Open-shell organochromium compounds supported by β-diketiminate ligands

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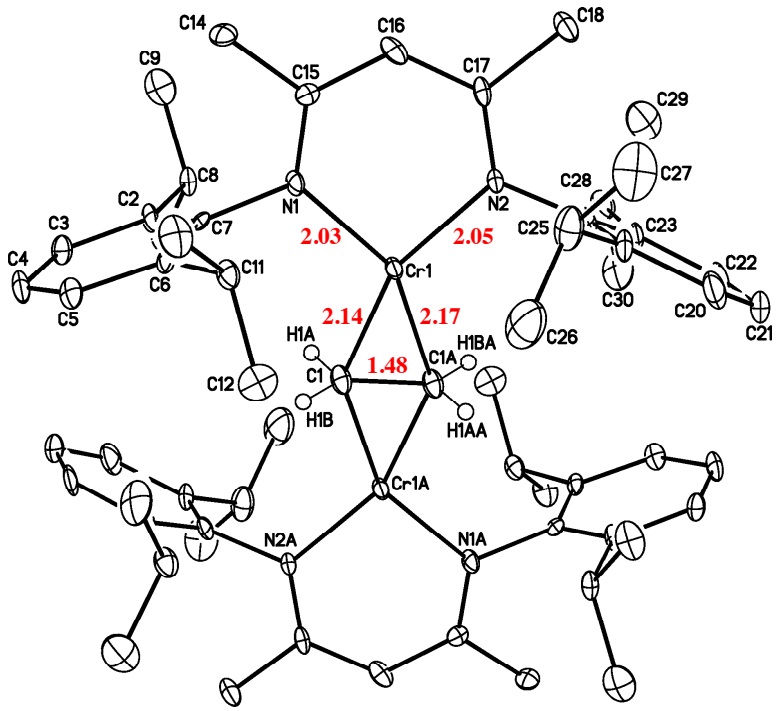
We have used sterically hindered β-diketiminate ('nacnac') ligands to model the hard, low-coordinate environment of oxide supported chromium catalysts. For example, cationic $(Ar)_2$nacnacCr(III) alkyls are excellent models for the Phillips olefin polymeriation catalyst. The organometallic chemistry of this class of compounds is rich and includes compounds in the unusually low formal oxidation state +I. The dinitrogen complex $[(^iPr_2Ph)_2$nacnacCr$]_2(\mu$-$N_2)$ reacts with many unsaturated molecules – the product of the reaction with ethlene is shown below). The N_2-complex catalyzes the selective trimerization of ethylene to 1-hexene and the cyclotrimerization of alkynes to arenes. These reactions give rise to chromacyclic intermediates, which have a bearing on the mechanism of the trimerization catalysis. We have also discovered dinuclear chromium hydrocarbyl hydrides that strenuously resist reductive elimnation of hydrocarbons. These results amply demonstrate that there is more to organometallic chemistry than obeys the 18-electron rule.



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Klaus Theopold (born in Berlin, Germany in 1954) received his Vordiplom from the Universität Hamburg in 1977. He then decided to pursue his graduate studies in the United States, where he studied with Prof. R. G. Bergman and received his Ph. D. in inorganic chemistry from UC Berkeley in 1982. After a year of postdoctoral research with Prof. R. R. Schrock at MIT, he joined the faculty at Cornell University as an Assistant Professor in 1983. In 1990, he moved to the University of Delaware as an Associate Professor and was promoted to Professor in 1995. He holds a joint appointment in the Department of Chemical Engineering and serves as an Associate Director of the University's Center for Catalytic Science and Technology. Since 2007, he is serving as the Chair of the Department of Chemistry and Biochemistry. Prof. Theopold is a co-author of ca. 120 papers and he has lectured widely. He was honored with a Presidential Young Investigator Award by the National Science Foundation (in 1985), a Sloan Research Fellowship from the Alfred P. Sloan Foundation (in 1992), and he was named an AAAS Fellow (in 1995) and a JSPS Invitation Fellow (in 2004).

Key References:

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