H}, 2.1792701299,0 ., 3.9411612076$ |
|  | $\mathrm{H},-2.1792701299,0 ., 3.9411612076$ |
|  | $\mathrm{H}, 4.5708850911,0 .,-0.1900494603$ |
|  | $\mathrm{H}, 2.4136725845,0,-3.9606730566$ |
|  | $\mathrm{H},-2.4136725845,0 .,-3.9606730566$ |
|  | $\mathrm{H},-4.5708850911,0 .,-0.1900494603$ |
|  | $\mathrm{H}, 0 ., 0 ., 5.6682888006$ |
|  | $\mathrm{H}, 5.0180968728,0 .,-2.8985250395$ |
|  | $\mathrm{H},-5.0180968728,0 .,-2.8985250395$ |
|  | $\mathrm{Cu}, 1.6019874969,0 ., 0.8494690479$ |
|  | $\mathrm{Cu}, 0 ., 0 .,-1.9376702754$ |
|  | $\mathrm{Cu},-1.6019874969,0 ., 0.8494690479$ |
|  | $\mathrm{Cl}, 7.5113542459,0 .,-3.3426250284$ |
|  | $\mathrm{Cl},-7.5113542459,0 .,-3.3426250284$ |


|  | ```MP2 \(=-2096.70196565\) NIMAG \(=0\) X X,1,r21 X,1,r21,2,120. X,1,r21,2,120.,3,180.,0 N,2,r52,1,90.,3,0.,0 N,2,r52,1,90.,4,0.,0 N,3,r52,1,90.,2,0.,0 N,3,r52,1,90.,4,0.,0 N,4,r52,1,90.,3,0.,0 N,4,r52,1,90.,2,0.,0 C,5,r115,2,a1152,1,180.,0 C,6,r115,2,a1152,1,180.,0 C,7,r115,3,a1152,1,180.,0 C,8,r115,3,a1152,1,180.,0 C,9,r115,4,a1152,1,180.,0 C,10,r115,4,a1152,1,180.,0 C,1,r171,3,120.,2,0.,0 C,1,r171,4,120.,3,0.,0 C,1,r171,2,120.,4,0.,0 H,11,r2011,5,a20115,2,180.,0 H,12,r2011,6,a20115,2,180.,0 H,13,r2011,7,a20115,3,180.,0 H,14,r2011,8,a20115,3,180.,0 H,15,r2011,9, a20115,4,180.,0 H,16,r2011,10,a20115,4,180.,0``` |
| :---: | :---: |


|  | $\mathrm{H}, 1, \mathrm{r} 261,3,120 ., 2,0 ., 0$ $\mathrm{H}, 1, \mathrm{r} 261,4,120 ., 3,0 ., 0$ $\mathrm{H}, 1, \mathrm{r} 261,2,120 ., 4,0 ., 0$ $\mathrm{Cu}, 1, \mathrm{r} 291,3,60 ., 2,0 ., 0$ $\mathrm{Cu}, 1, \mathrm{r} 291,4,60 ., 3,0 ., 0$ $\mathrm{Cu}, 1, \mathrm{r} 291,2,60 ., 4,0 ., 0$ $\mathrm{Br}, 1, \mathrm{rcl}, 2,90 ., 3,90 ., 0$ $\mathrm{Br}, 1, \mathrm{rcl}, 2,90 ., 3,-90 ., 0$ $\mathrm{r} 21=2.5388156$ $\mathrm{r} 52=0.6843305$ $\mathrm{r} 115=1.36410625$ $\mathrm{r} 171=4.70280233$ $\mathrm{r} 2011=1.08968088$ $\mathrm{r} 261=5.79387384$ $\mathrm{r} 291=1.77861966$ a1152=108.25139646 a20115=119.75793801 $\mathrm{rcl}=2.28093476$ |
| :---: | :---: |
|  | $\begin{aligned} & \mathrm{MP} 2=-2096.73373352 \mathrm{NIMAG}=0 \\ & \mathrm{~N}, 0.7393114761,0 ., 2.5344823242 \\ & \mathrm{~N},-0.6294307014,0 ., 2.4591910189 \\ & \mathrm{~N}, 2.5348832805,0 .,-0.6684485026 \\ & \mathrm{~N}, 1.8463350247,0 .,-1.8610490652 \\ & \mathrm{~N},-1.8252703401,0 .,-1.9075036818 \\ & \mathrm{~N},-2.4444372458,0 .,-0.6844925322 \\ & \mathrm{C}, 1.0928980976,0 ., 3.8525930866 \\ & \mathrm{C},-1.135305385,0 ., 3.7309509228 \\ & \mathrm{C}, 3.8739311705,0 .,-0.9477480452 \\ & \mathrm{C}, 2.7577394689,0 .,-2.8810487835 \\ & \mathrm{C},-2.7899944346,0 .,-2.8727740597 \\ & \mathrm{C},-3.7987509719,0 .,-0.8822721571 \\ & \mathrm{C},-0.0693571591,0 ., 4.6482677876 \\ & \mathrm{C}, 4.0566076977,0 .,-2.3420835462 \\ & \mathrm{C},-4.0601965672,0 .,-2.2640688322 \\ & \mathrm{H}, 2.1536097496,0 ., 4.104014218 \\ & \mathrm{H},-2.2140332558,0 ., 3.887961268 \\ & \mathrm{H}, 4.5807292503,0 .,-0.1181438731 \\ & \mathrm{H}, 2.3926802207,0 .,-3.907955962 \\ & \mathrm{H},-2.4773756954,0 .,-3.9170878621 \\ & \mathrm{H},-4.4740898549,0 .,-0.0265715898 \\ & \mathrm{H},-0.128454298,0 ., 5.7364900757 \\ & \mathrm{H}, 5.0006614837,0 .,-2.8871332537 \\ & \mathrm{H},-5.032173283,0 .,-2.7570003527 \end{aligned}$ |


