

Teresa K. Zimmermann Meister

(März 2016)

September 2013 - März 2016

"Homogeneous Industrial Catalysis: Hydrosilylation, Epoxidation, Transvinilation"



Abb. 38: Prof. Dr. Janos Mink, Dr. Teresa Zimmermann Meister, Prof. Dr. Fritz E. Kühn, Prof. Dr. Klaus Köhler, Prof. Dr. Richard W. Fischer (von links)

Gemeinsame Publikationen

- 1) T. K. Meister, J. W. Kück, K. Riener, A. Pöthig, W. A. Herrmann, F. E. Kühn*, *J. Catal.*, **2016**, 337, 157-166 (Decoding Catalytic Activity of Platinum Carbene Hydrosilylation Catalysts).
- 2) T. K. Meister, K. Riener, P. Gigler, J. Stohrer, W. A. Herrmann, F. E. Kühn*, *ACS Catalysis*, **2016**, 6, 1274-1284 (Platinum Catalysis Revisited – Unraveling Principles of Catalytic Olefin Hydrosilylation).
- 3) X. Cai, T. K. Meister, A. Pöthig, F. E. Kühn*, *Inorg. Chem.*, **2016**, 55, 858-864 (Filling a Gap: Electrochemical Property Comparison of the Completed Compound Series $[\text{Mo}_2(\text{DArF})_n(\text{O}_2\text{C-Fc})_{4-n}]$ (DArF = *N,N'*-Diarylformamidinate; $\text{O}_2\text{C-Fc}$ = Ferrocenecarboxylate)).
- 4) M. Hollering, R. O. Reithmeier, S. Meister, E. Herdtweck, F. E. Kühn*, B. Rieger*, *RSC Advances*, **2016**, 6, 14134-14139 ($[\text{Re}(\text{CO})_3\text{Cl}(\text{C}_5\text{H}_4\text{CIP})_2]$ and $[\text{Re}(\text{CO})_2\text{Cl}(\text{C}_5\text{H}_4\text{CIP})_3]$: Synthesis and Characterization of Two Novel Rhenium(I) Phosphinine Complexes).
- 5) K. Riener, T. K. Meister, P. Gigler, W. A. Herrmann, F. E. Kühn*, *J. Catal.* **2015**, 331, 203-209 (Mechanistic insights into iridium-catalyzed hydrosilylation of allyl compounds).
- 6) X. M. Cai, T. K. Zimmermann, A. Pöthig, F. E. Kühn*, *Inorg. Chem.*, **2015**, 54, 6631-6640 (Synthesis and Electrochemical Properties of *cis*- and *trans*- $[\text{Mo}_2(\text{O}_2\text{C-Fc})_2(\text{DArF})_2]$ ($\text{O}_2\text{C-Fc}$ = Ferrocenecarboxylate; DArF = *N,N'*-diarylformamidinate)).
- 7) T. K. Zimmermann, F. E. Kühn*, *Chem. i. uns. Zeit*, **2015**, 49, 248-259 (Molekulare Katalysatoren zur Bindungsaktivierung: Auf dem Weg zu alternativen Rohstoffquellen).
- 8) K. Riener, T. K. Zimmermann, A. Pöthig, W. A. Herrmann, F. E. Kühn*, *Inorg. Chem.*, **2015**, 54, 4600-4602 (Direct Synthesis and Bonding Properties of the First μ^2 - η^2 , η^2 -Allyl-Bridged Diiridium Complex).
- 9) A. Schmidt, N. Grover, T. K. Zimmermann, L. Graser, M. Cokoja, A. Pöthig, F. E. Kühn*, *J. Catal.*, **2014**, 319, 119-126 (Synthesis and Characterization of Novel Cyclopentadienyl Molybdenum Imidazo(1,5-a)pyridine-3-ylidene Complexes and their Application in Olefin Epoxidation Catalysis).
- 10) T. K. Zimmermann, J. Ziriakus, E. Herdtweck, A. Pöthig, F. E. Kühn*, *Organometallics*, **2014**, 33, 2667-2670 ($[\text{Ru}_4(\text{CO})_8(\mu\text{-OOCCH}_2\text{CH}_3)_4(\text{THF})_2]$ and $[\text{Ru}_3(\mu_3\text{-OH})(\text{CO})_6(\mu\text{-OOC}^t\text{Bu})_4(\text{OOC}^t\text{Bu})]$: Novel Multinuclear Ruthenium Carbonyl Carboxylates).
- 11) T. K. Zimmermann, S. Haslinger, A. Pöthig*, F. E. Kühn*, *Acta Cryst. C*, **2014**, 70, 384-387 (Structure and catalytic activity of the ruthenium(I) sawhorse-type complex $[\text{Ru}_2\{\mu, \eta^2\text{-CF}_3(\text{CF}_2)_5\text{COO}\}_2(\text{DMSO})_2]$).

- 12) J. Ziriakus, T. K. Zimmermann, A. Pöthig, M. Drees, S. Haslinger, D. Jantke, F. E. Kühn*, *Adv. Synth. Catal.*, **2013**, 355, 2845-2859 (Ruthenium Catalysed Transvinylolation – New Insights).



Experimentalvorlesung mit Dr. Rudolf Staudigl (links), CEO der Wacker Chemie AG im Januar 2016



Industriekooperation zur Verwendung von Reisschalenwachs statt Montanwachs

Mario Bitzer

(Juli 2016)

Mai 2013 - Mai 2016

"Functionalized *N*-Heterocyclic Carbene Complexes of Iridium and Ruthenium: Synthesis, Characterization and Scope towards (Tandem-)Catalysis"

