

## New synthetic routes to Rhenium dicarbonyl complexes of medicinal interest with unusual oxidation states

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In this master thesis, new synthetic routes to rhenium dicarbonyl with various oxidation states intermediates are described. The well-known addition reaction of diimine on rhenium dicarbonyl is updated by avoiding an oxygen-sensitive step. Synthesis of unpublished compounds are reported, and the complexes are fully characterized. In addition, 7 new crystal structures (compounds **5**, **8**, **9**, **10**, **11**, **13** as well as oxidized and chlorinated derivative of **6**) are related and analyzed. Their spectroscopic properties were investigated, such as comparison between symmetric stretching vibration frequency, measured by IR, and their correlation with  $\pi$ -backbonding. A stronger backdonation from the metal to the CO ligand was observed for rhenium(I) than its oxidized derivative, as expected. Measured infrared spectra were plotted versus DFT calculations and compared with calculated value from empirical formulas. UV-Vis measurements were assigned to molecular orbitals. Finally, C $\equiv$ O bonds lengths, determined by X-ray, were correlated with  $\pi$ -backdonation. However, the results are less significative than IR analysis.

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