|  | $\mathrm{Cu}, 1.8024639863,0,1.0211923735$ <br> $\mathrm{Cu}, 0.0168534556,0 .,-2.0715757883$ <br> Cu,-1.4819831498,0.,0.8556233704 <br> Br,4.3156784248,0.,2.5895444584 <br> Br,-0.0847720727,0.,-5.0322593797 |
| :---: | :---: |
|  | MP2 $=-2096.72625880$ NIMAG $=0$ <br> $\mathrm{N}, 0.684640668,0 ., 2.3970091193$ <br> N,-0.684640668,0.,2.3970091193 <br> $\mathrm{N}, 2.5015972041,0,-,-7480925616$ <br> $\mathrm{N}, 1.8183891553,0 .,-1.9393115352$ <br> $\mathrm{N},-1.8183891553,0 .,-1.9393115352$ <br> $\mathrm{N},-2.5015972041,0 .,-0.7480925616$ <br> C,1.1128247039,0.,3.6939915846 <br> C,-1.1128247039,0.,3.6939915846 <br> C,3.8430691449,0.,-1.0260485163 <br> C,2.7438497634,0.,-2.9501104246 <br> C,-2.7438497634,0.,-2.9501104246 <br> C,-3.8430691449,0.,-1.0260485163 <br> C,0.,0.,4.5529452313 <br> C,4.0434354688,0.,-2.4146671922 <br> C,-4.0434354688,0.,-2.4146671922 <br> H,2.1792525612,0.,3.9147735387 <br> H,-2.1792525612,0.,3.9147735387 <br> Н,4.5767367049,0.,-0.221179178 <br> H,2.4081246109,0.,-3.9865194215 <br> Н,-2.4081246109,0.,-3.9865194215 <br> Н,-4.5767367049,0.,-0.221179178 <br> Н,0.,0.,5.6416634889 <br> H,5.0133071047,0.,-2.9206231268 <br> H,-5.0133071047,0.,-2.9206231268 <br> $\mathrm{Cu}, 1.6036652184,0 ., 0.8242932915$ <br> $\mathrm{Cu}, 0,0 .,-1.9597541948$ <br> $\mathrm{Cu},-1.6036652184,0 ., 0.8242932915$ <br> Br,7.7686406869,0.,-2.990942837 <br> Br,-7.7686406869,0.,-2.990942837 |