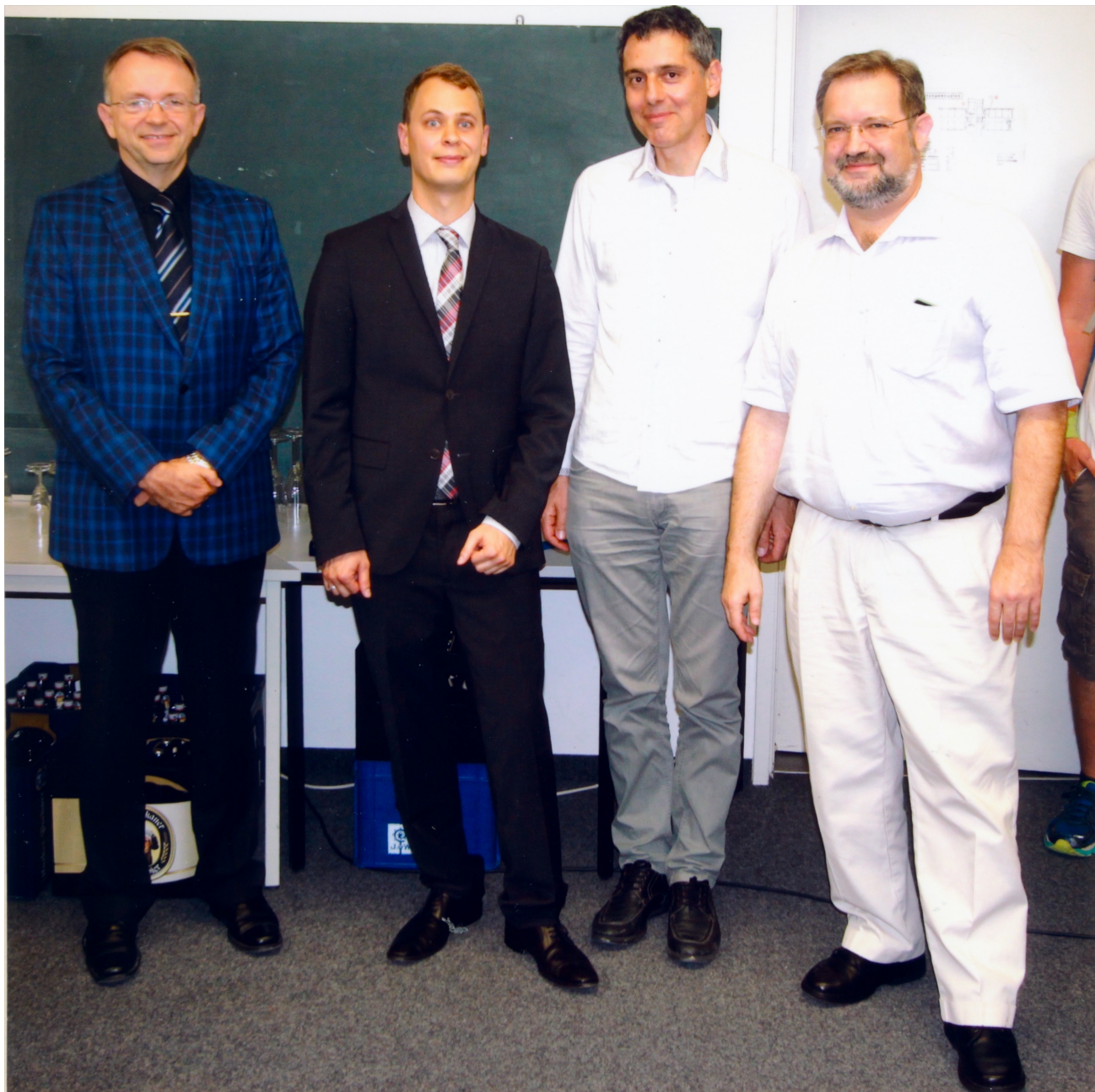


Abb. 39: Prof. Dr. Fritz E. Kühn, Dr. Mario Bitzer, Prof. Dr. Walter Baratta, Prof. Dr. Richard W. Fischer (v. links).

Gemeinsame Publikationen:

- 1) L. Pardatscher, M. J. Bitzer, C. Jandl, J. W. Kück, R. M. Reich, F. E. Kühn*, W. Baratta*, *Dalton Trans.*, **2019**, 48, 79-89 (Cationic abnormal *N*-heterocyclic carbene ruthenium complexes as suitable precursors for the synthesis of heterobimetallic compounds).
- 2) M. Hollering, D. T. Weiß, M. J. Bitzer, C. Jandl, F. E. Kühn*, *Inorg. Chem.*, **2016**, 55, 6010-6017 (Controlling Coordination Geometries: Ru-Carbene Complexes with Tetra-NHC Ligands).
- 3) M. J. Bitzer, F. E. Kühn*, W. Baratta*, *J. Catal.*, **2016**, 338, 222-226 (Tandem Suzuki-Miyaura / Transfer Hydrogenation Reaction Catalyzed by a Pd-Ru Complex Bearing an Anionic Dicarbene).
- 4) M. J. Bitzer, A. Pöthig, C. Jandl, F. E. Kühn*, W. Baratta*, *Dalton Trans.*, **2015**, 44, 11686-11689 (Ru-Ag and Ru-Au Dicarbene Complexes from an Abnormal Carbene Ruthenium System).
- 5) K. Riener, M. Bitzer, A. Pöthig*, A. Raba, M. Cokoja, W. A. Herrmann, F. E. Kühn*, *Inorg. Chem.*, **2014**, 53, 12767-12777 (On the Concept of Hemilability: Insights into a Donor-Functionalized Iridium(I) NHC Motif and its Impact on Reactivity).



Wacker/TUM-Kooperation auf dem Gebiet der Silizium-Chemie

Robert Reich

(Juli 2016)

Mai 2013 - Juni 2016

"Application of Imidazolium Based Ionic Liquids as Solvents and Catalysts in the Epoxidation of Olefins:
Influence of the Substitution Pattern of the Imidazolium Cation on Ion-pairing and Catalytic Activity"



Abb. 40: Prof. Dr. Walter Baratta, Dr. Robert Reich, Prof. Dr. Fritz E. Kühn (v. links).

