FULLERENE BASED CHELATING LIGANDS

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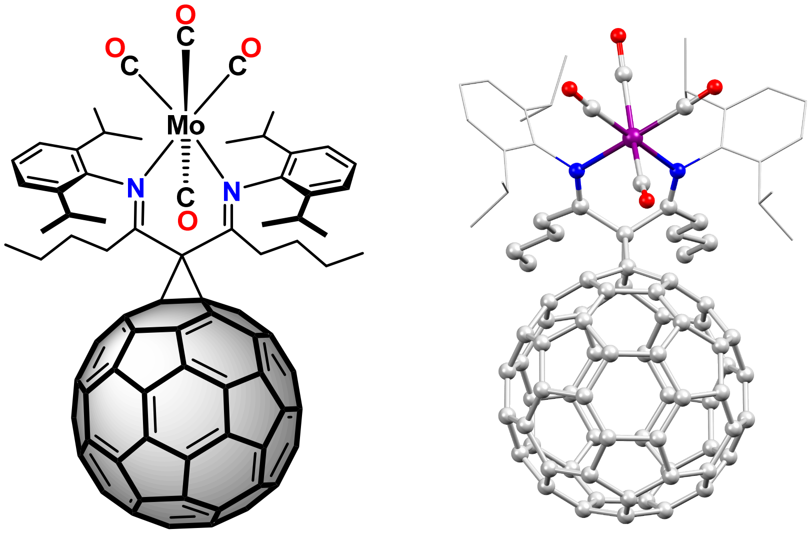
For group 6 and 7 metals, especially rhenium and manganese, carbonyl complexes bearing a κ^2-*N*,*N*-bidentate redox non-innocent ligand have been shown to be promising CO_2 reduction catalysts.[1, 2] Due to its capability of generally taking up electrons reversibly, the fullerene seems an intriguing moiety to try to create a redox non-innocent backbone in the ligand system. A novel chelating ligand system was obtained *via* Bingel-Hirsch addition of diketones to C_{60}[3, 4] and subsequent conversion into imines. Thus, these κ^2-*N*,*N*-bidentate ligands were tested for their coordination behavior to group 6 and 7 transition metals. To that end, the complexes $[M^{I}(L^{Me/nBu})(CO)_3Br]$ (M = Mn, Re) and $[M^{0}(L^{Me/nBu})(CO)_4]$ (M = Cr, Mo, W) were synthesized and characterized *via* NMR, IR and UV-Vis spectroscopy. First electrochemical studies were conducted under inert gas atmosphere. DFT calculations confirmed structural stability and furthermore provided some insight into the predicted coordination geometry around the metal centers (see figure below).



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[1] N. Elgrishi, M. B. Chambers, X. Wang, M. Fontecave, *Chem. Soc. Rev.*, **2017**, *46*, 761.

[2] K. Talukdar, S. S. Roy, E. Amatya, E. A. Sleeper, P. Le Magueres, J. W. Jurss, *Inorg. Chem.*, **2020**, *59*, 6087.

[3] C. Bingel, *Chem. Ber.*, **1993**, *126*, 1957.

[4] X. Camps, A. Hirsch, *J. Chem. Soc., Perkin Trans.*, **1997**, *1*, 1595.