|  | $\mathrm{MP} 2=-1564.21127878$ NIMAG= 0 <br> $\mathrm{~N}, 0.6868406381,0 ., 2.5221144355$ <br> $\mathrm{~N},-0.6868220739,0 ., 2.5220744169$ <br> $\mathrm{~N}, 2.5276064594,0 .,-0.6662517715$ <br> $\mathrm{~N}, 1.8407655217,0 .,-1.855850362$ <br> $\mathrm{~N},-1.8407546557,0 .,-1.8558404671$ <br> $\mathrm{~N},-2.5275795104,0 .,-0.6662161327$ <br> $\mathrm{C}, 1.11921296,0 ., 3.8185088708$ <br> $\mathrm{C},-1.1192561722,0 ., 3.8184561587$ <br> $\mathrm{C}, 3.8665084152,0 .,-0.9399840166$ <br> $\mathrm{C}, 2.7472505743,0 .,-2.8785306177$ <br> $\mathrm{C},-2.7472604596,0 .,-2.878509292$ <br> $\mathrm{C},-3.8664839711,0 .,-0.9399458364$ <br> $\mathrm{C},-0.0000413589,0 ., 4.6814803811$ <br> $\mathrm{C}, 4.0542540979,0 .,-2.3407676893$ <br> $\mathrm{C},-4.0542543435,0 .,-2.340727392$ <br> $\mathrm{H}, 2.1981862998,0 ., 3.9860698522$ <br> $\mathrm{H},-2.1982392338,0 ., 3.9859711076$ <br> $\mathrm{H}, 4.5510985176,0 .,-0.0893373683$ <br> $\mathrm{H}, 2.3528331693,0 .,-3.8967136965$ <br> $\mathrm{H},-2.3528647563,0 .,-3.8967015357$ <br> $\mathrm{H},-4.551067021,0 .,-0.0892948804$ <br> $\mathrm{H},-0.000066779,0 ., 5.7745154992$ <br> $\mathrm{H}, 5.0008418941,0 .,-2.8872980468$ <br> $\mathrm{H},-5.000851175,0 .,-2.88724372$ <br> $\mathrm{Cu}, 1.8103057642,0 ., 1.0451731775$ <br> $\mathrm{Cu}, 0.0000136829,0 .,-2.0903045361$ <br> $\mathrm{Cu},-1.8102420265,0 ., 1.0451580954$ <br> F,3.7249181008,0.,2.1505530285 <br> F,0.0000020429,0.,-4.3011040213 <br> F,-3.7248546014,0.,2.1505495099 |
| :---: | :---: |



|  | a20115=119.23623403 |
| :---: | :---: |
|  | MP2 $=-2644.39916814$ NIMAG $=0$ <br> $\mathrm{N}, 0.6862226141,0 ., 2.4967553998$ <br> $\mathrm{N},-0.6862226141,0.2 .4967553998$ <br> $\mathrm{N}, 2.505331815,0,-,-0.6540730086$ <br> $\mathrm{N}, 1.8191048601,0 .,-1.8426329634$ <br> $\mathrm{N},-1.8191048601,0 .,-1.8426329634$ <br> $\mathrm{N},-2.505331815,0 .,-0.6540730086$ <br> C,1.1071898609,0.,3.8008056819 <br> C,-1.1071898609,0.,3.8008056819 <br> C,3.8451448468,0.,-0.9415667973 <br> C,2.7379179971,0.,-2.859266084 <br> C,-2.7379179971,0.,-2.859266084 <br> C,-3.8451448468,0.,-0.9415667973 <br> C,0.,0.,4.6671088777 <br> C,4.0417588179,0.,-2.3335856418 <br> C,-4.0417588179,0.,-2.3335856418 <br> Н,2.1729974458,0.,4.0259735117 <br> H,-2.1729974458,0.,4.0259735117 <br> Н,4.5730645483,0.,-0.1311485806 <br> H,2.3999912066,0.,-3.894861969 <br> Н,-2.3999912066,0.,-3.894861969 <br> Н,-4.5730645483,0.,-0.1311485806 <br> Н,0.,0.,5.7632050926 <br> H,4.9909904468,0.,-2.8816600017 <br> Н,-4.9909904468,0.,-2.8816600017 <br> $\mathrm{Cu}, 1.6071467473,0 ., 0.927901612$ <br> $\mathrm{Cu}, 0 ., 0 .,-1.8556229381$ <br> $\mathrm{Cu},-1.6071467473,0 ., 0.927901612$ <br> $\mathrm{Cl}, 7.3666453966,0 .,-4.253152124$ <br> Cl,-7.3666453966,0.,-4.253152124 <br> $\mathrm{Cl}, 0,0,0,8.5063318427$ |