Gemeinsame Publikationen:

- 1) J. Mayr, R. M. Reich, Fritz E. Kühn*, *Adv. in Organomet. Chem.*, **2023**, 79, 135-156 (Ru(II) complexes with phosphine-functionalized NHC ligands in catalytic transfer hydrogenations).
- 2) M. Kaikhosravi, A. D. Böth, M. J. Sauer, R. M. Reich, Fritz E. Kühn*, *J. Organomet. Chem.*, **2022**, 979, 122498 (Synthesis and Characterisation of a Heterobimetallic *N*-heterocyclic Carbene Rhodium Ruthenium Complex as Catalyst for Transfer Hydrogenation).
- 3) G. G. Zámbo, J. Mayr, M. J. Sauer, T. P. Schlachta, R. M. Reich, F. E. Kühn*, *Dalton Trans.* **2022**, 51, 13591-13595 (The first macrocyclic abnormally coordinating tetra-1,2,3-triazole-5-ylidene iron complex: a promising candidate for olefin epoxidation).
- 4) A. D. Böth, M. J. Sauer, R. M. Reich, F. E. Kühn, Reference Collection in Chemistry and Chemical Engineering, Comprehensive Organometallic Chemistry IV (Eds: K. Meyer, D. O'Hare, G. Parkin), Elsevier, **2022**, Vo. 7, 444-527 (Ruthenium and Osmium Complexes containing NHC and π - Acid Ligands).
- 5) G. G. Zámbo, J. F. Schlagintweit, R. M. Reich, F. E. Kühn, *Cat. Sci. Technol.* **2022**, 12, 4940-4961 (Organometallic 3d transition metal NHC complexes in oxidation catalysis).
- 6) E. M. H. J. Esslinger, J. F. Schlagintweit, G. G. Zámbo, A. M. Imhof, R. M. Reich, F. E. Kühn, *Asian J. Org. Chem.*, **2021** 10, 2654-2662 (Effects of *trans* Axial Isocyanide Ligands on Iron(II) tetra-NHC Complexes and their Reactivity in Olefin Epoxidation).
- 7) J. F. Schlagintweit, C. H. G. Jakob, N. L. Wilke, M. Ahrweiler, C. Frias, J. Frias, M. König, E. M. H. J. Esslinger, F. Marques, J. F. Machado, R. M. Reich, T. S. Morais, J. D. G. Correia, A. Prokop*, F. E. Kühn*, *J. Med. Chem.*, **2021**, 64, 15747 - 15757 (Gold(I)bis(1,2,3-Triazol-5-yliden) Complexes as Promising Selective Anticancer Compounds).
- 8) T. P. Schlachta, M. R. Anneser, J. F. Schlagintweit, C. H. G. Jakob, C. Hintermeier, A. D. Böth, S. Haslinger, R. M. Reich, F. E. Kühn* *Chem. Commun.*, **2021**, 57, 6644-6647 (Mimicking reactive high-valent diiron- μ_2 -oxo intermediates of nonheme enzymes by an iron teracarbene complex).
- 9) F. Dyckhoff, J. F. Schlagintweit, M. A. Bernd, C. H. G. Jakob, T. P. Schlachta, B. J. Hofmann, R. M. Reich, F. E. Kühn*, *Cat. Sci. Technol.*, **2021**, 11, 795-799 (Degradation pathways of a highly active iron(III) tetra-NHC epoxidation catalyst).
- 10) C. H. G. Jakob, A. Weigert Muñoz, J. F. Schlagintweit, V. Weiß, R. M. Reich, S. A. Sieber, J. D. G. Correia, F. E. Kühn*, *J. Organomet. Chem.*, **2021**, 932, 121643 (Anticancer and antibacterial properties of trinuclear Cu(I), Ag(I) and Au(I) macrocyclic NHC/urea complexes).
- 11) J. F. Schlagintweit, P. J. Altmann, B. J. Hofmann, A. D. Böth, C. Jandl, C. Kaußler, L. Nguyen, R. M. Reich, A. Pöthig, F. E. Kühn*, *Chem. Eur. J.*, **2021**, 18, 1311-1315 (Activation of Molecular Oxygen by a Cobalt(II) tetra-NHC Complex).

- 12) C. H. G. Jakob, B. Dominelli, J. F. Schlagintweit, P. J. Fischer, F. Schuderer, R. M. Reich, F. Marques, J. D. G. Correia, F. E. Kühn*, *Chem. As. J.* **2020**, *24*, 4275-4279 (Improved Antiproliferative Activity and Fluorescence of a Dinuclear Gold(I) Bisimidazolylidene Complex via Anthracene-Modification).
- 13) M. A. Bernd, E. B. Bauer, J. Oberkofler, A. Bauer, R. M. Reich, F. E. Kühn*, *Dalton Trans.* **2020**, *49*, 14106-14114 (Macrocyclic NHC complexes of group 10 elements with enlarged aromaticity for biological studies).
- 14) M. A. Bernd, F. Dyckhoff, B. J. Hofmann, A. D. Böth, J. F. Schlagintweit, J. Oberkofler, R. M. Reich, F. E. Kühn*, *J. Catal.*, **2020**, *391*, 548-561 (Tuning the electronic properties of tetradentate iron-NHC complexes: Towards stable and selective epoxidation catalysts).
- 15) C. H. G. Jakob, B. Dominelli, E. M. Hahn, T. O. Berghausen, T. Pinheiro, F. Marques, R. M. Reich, J. D. G. Correia, F. E. Kühn*, *Chem. As. J.*, **2020**, *15*, 2754-2762 (Antiproliferative Activity of Functionalized Histidine derived A(I) *bis*-NHC Complexes for Bioconjugation).
- 16) B. Dominelli, C. H. G. Jakob, J. Oberkofler, P. J. Fischer, E. M. Esslinger, R. M. Reich, F. Marques, T. Pinheiro, J. D. G. Correia, F. E. Kühn*, *Eur. J. Med. Chem.*, **2020**, *203*, 112576 (*Mechanisms Underlying the Cytotoxic Activity of Syn/Anti-Isomers of Dinuclear Au(I) NHC Complexes*).
- 17) D. Xu, H. Li, G. Pan, P. Huang, J. Oberkofler, R. M. Reich, F. E. Kühn*, H. Guo*, *Org. Letters*, **2020**, *22*, 4372-4377 (Visible light-induced metal-free olefin-olefin coupling for building seven- and eight-membered rings).
- 18) F. Dyckhoff, J. F. Schlagintweit, R. M. Reich, F. E. Kühn*, *Cat. Sci. Technol.*, **2020**, *10*, 3532-3536 (Pushing the Limits of Activity and Stability: The Effects of Lewis Acids on non-heme Iron-NHC Epoxidation Catalysis).
- 19) C. H. G. Jakob, B. Dominelli, J. Rieb, C. Jandl, A. Pöthig, R. Reich, J. D. G. Correia, F. E. Kühn*, *Chem. Asian J.*, **2020**, *15*, 1848-1851 (Dinuclear Gold(I) Complexes Bearing *N, N'*-Allyl Bridged Bisimidazolylidene Ligands).
- 20) J. F. Schlagintweit, F. Dyckhoff, L. Nguyen, C. H. G. Jakob, R. M. Reich, F. E. Kühn*, *J. Catal.*, **2020**, *383*, 144-152 (Mixed tetradentate NHC/1,2,3-triazole iron complexes bearing *cis* labile coordination sites as highly active catalysts in Lewis and Brønsted acid mediated olefin epoxidation).
- 21) C. M. Egger, C. H. G. Jakob, F. Kaiser, O. Rindle, P. J. Altmann, R. M. Reich, Fritz E. Kühn*, *Eur. J. Inorg. Chem.*, **2019**, *48*, 5059-5065 (Reactivity studies of a dipyridine ethynyl ligand with Zn(II)).

