

Title: Synthesis, Characterization, and Reactivity of High-Valent Molybdenum Complexes Containing Redox-Active Ligands

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Much work has been done in the way of characterizing perchlorate-reducing enzymes such as *perchlorate reductase*, which makes use of a molybdopterin active site. Analogous α -diamine ligands are currently being used to model the enzyme's active site. A variety of molybdenum complexes with general formulas $\text{Mo}(\text{CO})_3(\text{MeCN})\text{L}$, $\text{Mo}(\text{CO})_4\text{L}$, and $\text{Mo}(\text{CO})_2\text{L}_2$, where L is bis-mesityl-diazadiene or bis-mesityl-diazabutadiene, have been prepared and characterized using X-ray crystallography, X-ray Photoelectron Spectroscopy, electrochemistry, NMR, IR, and UV-Vis spectroscopy. The $\text{Mo}(\text{CO})_3(\text{MeCN})\text{L}$ species undergoes oxidation followed quickly by disproportionation, as confirmed spectroscopically and electrochemically. Comparison of the crystallographic data between the three families of complexes illustrates differences in bonding and electronic character of the redox-active ligands.