|  | $\begin{aligned} & \mathrm{MP} 2=-2512.37387779 \mathrm{NIMAG}=0 \\ & \mathrm{~N}, 0.686148984,0 ., 2.4965483731 \\ & \mathrm{~N},-0.6861489841,0 ., 2.4965483731 \\ & \mathrm{~N}, 2.5051641689,0 .,-0.6540553825 \\ & \mathrm{~N}, 1.8190090963,0 .,-1.842495185 \\ & \mathrm{~N},-1.8190090962,0 .,-1.842495185 \\ & \mathrm{~N},-2.5051641689,0 .,-0.6540553826 \\ & \mathrm{C}, 1.107867224,0 ., 3.7998914873 \\ & \mathrm{C},-1.1078672241,0 ., 3.7998914873 \\ & \mathrm{C}, 3.8447506165,0 .,-0.9405169572 \\ & \mathrm{C}, 2.7368696491,0 .,-2.8593924462 \\ & \mathrm{C},-2.736869649,0 .,-2.8593924462 \\ & \mathrm{C},-3.8447506165,0 .,-0.9405169573 \\ & \mathrm{C},-0.0000000001,0 ., 4.6648517161 \\ & \mathrm{C}, 4.0398843321,0 .,-2.3324402451 \\ & \mathrm{C},-4.0398843321,0 .,-2.3324402452 \\ & \mathrm{H}, 2.1734841324,0 ., 4.0255790749 \\ & \mathrm{H},-2.1734841325,0 ., 4.0255790748 \\ & \mathrm{H}, 4.5730163782,0 .,-0.1305148332 \\ & \mathrm{H}, 2.3995043024,0 .,-3.8950849854 \\ & \mathrm{H},-2.3995043024,0 .,-3.8950849855 \\ & \mathrm{H},-4.5730163782,0 .,-0.1305148333 \\ & \mathrm{H},-0.0000000001,0 ., 5.7592642285 \\ & \mathrm{H}, 4.9876693278,0 .,-2.8796528293 \\ & \mathrm{H},-4.9876693277,0 .,-2.8796528294 \\ & \mathrm{Cu}, 1.6071310012,0 ., 0.9278723798 \\ & \mathrm{Cu}, 0 ., 0 .,-1.8557285226 \\ & \mathrm{Cu},-1.6071310012,0 ., 0.9278723798 \\ & \mathrm{Br}, 7.5597621472,0 .,-4.3645300885 \\ & \mathrm{Br},-7.5597621471,0 .,-4.3645300886 \\ & \mathrm{Br},-0.0000000001,0 ., 8.7291967801 \end{aligned}$ |
| :---: | :---: |

Table S4. Electron density properties (au) at the intermolecular BCPs in the $1: 1$ complexes.
1:1 Cu complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Apical | Cu25-F28 | 2.1354 | 0.0522 | 0.2611 | -0.0071 |
| Planar | F28-Cu26 | 2.0158 | 0.0683 | 0.3678 | -0.0121 |
| Planar | H19-F28 | 2.2785 | 0.0148 | 0.0541 | 0.0004 |
| CH(4) | H22-F28 | 1.5510 | 0.0608 | 0.1809 | -0.0107 |
|  |  |  |  |  |  |
| Apical | Cl28-Cu25 | 2.5561 | 0.0392 | 0.1336 | -0.0034 |
| Planar | Cl28-Cu26 | 2.4297 | 0.0507 | 0.1711 | -0.0084 |
| Planar | H19-Cl28 | 2.5748 | 0.0141 | 0.0429 | 0.0009 |
| CH(4) | H22-Cl28 | 2.3572 | 0.0192 | 0.0495 | 0.0005 |
|  |  |  |  |  |  |
| Apical | Br28-Cu25 | 2.6924 | 0.0362 | 0.1012 | -0.0040 |
| Planar | Br28-Cu26 | 2.5745 | 0.0455 | 0.1243 | -0.0080 |
| Planar | H19-Br28 | 2.6652 | 0.0140 | 0.0404 | 0.0008 |
| CH(4) | Br28-H22 | 2.5470 | 0.0160 | 0.0379 | 0.0003 |