- 22) L. Pardatscher, B. J. Hofmann, P. J. Fischer, S. M. Hölzl, R. M. Reich, F. E. Kühn,* W. Baratta*, *ACS Catalysis*, **2019**, 9, 11302-11306 (Highly Efficient Abnormal NHC Ruthenium Catalyst for Oppenauer-Type Oxidation and Transfer Hydrogenation Reactions).
- 23) E. B. Bauer, M. Bernd, M. Schütz, J. Oberkofler, A. Pöthig, R. M. Reich, F. E. Kühn, *Dalton Trans.*, **2019**, 48, 16615-16625 (Synthesis, Characterization and Biological Studies of Multidentate Gold(I) and Gold(III) NHC Complexes).
- 24) J. F. Schlagintweit, L. Nguyen, F. Dyckhoff, F. Kaiser, R. M. Reich, F. E. Kühn*, *Dalton Trans.*, **2019**, 48, 14820-14828 (Exploring Different Coordination Modes of the First Tetradentate NHC/1,2,3-Triazole Hybrid Ligand for Group 10 Complexes).
- 25) B. Dominelli, G. M. Roberts, C. Jandl, P. J. Fischer, R. M. Reich, A. Pöthig, J. D. G. Correia, F. E. Kühn, *Dalton Trans.*, **2019**, 48, 14036-14043 (Dinuclear zwitterionic silver(i) and gold(i) complexes bearing 2,2-acetate-bridged bisimidazolyliene ligands).
- 26) P. Huang, D. Xu, R. M. Reich, F. Kaiser, B. Liu, F. E. Kühn*, *Tet. Lett.*, **2019**, 60, 24, 1574-1577 (Et₂Zn-mediated Stoichiometric C(sp)-H Silylation of 1-Alkynes and Chlorosilanes).
- 27) E. B. Bauer, A. Haase, R. M. Reich, D. C. Crans*, F. E. Kühn*, *Coord. Chem. Rev.*, **2019**, 393, 79-117 (Organometallic and coordination rhenium compounds and their potential in cancer therapy).
- 28) F. E. Kühn, R. M. Reich, *PSE-Broschüre der GDCh*, **2019**, 117-119 (Rhenium-ein patrotisches Chamäleon).
- 29) B. J. Hofmann, R. G. Harms, S. P. Schwaminger, R. M. Reich, F. E. Kühn*, *J. Catal.*, **2019**, 373, 190-200 (Reactivity of Re₂O₇ in Aromatic Solvents – Cleavage of a β -O-4 Lignin Model Substrate by Lewis-acidic Rhenium Oxide Nanoparticles).
- 30) Y. Li, B. Dominelli, R. M. Reich, B. Liu, F. E. Kühn*, *Cat. Comm.*, **2019**, 124, 118-122 (Bridge-Functionalized Bisimidazolium Bromides as Catalysts for the Conversion of Epoxides to Cyclic Carbonates with CO₂).
- 31) B. J. Hofmann, S. Huber, R. M. Reich, M. Drees, F. E. Kühn*, *J. Organomet. Chem.*, **2019**, 885, 32-38 (Ethyltrioxorhenium – Catalytic Application and Decomposition Pathway).
- 32) D. Xu, F. Kaiser, R. M. Reich, H. Guo*, F. E. Kühn*, *Org. Biomol. Chem.*, **2019**, 17, 49-52 (Highly selective AlCl₃ initiated intramolecular α -alkylation of α,β -unsaturated lactams and lactones).
- 33) L. Pardatscher, M. J. Bitzer, C. Jandl, J. W. Kück, R. M. Reich, F. E. Kühn*, W. Baratta*, *Dalton Trans.*, **2019**, 48, 79-89 (Cationic abnormal *N*-heterocyclic carbene ruthenium complexes as suitable precursors for the synthesis of heterobimetallic compounds).

- 34) P. J. Fischer, M. P. Do, R. M. Reich, A. Nagasubramanian, M. Srinivasan, F. E. Kühn*, *Phys. Chem. Chem. Phys.*, **2018**, 20, 29412-29422 (Synthesis and physicochemical characterization of room temperature ionic liquids and their application in sodium ion batteries).
- 35) N. Tappe, R. Reich, V. de Elia, F. E. Kühn*, *Dalton Trans.*, **2018**, 47, 13281-13313 (4.1) (Current advances in the catalytic conversion of carbon dioxide by molecular catalysts: an update).
- 36) F. Dyckhoff, S. Li, R. M. Reich, B. J. Hofmann, E. Herdtweck, F. E. Kühn*, *Dalton Trans.*, **2018**, 47, 9755-9764 (Synthesis, characterization and application of organorhenium(VII) trioxides in metathesis reactions and epoxidation catalysis).
- 37) D. A. Hey, R. M. Reich, W. Baratta*, F. E. Kühn*, *Coord. Chem. Rev.*, **2018**, 374, 114-132 (Current advances on ruthenium(II) *N*-heterocyclic carbenes in hydrogenation reactions).
- 38) F. Kaiser, R. M. Reich, E. Rivard*, F. E. Kühn*, *Organometallics*, **2018**, 37(1), 136-144 (Pyridine functionalized *N*-heterocyclic silane complexes of iridium and rhodium– an unexpected change in coordination).
- 39) E. Bayon Castanon, M. Kaposi, R. M. Reich, F. E. Kühn*, *Dalton Trans.*, **2018**, 47(7), 2318- 2329 (Water-soluble transition metal complexes of ruthenium(II), osmium(II), rhodium(III) and iridium(III) with chelating *N*-heterocyclic carbene ligands in hydrogenation and transfer hydrogenation catalysis).
- 40) M. Cokoja*, R. M. Reich, F. E. Kühn, *Cat. Comm.*, **2017**, 100, 103-106 (*N*-alkyl ammonium perhenate salts as catalysts for the epoxidation of olefins under mild conditions).
- 41) F. E. Kühn, R. M. Reich, *GdCh – aktuelle Wochenschau*, **2016**, KW29, (Rhenium – ein patriotisches Chamäleon).
- 42) M. Cokoja*, R. M. Reich, M. E. Wilhelm, M. Kaposi, J. Schäffer, D. S. Morris, C. J. Münchmeyer, M. H. Anthofer, I. I. E. Markovits, F. E. Kühn, W. A. Herrmann, A. Jess, J. B. Love, *ChemSusChem*, **2016**, 9, 1773-1776 (Olefin Epoxidation in Aqueous Phase Using Ionic Liquid Catalyst).
- 43) R. M. Reich, M. Kaposi, A. Pöthig, F. E. Kühn*, *Cat. Sci. Technol.*, **2016**, 6, 4970-4977 (Kinetic studies of fluorinated aryl molybdenum(II) tricarbonyl precursor in epoxidation catalysis).
- 44) J. W. Kück, R. M. Reich, F. E. Kühn*, *The Chemical Record*, **2016**, 16, 349-364 (Molecular Epoxidation Reactions Catalyzed by Rhenium, Molybdenum and Iron Complexes).
- 45) L. Graser, R. M. Reich, M. Cokoja, A. Pöthig, F. E. Kühn*, *Cat. Sci. Technol.*, **2015**, 5, 4772-4777 (Aryl-substituted organomolybdenum(II) complexes as olefin epoxidation catalysts).

