

Prof. Dr. rer. nat. Karsten Meyer

Chair of Inorganic and General Chemistry
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Curriculum Vitae

Oct. 1989 Study of Chemistry at the Ruhr-University-Bochum in Germany
May 1995 Diploma (Ruhr-University-Bochum)
July 1995 PhD Studies at the Max-Planck-Institute for Bioinorganic Chemistry
(previously Radiation Chemistry) in Mülheim/Ruhr, Germany
under the supervision of Prof. Dr. Karl Wieghardt
Jan. 1998 Dissertation (Dr. rer. nat) "Molecular and Electronic Structure of
High-Valent Transition-Metal Nitrido Complexes"
Feb. 1998 Postdoctoral Studies at the MPI for Bioinorganic Chemistry
Oct. 1998 Postdoctoral Studies at the Massachusetts Institute of Technology (MIT)
under the direction of Prof. Christopher C. Cummins
Jan. 2001 Assistant Professor at the University of California, San Diego (UCSD)
June 2004 Alfred P. Sloan Foundation Fellow
Jan. 2006 Adjunct Professor at UCSD
Jan. 2006 University Full Professor (W3/C4)
Chair of Inorganic and General Chemistry

Scientific Interests

The inorganic chemistry in the Meyer laboratory bridges the field of classical coordination chemistry with fields of supramolecular, organometallic, and bioinorganic chemistry. The general research focuses on the synthesis of new chelating ligands and their transition and actinide metal coordination complexes. These complexes often exhibit unprecedented coordination modes and unusual electronics structures and consequently, show enhanced reactivities towards small molecules of industrial and biological relevance such as organic azides and H₂, N₂, CH₄, CO, CO₂, NO, O₂, O₃, P₄ etc. Small molecule activation and atom or group transformation to functionalize important organic and inorganic precursor molecules is the ultimate goal of our research. In order to achieve this goal, the coordination chemistry is being investigated. Single-crystal diffraction studies in conjunction with a battery of spectroscopic methods such as SQUID magnetization studies as well as EPR, Mößbauer, electronic and X-ray absorption spectroscopy is applied to study the electronic properties and reactivities of these new species. Synthetic chemistry is at the heart of our research but modern computational methods are applied to elucidate the electronic structures and origin of reactivity of our newly synthesized molecules. In general, the research in our laboratory allows for learning a variety of inorganic and organic synthetic techniques as well as theory and application of a large number of spectroscopic and computational methods.

Selected Publications

- S.C. Bart, C. Anthon, F.W. Heinemann, E. Bill, N.M. Edelstein, and **K. Meyer**
Carbon Dioxide Activation with Sterically Pressured Mid- and High-Valent Uranium Complexes
J. Am. Chem. Soc. **2008**, *130*, 12536 – 12546.
- A. R. Fox, S. C. Bart, **K. Meyer** and C. C. Cummins
Towards Uranium Catalysts
Nature **2008**, *455*, 341 – 349.
- O.P. Lam, C. Anthon, F.W. Heinemann, J.M. O'Connor, and **K. Meyer**
Structural and Spectroscopic Characterization of a Charge-Separated Uranium Benzophenone Ketyl Radical Complex
J. Am. Chem. Soc. **2008**, *130*, 6567 – 6576.
- S.C. Bart and **K. Meyer**
Highlights in Uranium Coordination Chemistry
Structure & Bonding **2008**, *127*, 119 – 176.
- C. Hauser and **K. Meyer**
Uranchemie zwischen Phobie und Begeisterung
Invited Review, Nachrichten aus der Chemie **2008**, *55*, 1195 – 1199.
- C. Vogel, F. W. Heinemann, J. Sutter, C. Anthon, and **K. Meyer**
An Iron Nitride Complex
Angew. Chem. Int. Ed. **2008**, *47*, 2681 – 2684.
- I. Castro-Rodriguez, H. Nakai and **K. Meyer**
Multiple Bond Metathesis and N-Atom Transfer Chemistry Mediated by a Nucleophilic Uranium(V) Imido Complex
Angew. Chem. Int. Ed. **2006**, *45*, 1757 – 1759.
- I. Castro-Rodriguez, H. Nakai and **K. Meyer**
Small Molecule Activation at Uranium Coordination Complexes: Control of Reactivity via Molecular Architecture (Invited Feature Article)
Chem. Commun. **2006**, 1353 – 1367.
- I. Castro-Rodriguez and **K. Meyer**
Carbon Dioxide Reduction and Carbon Monoxide Activation Employing a Reactive Uranium(III) Complex
J. Am. Chem. Soc. **2005**, *127*, 11242 – 11243.
- X. Hu and **K. Meyer**
Terminal Cobalt(III) Imido Complexes Supported by Tris(Carbene) Ligands: Imido Insertion into the Cobalt-Carbene Bond
J. Am. Chem. Soc. **2004**, *126*, 16322 – 16323.
- I. Castro-Rodriguez, H. Nakai, L. Zakharov, A.L. Rheingold and **K. Meyer**
A Linear, O-Coordinated η^1 -CO₂ Bound to Uranium
Science **2004**, *305*, 1757-1759.
- X. Hu, I. Castro-Rodriguez and **K. Meyer**
Dioxygen Activation by a Low-Valent Cobalt Complex Employing a Flexible Tripodal N-Heterocyclic Carbene Ligand
J. Am. Chem. Soc. **2004**, *126*, 13464-13473.
- X. Hu, I. Castro-Rodriguez, K. Olsen and **K. Meyer**
Group 11 Metal Complexes of N-Heterocyclic Carbene Ligands: The Nature of the Metal-Carbene Bond. *Organometallics* **2004**, *23*, 755-764.