1: 1 Ag complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Apical | F28-Ag25 | 2.379 | 0.0422 | 0.1823 | -0.0045 |
| Planar | F28-Ag26 | 2.256 | 0.0545 | 0.2623 | -0.0048 |
| Planar | H19-F28 | 2.483 | 0.0094 | 0.0355 | 0.0009 |
| CH(4) | H22-F28 | 1.554 | 0.0605 | 0.1800 | -0.0105 |
|  |  |  |  |  |  |
| Apical | Cl28-Ag25 | 2.758 | 0.0341 | 0.1118 | -0.0026 |
| Planar | Cl28-Ag26 | 2.623 | 0.0443 | 0.1474 | -0.0051 |
| Planar | H19-Cl28 | 2.790 | 0.0094 | 0.0272 | 0.0007 |
| CH(4) | H22-Cl28 | 2.366 | 0.0188 | 0.0486 | 0.0005 |
|  |  |  |  |  |  |
| Apical | Br28-Ag25 | 2.856 | 0.0337 | 0.0935 | -0.0039 |
| Planar | Br28-Ag26 | 2.722 | 0.0434 | 0.1177 | -0.0072 |
| Planar | H19-Br28 | 2.889 | 0.0093 | 0.0263 | 0.0008 |
| CH(4) | H22-Br28 | 2.556 | 0.0157 | 0.0373 | 0.0003 |

1: 1 Au complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Apical | Au25-F28 | 2.558 | 0.0358 | 0.1296 | -0.0036 |
| Planar | F28-Au26 | 2.434 | 0.0454 | 0.1776 | -0.0046 |
| Planar | H19-F28 | 2.336 | 0.0126 | 0.0433 | 0.0004 |
| CH(4) | H22-F28 | 1.508 | 0.0676 | 0.1866 | -0.0155 |
|  |  |  |  |  |  |
| Apical | Cl28-Au25 | 3.017 | 0.0253 | 0.0738 | -0.0005 |
| Planar | Cl28-Au26 | 2.956 | 0.0283 | 0.0817 | -0.0008 |


| Planar | H19-Cl28 | 2.614 | 0.0127 | 0.0351 | 0.0006 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| CH(4) | H22-Cl28 | 2.317 | 0.0208 | 0.0537 | 0.0005 |
|  |  |  |  |  |  |
| Apical | Br28-Au25 | 3.127 | 0.0246 | 0.0637 | -0.0010 |
| Planar | Br28-Au26 | 3.088 | 0.0265 | 0.0666 | -0.0014 |
| Planar | H19-Br28 | 2.706 | 0.0127 | 0.0336 | 0.0006 |
| CH(4) | H22-Br28 | 2.507 | 0.0173 | 0.0406 | 0.0003 |

Table S5. Barriers ( $\mathrm{kJ} \mathrm{mol}^{-1}$ ) and interhalogen distance $(\AA)$ in the maximum of the dissociation curve (Figure S1) of the 1:2 apical complexes.

|  | Barrier |  |  |  | $\mathrm{X} \cdots \mathrm{X}$ distance |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | F $^{-}$ | Cl $^{-}$ | Br $^{-}$ | $\mathrm{F}^{-}$ | $\mathrm{Cl}^{-}$ | $\mathrm{Br}^{-}$ |  |
| Au | 33.0 | 7.5 | 8.7 | 4.9 | 6.2 | 6.7 |  |
| Ag | 88.6 | 56.4 | 59.0 | 5.4 | 6.3 | 6.8 |  |
| Cu | 95.6 | 29.6 | 23.7 | 4.7 | 5.7 | 6.2 |  |

Table S6. Interatomic $X \cdots \times$ distances $(\AA)$ in the 1:2 complexes.

| $\mathbf{F}^{-}$ | $\mathbf{1 : 2}$ apical | $\mathbf{1 : 2}$ planar | $\mathbf{1 : 2 ~ C H ( 4 ) ~}$ |
| :---: | :---: | :---: | :---: |
| Au | 3.534 | $12.219^{*}$ | 13.360 |
| Ag | 3.165 | 8.343 | 13.602 |
| Cu | 2.697 | 7.370 | 13.156 |
| $\mathbf{C l}^{-}$ |  |  |  |
| Au | 5.206 | 9.323 | 15.182 |
| Ag | 4.330 | 8.886 | 15.484 |
| Cu | 4.087 | 8.324 | 15.023 |
| Br |  |  |  |
| Au | 5.483 | 9.510 | 15.699 |
| Ag | 4.627 | 9.097 | 16.019 |
| Cu | 4.562 | 8.801 | 15.537 |

* In this complex, the $\mathrm{F}(-)$ anions are interacting with the $\mathrm{C}(3)-\mathrm{H}$.