- 46) H. B. T. Thu, M. Markiewicz, J. Thöming, R. M. Reich, V. Korinth, M. Cokoja, F. E. Kühn*, S. Stolte*, *N. J. Chem*, **2015**, 39, 5431-5436 (Catalytically active perrhenate based ionic liquids: A preliminary ecotoxicity and biodegradability assessment).
- 47) R. M. Reich, M. Cokoja*, I. I. E. Markovits, C. J. Münchmeyer, M. Kaposi, A. Pöthig, W. A. Herrmann, F. E. Kühn*, *Dalton Trans.*, **2015**, 44, 8669-8677 (Structural Studies of Imidazolium Perrhenates: Influence of Substituents on the Strength of Cation-Anion Contacts).
- 48) S. A. Hauser, R. M. Reich, J. Mink, A. Pöthig, M. Cokoja, F. E. Kühn*, *Cat. Sci. Technol.*, **2015**, 5, 2282-2289 (Influence of structural and electronic properties of Organomolybdenum(II) complexes of the type $[\text{CpMo}(\text{CO})_3\text{R}]$ and $[\text{CpMo}(\text{O}_2)(\text{O})\text{R}]$ ($\text{R} = \text{Cl}, \text{CH}_3, \text{CF}_3$) on the catalytic olefin epoxidation) .
- 49) M. E. Wilhelm, M. H. Anthofer, R. M. Reich, V. d'Elia, J. M. Basset, W. A. Herrmann, M. Cokoja*, F. E. Kühn*, *Cat. Sci. Technol.*, **2014**, 4, 1638-1643 (Niobium(V)chloride and imidazolium bromides as efficient dual catalyst system for the cycloaddition of carbon dioxide and propylene oxide).

Sara Abbassi

(Juli 2016)

Nov 2011 - Dez 2015

"Building Blocks for Organometallic Frameworks and Ionic Liquids"



Abb. 41: Prof. Dr. Klaus Köhler, Prof. Dr. Ghada Bassioni, Dr. Sara Abbassi, Prof. Dr. Fritz E. Kühn (v. links).

Jens Kück

(September 2016)

August 2013 - September 2016

"Adding Value to Double Bonds: Epoxidation Reactions Catalyzed by Iron N-Heterocyclic Carbene Complexes"



Abb. 42: Dr. Jens Kück, Prof. Dr. Fritz E. Kühn (v. links

Gemeinsame Publikationen:

- 1) L. Pardatscher, M. J. Bitzer, C. Jandl, J. W. Kück, R. M. Reich, F. E. Kühn*, W. Baratta*, *Dalton Trans.*, **2019**, 48, 79-89 (Cationic abnormal *N*-heterocyclic carbene ruthenium complexes as suitable precursors for the synthesis of heterobimetallic compounds).
- 2) S. M. Hölzl, P. J. Altmann, J. W. Kück, F. E. Kühn*, *Coord. Chem. Rev.*, **2017**, 7, 5644-5649 (Speciation in Iron Epoxidation Catalysis: A Perspective on the Discovery and Role of non-heme Iron(III)-hydroperoxo Species in Iron-Catalyzed Oxidation Reactions).
- 3) Ö. Karaca, M. R. Anneser, J. W. Kück, A. Lindhorst, M. Cokoja, F. E. Kühn*, *J. Catal.*, **2016**, 344, 213-220 (Iron(II) *N*-Heterocyclic Carbene Complexes in Catalytic One-Pot Wittig Reactions: Mechanistic Insights).
- 4) J. W. Kück, R. M. Reich, F. E. Kühn*, *The Chemical Record*, **2016**, 16, 349-364 (Molecular Epoxidation Reactions Catalyzed by Rhenium, Molybdenum and Iron Complexes).
- 5) T. K. Meister, J. W. Kück, K. Riener, A. Pöthig, W. A. Herrmann, F. E. Kühn*, *J. Catal.*, **2016**, 337, 157-166 (Decoding Catalytic Activity of Platinum Carbene Hydrosilylation Catalysts).
- 6) J. W. Kück, M. R. Anneser, B. Hofmann, A. Pöthig, M. Cokoja, F. E. Kühn*, *ChemSusChem*, **2015**, 8, 4056-4063 (Fighting Fenton Chemistry: A Highly Active Iron(III)-Tetracarbene Complex in Epoxidation Catalysis).
- 7) S. Haslinger, J. W. Kück, M. R. Anneser, M. Cokoja, A. Pöthig, F. E. Kühn*, *Chem. Eur. J.*, **2015**, 21, 17860-17869 (Formation of Highly-Strained *N*-Heterocycles via Decomposition of Iron *N*-Heterocyclic Carbene Complexes: The Value of Labile Fe–C Bonds).
- 8) S. Haslinger, A. C. Lindhorst, J. W. Kück, M. Cokoja, A. Pöthig, F. E. Kühn*, *RSC Advances*, **2015**, 5, 85486-85493 (Isocyanide Substitution Reactions at the Trans Labile Sites of an Iron(II) *N*-Heterocyclic Carbene Complex).
- 9) S. Haslinger, J. W. Kück, E. M. Hahn, M. Cokoja, A. Pöthig, J.-M. Basset, F. E. Kühn*, *Inorg. Chem.*, **2014**, 53, 11573-11583 (Making Oxidation Potentials Predictable: Coordination of Additives Applied to the Electronic Fine Tuning of an Iron(II) Complex).
- 10) J. W. Kück, A. Raba, I. I. E. Markovits, M. Cokoja, F. E. Kühn*, *ChemCatChem*, **2014**, 6, 1882-1886 (Epoxidation of Olefins Catalyzed by a Molecular Iron *N*-Heterocyclic Carbene Complex: Influence of Reaction Parameters on the Catalytic Activity).

