# Reactivity of cobalt(II)-dichalcogenide complexes: correlation between redox conversion and ligand-field strength

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# Reactivity of Cobalt(II)-Dichalcogenide Complexes:
## Correlation between Redox Conversion and Ligand-field Strength

Proefschrift

ter verkrijging van

de graad van doctor aan de Universiteit Leiden,

op gezag van rector magnificus prof.dr.ir. H. Bijl,

volgens besluit van het college voor promoties

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door

**Christian Marvelous**

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*"If you wish to succeed in life, make perseverance your bosom friend, experience your wise counselor, caution your elder brother, and hope your guardian genius."*

Joseph Addison

To my parents and to my future self,

As a reminder that persistence is almost always rewarding.

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# List of Abbreviations

| | | | |
|---|---|---|---|
| ATP | adenosine triphosphate | mer | meridional |
| a.u. | arbitrary units | Met | methionine |
| bpy | 2,2'-bipyridine | MO | molecular orbital |
| br | broad | MS | mass spectrometry |
| calcd. | calculated | $N(nBu_4)I$ | tetrabutylammonium iodide |
| CcO | cytochrome c oxidase | $NEt_4Cl$ | tetraethylammonium chloride |
| Cys | cysteine | $(NGuaS)_2$ | 2',2'-(2,2'-dithiodiphenyl)bis(1,1,3,3-tetramethylguanidine) |
| d | doublet (NMR) | NHase | nitrile hydratase |
| DCM | dichloromethane | NMR | nuclear magnetic resonance |
| dd | double doublet | Ph | phenyl |
| DFT | density functional theory | phen | 1,10-phenanthroline |
| DIPEA | diisopropylethylamine | ppm | parts per million |
| DMF | dimethylformamide | Py | 2-pyridyl |
| DMSO | dimethylsulfoxide | q | quartet |
| equiv. | equivalent | Hquin | 8-quinolinol |
| ESI | electrospray ionization | RT | room temperature |
| fac | facial | s | singlet (NMR), strong (IR) |
| Glu | glutamic acid | Sec | selenocysteine |
| His | histidine | Ser | serine |
| HOTf | trifluoromethanesulfonic acid | SOMO | singly occupied molecular orbital |
| IR | infrared | t | triplet |
| Leu | leucine | TDDFT | time-dependent density functional theory |
| LMCT | ligand-to-metal charge transfer | UV-vis | ultraviolet -visible |
| m | multiplet (NMR), medium (IR) | vs | very strong |
| Me | methyl | w | weak |