Table S7. Anion-Anion repulsion corrected binding energies ( $\mathrm{kJ} / \mathrm{mol}$ ) for the 1:2 complexes.

| $\mathrm{F}^{-}$ | 1:2 apical | $\mathbf{1 : 2}$ planar | $\mathbf{1 : 2 ~ C H ( 4 ) ~}$ |
| :---: | :---: | :---: | :---: |
| Au | -280.1 | -149.4 | -143.6 |
| Ag | -485.4 | -245.5 | -120.7 |
| Cu | -549.9 | -270.8 | -125.9 |
| $\mathrm{Cl}^{-}$ |  |  |  |
| Au | -127.4 | -125.1 | -75.7 |
| Ag | -297.6 | -182.2 | -60.5 |
| Cu | -246.5 | -164.8 | -64.4 |
| Br |  |  |  |
| Au | -133.0 | -125.9 | -69.7 |
| Ag | -285.0 | -176.7 | -55.5 |
| Cu | -210.5 | -147.3 | -59.1 |

Table S8. Electron density properties (au) at the intermolecular BCPs in the 1:2 complexes.
1:2 Cu complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Apical | F28-F29 | 2.6975 | 0.0197 | 0.0744 | -0.0010 |
| Apical | Cu25-F28 | 2.2109 | 0.0442 | 0.2059 | -0.0055 |
| Planar | F28-Cu25 | 2.0895 | 0.0577 | 0.2947 | -0.0087 |
| Planar | F28-H18 | 2.4934 | 0.0095 | 0.0383 | 0.0011 |
| Planar | H16-F28 | 2.2599 | 0.0153 | 0.0538 | 0.0002 |
| CH(4) | F28-H23 | 1.6591 | 0.0471 | 0.1519 | -0.0043 |
|  |  |  |  |  |  |
| Apical | Cl28-Cu25 | 2.7073 | 0.0293 | 0.0928 | -0.0012 |
| Planar | Cl28-Cu25 | 2.6392 | 0.0333 | 0.1072 | -0.0020 |
| Planar | Cl28-H18 | 2.6170 | 0.0127 | 0.0376 | 0.0008 |
| Planar | H16-Cl28 | 2.5495 | 0.0146 | 0.0430 | 0.0008 |
| CH(4) | Cl28-H23 | 2.5325 | 0.0138 | 0.0352 | 0.0004 |
|  |  |  |  |  |  |
| Apical | Br28-Cu25 | 2.8924 | 0.0252 | 0.0650 | -0.0014 |
| Planar | Cu25-Br28 | 2.9624 | 0.0222 | 0.0539 | -0.0011 |
| Planar | H18-Br28 | 2.7206 | 0.0123 | 0.0340 | 0.0007 |
| Planar | H16-Br28 | 2.6397 | 0.0144 | 0.0392 | 0.0006 |
| CH(4) | Br28-H23 | 2.7562 | 0.0110 | 0.0275 | 0.0005 |

1:2 Ag complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Apical | Ag26-F28 | 2.437 | 0.0372 | 0.1526 | -0.0042 |
| Planar | F28-Ag25 | 2.327 | 0.0467 | 0.2100 | -0.0046 |
| Planar | H16-F28 | 2.179 | 0.0173 | 0.0555 | -0.0004 |
| CH(4) | F28-H23 | 1.660 | 0.0470 | 0.1514 | -0.0043 |
|  |  |  |  |  |  |
| Apical | Cl28-Ag25 | 2.845 | 0.0287 | 0.0923 | -0.0015 |
| Planar | Cl28-Ag25 | 2.734 | 0.0354 | 0.1156 | -0.0028 |
| Planar | H16-Cl28 | 2.720 | 0.0106 | 0.0301 | 0.0006 |
| Planar | Cl28-H18 | 2.971 | 0.0068 | 0.0200 | 0.0007 |
| CH(4) | Cl28-H23 | 2.538 | 0.0137 | 0.0348 | 0.0004 |
|  |  |  |  |  |  |
| Apical | Br28-Ag25 | 2.949 | 0.0282 | 0.0785 | -0.0023 |
| Planar | Br28-Ag25 | 2.849 | 0.0340 | 0.0932 | -0.0039 |
| Planar | Br28-H18 | 3.001 | 0.0075 | 0.0216 | 0.0008 |
| Planar | H16-Br28 | 2.827 | 0.0103 | 0.0286 | 0.0007 |
| CH(4) | Br28-H23 | 2.775 | 0.0107 | 0.0269 | 0.0005 |