Andrea Schmidt

(Okt. 2016)

Juni 2013 – Juli 2016

"Ruthenium and Gold Complexes as potential Anticancer Drugs targeting selectively Integrin Receptors"

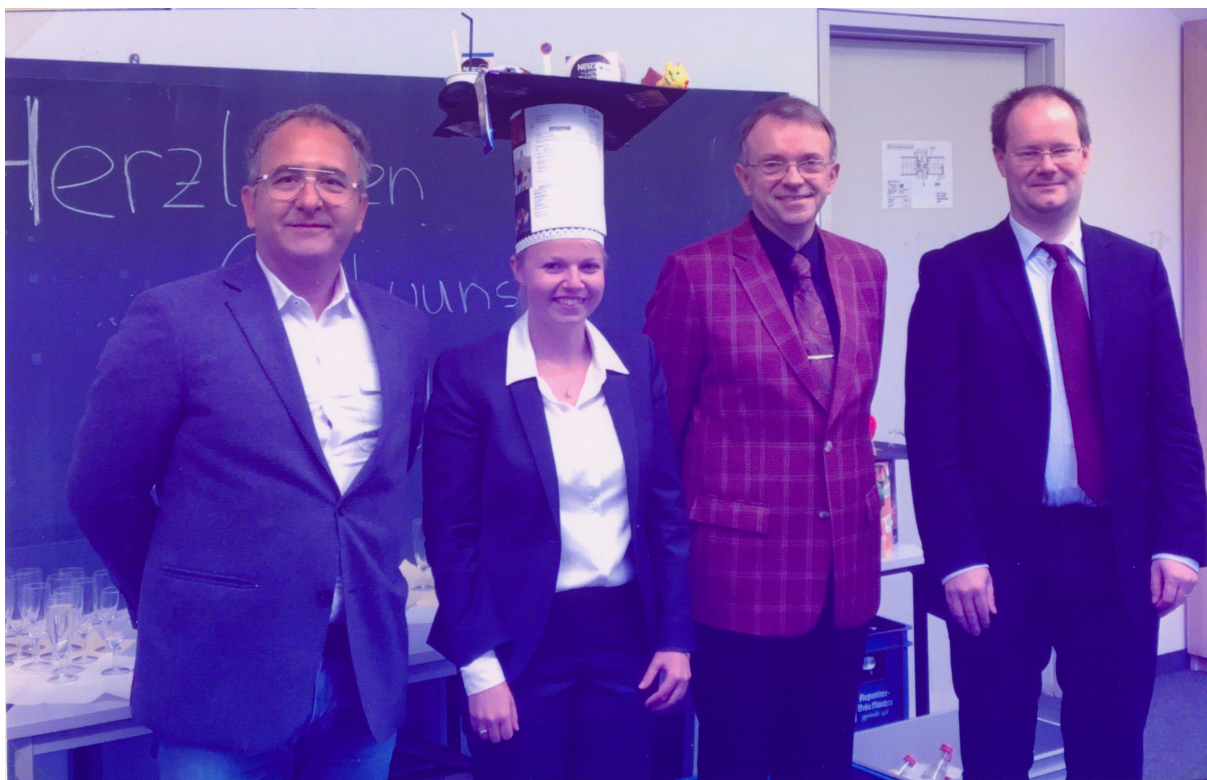


Abb. 43: Prof. Dr. J. D. G. Correia, Dr. Andrea Schmidt, Prof. Dr. Fritz E. Kühn, Prof. Dr. Lukas Hintermann (v. links)

Gemeinsame Publikationen:

- 1) A. Schmidt, F. E. Kühn*, *Chemie i. uns. Zeit.*, **2017**, 51, 86-95 (Metallkomplexe als Antikrebsmittel: Konzepte in der Tumorforschung und Wirkmechanismen).
- 2) J. Han, A. Schmidt, T. Zhang, H. Permentier, G. M. M. Groothuis, R. Bischoff, F. E. Kühn, P. Horvatovich*, A. Casini*, *Chem. Commun.*, **2017**, 53, 1405-1408 (Bioconjugation strategies to couple supramolecular exo-functionalized palladium cages to peptides for biomedical applications).
- 3) F. Kaiser, A. Schmidt, W. Heydenreuther, P. J. Altmann, A. Casini, S. A. Sieber, F. E. Kühn*, *Eur. J. Inorg. Chem.*, **2016**, 5189-5196 (Self-assembled palladium and platinum coordination cages: Photophysical studies and anticancer activity).
- 4) A. Schmidt, M. Hollering, H. Han, A. Casini*, F. E. Kühn*, *Dalton Trans.*, **2016**, 45, 12297-12300 (Self-assembly of highly luminescent heteronuclear coordination cages).
- 5) A. Schmidt, M. Hollering, M. Drees, A. Casini*, F. E. Kühn*, *Dalton Trans.*, **2016**, 45, 8556-8565 (Supramolecular exo-functionalized palladium cages: fluorescent properties and biological activity).
- 6) A. Schmidt, V. Molano, M. Hollering, A. Pöthig, A. Casini*, F. E. Kühn*, *Chem. Eur. J.*, **2016**, 22, 2253-2256 (Evaluation of novel palladium cages as potential delivery systems for the anticancer drug cisplatin).
- 7) A. Schmidt, N. Grover, T. K. Zimmermann, L. Graser, M. Cokoja, A. Pöthig, F. E. Kühn*, *J. Catal.*, **2014**, 319, 119-126 (Synthesis and Characterization of Novel Cyclopentadienyl Molybdenum Imidazo(1,5-a)pyridine-3-ylidene Complexes and their Application in Olefin Epoxidation Catalysis).
- 8) A. Schmidt, A. Casini*, F. E. Kühn*, *Coord. Chem. Rev.*, **2014**, 275, 19-36 (Self-Assembled M2L4 Coordination Cages: Synthesis and Potential Applications).

