

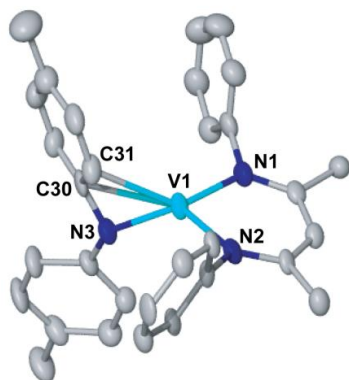


Reactivity and Spectroscopic Studies of a “Masked” Three-Coordinate Vanadium(II) Complex



B. L. Tran, M. Singhal, H. Park, M. Pink, D. J. Mindiola (Indiana U., Bloomington, IN); J. Telsler (Roosevelt U., Chicago, IL); O. P. Lam, K. Meyer (U. Erlangen, Germany); J. Krzystek, A. Ozarowski (NHMFL)

Friedrich-Alexander-Universität
Erlangen-Nürnberg



This project, which involved scientists in Europe and North America, was directed towards the synthesis and characterization of a new type of complex containing vanadium(II). In contrast to previous examples of V(II) complexes, in this case the V(II) ion is “masked” by a specially chosen set of ligands. The molecular structure is shown at the left, in which it can be seen that two coordination sites are taken up by each of the N atoms of the β -ketiminate (“NacNac”)ligand, one by the N atom of a ditolylamide, and tolyl ring of that ligand “masks” the V(II) ion. The complex was further investigated by reactivity studies that showed removal of the mask and binding of a variety of small molecules, such as alkynes, to V(II).

The complex that has an $S = 3/2$ ground state was also probed by both magnetometry and high-frequency and -field electron paramagnetic resonance (HF-EPR). These two techniques were in excellent agreement and showed an unusual electronic structure of the complex, relative to that of traditional V(II) complexes. HF-EPR spectra and simulations at 208 GHz and 10 K are shown at the right. This research was supported by the Chemical Sciences, Geosciences and Biosciences Division, Office of Basic Energy Science, Office of Science, U.S. Department of Energy (Grant No. DE-FG02-07ER15893) and the NHMFL.