1:2 Au complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Apical | Au25-F28 | 2.613 | 0.0320 | 0.1118 | -0.0032 |


| Planar | F28-H16 | 1.592 | 0.0552 | 0.1725 | -0.0074 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| CH(4) | F28-H23 | 1.619 | 0.0517 | 0.1635 | -0.0061 |
|  |  |  |  |  |  |
| Apical | Cl28-Au25 | 3.226 | 0.0174 | 0.0482 | 0.0002 |
| Planar | Au26-Cl29 | 3.325 | 0.0148 | 0.0391 | 0.0003 |
| Planar | H16-Cl28 | 2.591 | 0.0130 | 0.0340 | 0.0005 |
| Planar | Cl28-H18 | 2.977 | 0.0065 | 0.0179 | 0.0005 |
| CH(4) | Cl28-H23 | 2.478 | 0.0153 | 0.0391 | 0.0005 |
|  |  |  |  |  |  |
| Apical | Br28-Au25 | 3.339 | 0.0169 | 0.0436 | 0.0001 |
| Planar | Br29-Au26 | 3.455 | 0.0140 | 0.0349 | 0.0003 |
| Planar | H16-Br28 | 2.727 | 0.0120 | 0.0304 | 0.0005 |
| Planar | H18-Br28 | 2.996 | 0.0074 | 0.0198 | 0.0006 |
| CH(4) | Br28-H23 | 2.696 | 0.0123 | 0.0304 | 0.0005 |

Table S9. Interatomic distances ( $\AA$ ) of the anions in the 1:3 complexes.

| $\mathbf{F}(-)$ | Planar | $\mathbf{C H}(\mathbf{4})$ |
| :---: | :---: | :---: |
| Au |  | 13.361 |
| Ag | 8.158 | 13.573 |
| Cu | 7.450 | 13.141 |
|  |  |  |
| $\mathrm{Cl}(-)$ | planar | $\mathrm{CH}(4)$ |
| Au |  | 14.866 |
| Ag | 9.038 | 15.169 |
| Cu |  | 14.733 |
|  |  |  |
| $\mathrm{Br}(-)$ | planar | $\mathrm{CH}(4)$ |
| Au |  | 15.226 |
| Ag | 9.353 | 15.559 |
| Cu |  | 15.120 |

Table S10. Anion-Anion repulsion corrected binding energies ( $\mathrm{kJ} / \mathrm{mol}$ ) in the 1:3 complexes.

| $\mathbf{F ( - )}$ | Planar | CH(4) |
| :---: | :---: | :---: |
| Au |  | -175.8 |
| Ag | -286.3 | -146.8 |
| Cu | -307.4 | -153.3 |
|  |  |  |
| $\mathrm{Cl}(-)$ | planar | $\mathrm{CH}(4)$ |
| Au |  | -92.3 |
| Ag | -201.0 | -71.7 |
| Cu |  | -76.6 |
|  |  |  |
| $\mathrm{Br}(-)$ | planar | $\mathrm{CH}(4)$ |
| Au |  | -85.6 |
| Ag | -193.4 | -66.0 |
| Cu |  | -70.7 |

Table S11. Electron density properties at the intermolecular BCPs in the 1:3 complexes.
1:3 Cu complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Planar | F28-Cu25 | 2.2108 | 0.0443 | 0.2049 | -0.0053 |
| Planar | F28-H16 | 2.3875 | 0.0116 | 0.0425 | 0.0007 |
| CH(4) | F30-H22 | 1.7813 | 0.0357 | 0.1149 | -0.0018 |
|  |  |  |  |  |  |
| $\mathrm{CH}(4)$ | H22-Cl30 | 2.7431 | 0.0093 | 0.0231 | 0.0003 |
|  |  |  |  |  |  |
| $\mathrm{CH}(4)$ | Br30-H22 | 2.9699 | 0.0074 | 0.0182 | 0.0005 |

1:3 Ag complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| Planar | Ag27-F30 | 2.411 | 0.0392 | 0.1624 | -0.0042 |
| Planar | F28-H16 | 2.461 | 0.0098 | 0.0350 | 0.0007 |
| CH(4) | F30-H22 | 1.777 | 0.0360 | 0.1160 | -0.0019 |
|  |  |  |  |  |  |
| Planar | Cl30-Ag27 | 3.025 | 0.0204 | 0.0615 | -0.0002 |
| Planar | H16-Cl28 | 2.863 | 0.0081 | 0.0225 | 0.0006 |
| CH(4) | Cl28-H23 | 2.740 | 0.0094 | 0.0232 | 0.0003 |
|  |  |  |  |  |  |
| Planar | Br30-Ag27 | 3.238 | 0.0166 | 0.0448 | 0.0001 |
| Planar | H16-Br28 | 2.942 | 0.0082 | 0.0223 | 0.0007 |
| CH(4) | H24-Br29 | 2.969 | 0.0074 | 0.0182 | 0.0005 |