Eva Hahn

(Okt. 2016)

Juli 2013 – Okt. 2016

"Supramolecular metallocages as potential delivery systems for anticancer drugs"



Abb. 44: Prof. Dr. Joao D. G. Correia, Dr. Eva Hahn, Prof. Dr. Fritz E. Kühn (v. links).

Gemeinsame Publikationen:

- 1) C. H. G. Jakob, B. Dominelli, E. M. Hahn, T. O. Berghausen, T. Pinheiro, F. Marques, R. M. Reich, J. D. G. Correia, F. E. Kühn*, *Chem. As. J.*, **2020**, *15*, 2754-2762 (Antiproliferative Activity of Functionalized Histidine derived A(I) bis-NHC Complexes for Bioconjugation).
- 2) E. M. Hahn, N. Estrada, J. Han, V. F. C. Ferreira, T. G. Kapp, J. D. G. Correia, A. Casini*, F. E. Kühn*, *Eur. J. Inorg. Chem.*, **2017**, 1667-1672 (Functionalization of Ruthenium(II) terpyridine complexes with cyclic RGD peptides to target integrin receptors in cancer cells).
- 3) S. Haslinger, J. W. Kück, E. M. Hahn, M. Cokoja, A. Pöthig, J.-M. Basset, F. E. Kühn*, *Inorg. Chem.*, **2014**, *53*, 11573-11583 (Making Oxidation Potentials Predictable: Coordination of Additives Applied to the Electronic Fine Tuning of an Iron(II) Complex).
- 4) E. M. Hahn, A. Casini*, F. E. Kühn*, *Coord. Chem. Rev.*, **2014**, *276*, 97-111 (Re(VII) and Tc(VII) trioxo complexes stabilized by tridentate ligands and their potential use as radiopharmaceuticals).



Kooperation mit AtlantiChem zur Herstellung umweltfreundlicher Waschmittelbestandteile

Manuela Hollering

(Nov. 2016)

Mai 2013 – Nov. 2016

"Homogeneous Catalysis and Supramolecular Chemistry: Diverse Applications of Transition Metal Complexes"



Abb. 45: Prof. Dr. Richard W. Fischer, Prof. Dr. Kai Olaf Hinrichsen, Dr. Manuela Hollering, Prof. Dr. Fritz E. Kühn (v. rechts).

Gemeinsame Publikationen:

- 1) M. Hollering, M. Albrecht*, F. E. Kühn* *Organometallics*, **2016**, 35, 2980-2986 (Bonding and catalytic application of ruthenium N-heterocyclic carbene complexes featuring triazole, triazolylidene and imidazolylidene ligands).
- 2) A. Schmidt, M. Hollering, H. Han, A. Casini*, F. E. Kühn*, *Dalton Trans.*, **2016**, 45, 12297-12300 (Self-assembly of highly luminescent heteronuclear coordination cages).
- 3) M. Hollering, D. T. Weiß, M. J. Bitzer, C. Jandl, F. E. Kühn*, *Inorg. Chem.*, **2016**, 55, 6010-6017 (Controlling Coordination Geometries: Ru-Carbene Complexes with Tetra-NHC Ligands).
- 4) A. Schmidt, M. Hollering, H. Han, A. Casini*, F. E. Kühn*, *Dalton Trans.*, **2016**, 45, 12297-12300 (Self-assembly of highly luminescent heteronuclear coordination cages).
- 5) A. Schmidt, M. Hollering, M. Drees, A. Casini*, F. E. Kühn*, *Dalton Trans.*, **2016**, 45, 8556-8565 (Supramolecular exo-functionalized palladium cages: fluorescent properties and biological activity).
- 6) A. Schmidt, V. Molano, M. Hollering, A. Pöthig, A. Casini*, F. E. Kühn*, *Chem. Eur. J.*, **2016**, 22, 2253-2256 (Evaluation of novel palladium cages as potential delivery systems for the anticancer drug cisplatin).
- 7) M. Hollering, R. O. Reithmeier, S. Meister, E. Herdtweck, F. E. Kühn*, B. Rieger*, *RSC Advances*, **2016**, 6, 14134-14139 ([Re(CO)₃Cl(C₅H₄CIP)₂] and [Re(CO)₂Cl(C₅H₄CIP)₃]: Synthesis and Characterization of Two Novel Rhenium(I) Phosphinine Complexes).
- 8) M. Hollering, B. Dutta, F. E. Kühn*, *Coord. Chem. Rev.*, **2016**, 309, 51-67 (Transition Metal Mediated Coupling of Carbon Dioxide and Ethene to Acrylic Acid/Acrylates).

Markus Anneser

(Dez. 2016)

Dez. 2012 – Okt. 2015

„A Bioinspired Tetra(NHC) Iron Complex: Synthesis, Characterization and Catalytic Application of an Organometallic Heme Analogue“