1:3 Au complexes

| Configuration | Atoms | Dist | Rho | Lap | H |
| :--- | :--- | :---: | :---: | :---: | :---: |
| $\mathrm{CH}(4)$ | F30-H22 | 1.735 | 0.0395 | 0.1280 | -0.0025 |
|  |  |  |  |  |  |
| $\mathrm{CH}(4)$ | H22-Cl30 | 2.651 | 0.0110 | 0.0273 | 0.0003 |
|  |  |  |  |  |  |
| $\mathrm{CH}(4)$ | H22-Br30 | 2.864 | 0.0089 | 0.0217 | 0.0005 |

Table S12. Anion-Metal distances in the CSD search.
Cu-F

| Refcode | Distances ( $\AA$ ) |  |  |
| :--- | :---: | :---: | :---: |
| HUXWUU | 2.383 | 2.579 | 2.482 |
| HUXWUU | 2.605 | 2.536 | 2.448 |
|  |  |  |  |
|  | Average | Maximum | Minimum |
|  | 2.506 | 2.605 | 2.383 |

$\mathrm{Cu}-\mathrm{Cl}$

| Refcode | Distances ( $\AA$ ) |  |  |
| :--- | :---: | :---: | :---: |
| JALKIT | 2.622 | 2.424 | 2.486 |
| OBOQAY | 2.359 | 2.545 | 2.923 |
| OBOQEC | 2.361 | 2.549 | 2.931 |
| OBOQIG | 2.354 | 2.560 | 2.977 |
| RETQIR | 2.500 | 2.584 | 2.558 |
| RETQIR | 2.628 | 2.501 | 2.614 |
| RUYGUN | 2.461 | 2.453 | 3.056 |
| RUYGUN | 2.641 | 2.965 | 2.350 |
| RUYGUN | 2.486 | 2.398 | 3.039 |
| RUYGUN | 2.756 | 2.756 | 2.341 |
| RUYHAU | 2.600 | 2.986 | 2.357 |
| UWOMAW | 2.626 | 2.502 | 2.630 |
| UWOMAW | 2.648 | 2.761 | 2.581 |
| VADYAB | 2.623 | 2.603 | 2.603 |
| VAZCUX | 2.527 | 2.631 | 2.666 |
| VAZCUX | 2.604 | 2.527 | 2.564 |
|  |  |  |  |
|  | Average | Maximum | Minimum |
|  | 2.609 | 3.056 | 2.341 |

$\mathrm{Cu}-\mathrm{Br}$

| Refcode | Distances (̊) |  |  |
| :--- | :---: | :---: | :---: |
| ELODIS | 2.722 | 3.063 | 2.504 |
| ELODOY | 2.652 | 2.750 | 2.645 |
| ELODOY | 2.698 | 2.638 | 2.806 |
|  |  |  |  |
|  | Average | Maximum | Minimum |
|  | 2.720 | 3.063 | 2.504 |

Figure S1. Energy profiles ( $\mathrm{kJ} / \mathrm{mol}$ ) as a function of the $\mathrm{X}-\mathrm{X}$ distance $(\AA)$ in the 1:2 apical complexes. Only one of the $X$ anions in move further away from the $(\mathrm{Pz}-\mathrm{M})_{3:} \mathrm{X}^{-}$system.
$X=F(-)$
$\mathrm{Cl}(-)$
$\operatorname{Br}(-)$
$\mathrm{M}=$



Ag



Cu




Figure S2. Electron density at the $\mathrm{BCP}(\mathrm{au})$ vs. the interatomic distance $(\AA)$.


The exponential relationships show $\mathrm{R}^{2}$ values of $0.998(\mathrm{H}-\mathrm{F}), 0.98(\mathrm{H}-\mathrm{Cl})$ and $0.98(\mathrm{H}-\mathrm{Br})$.


The exponential relationships show $\mathrm{R}^{2}$ values $>0.999$.


The exponential relationships show $\mathrm{R}^{2}$ values $>0.999$.


The exponential relationships show $\mathrm{R}^{2}$ values $>0.99$.