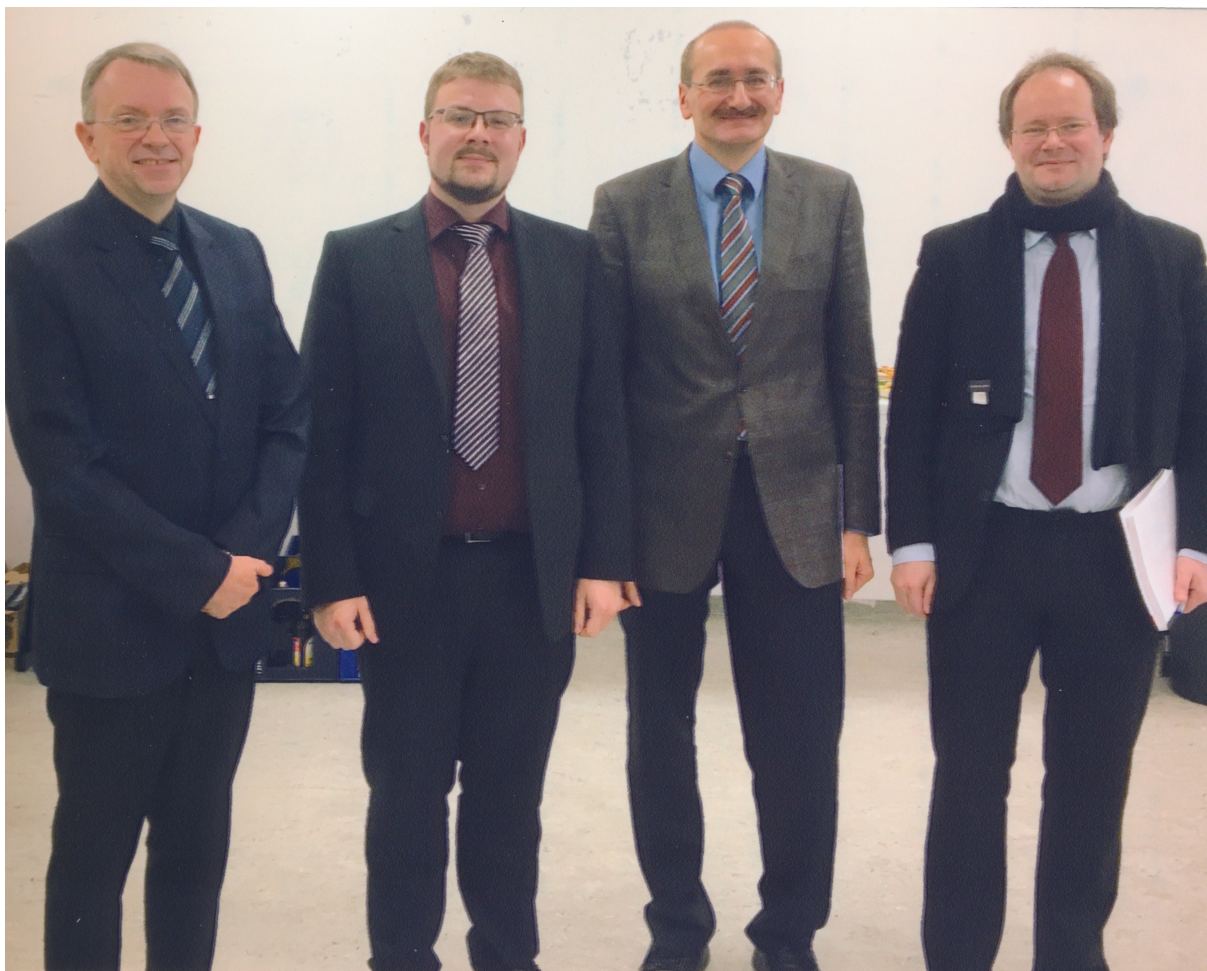


Abb. 46: Prof. Dr. Fritz E. Kühn, Dr. Markus Anneser, Prof. Dr. Klaus Köhler, Prof. Dr. Lukas Hintermann (v. links)

Gemeinsame Publikationen:

- 1) T. P. Schlachta, M. R. Anneser, J. F. Schlagintweit, C. H. G. Jakob, C. Hintermeier, A. D. Böth, S. Haslinger, R. M. Reich, F. E. Kühn* *Chem. Commun.*, **2021**, 57, 6644-6647 (Mimicking reactive high-valent diiron- μ_2 -oxo intermediates of nonheme enzymes by an iron teracarbene complex).
- 2) T. P. Schlachta, J. F. Schlagintweit, M. R. Anneser, M. E. H. J. Esslinger, M. Muhr, S. Haslinger, F. E. Kühn*, *Inorg. Chim. Acta*, **2021** 518, 120228 (Modification of Bio-Inspired tetra-NHC Iron Complexes with Axial Nitrile Ligands).
- 3) J. F. Schlagintweit, C. Hintermeier, M. Anneser, E. M. H. J. Esslinger, S. Haslinger, F. E. Kühn*, *Chem. Asian J.* **2020**, 15, 1896-1902 (Electronic Fine tuning of a Bio-inspired Iron(II) tetra-NHC Complex by trans Axial Isocyanide Substitution).
- 4) Z. S. Ghamavi, M. R. Anneser, F. Kaiser, P. J. Altmann, B. J. Hofmann, J. F. Schlagintweit, G. Grivani, F. E. Kühn*, *Chem. Sci.*, **2018**, 9, 8307-8314. (A bench stable formal Cu(III)*N*-heterocyclic carbene accessible from simple copper(II)acetate).
- 5) Ö. Karaca, M. R. Anneser, J. W. Kück, A. Lindhorst, M. Cokoja, F. E. Kühn*, *J. Catal.*, **2016**, 344, 213-220 (Iron(II) *N*-Heterocyclic Carbene Complexes in Catalytic One-Pot Wittig Reactions: Mechanistic Insights).
- 6) M. R. Anneser, S. Haslinger, A. Pöthig, M. Cokoja, V. d'Elia, M. Högerl, J. M. Basset, F. E. Kühn*, *Dalton Trans.*, **2016**, 45, 6449-6455 (Binding of molecular oxygen by an artificial heme analogue: Investigation on the formation of an Fe-tetracarbene superoxo complex).
- 7) J. W. Kück, M. R. Anneser, B. Hofmann, A. Pöthig, M. Cokoja, F. E. Kühn*, *ChemSusChem*, **2015**, 8, 4056-4063 (Fighting Fenton Chemistry: A Highly Active Iron(III)-Tetracarbene Complex in Epoxidation Catalysis).
- 8) S. Haslinger, J. W. Kück, M. R. Anneser, M. Cokoja, A. Pöthig, F. E. Kühn*, *Chem. Eur. J.*, **2015**, 21, 17860-17869 (Formation of Highly-Strained *N*-Heterocycles via Decomposition of Iron *N*-Heterocyclic Carbene Complexes: The Value of Labile Fe–C Bonds).
- 9) D. T. Weiß, M. R. Anneser, S. Haslinger, A. Pöthig, M. Cokoja, J. M. Basset, F. E. Kühn*, *Organometallics*, **2015**, 34, 3155-3166 (NHC Versus Pyridine: How “Teeth” Change the Redox-Behavior of Iron(II) Complexes).
- 10) I. Klawitter, M. R. Anneser, S. Dechert, S. Meyer, S. Demeshko, S. Haslinger, A. Pöthig, F. E. Kühn*, Franc Meyer*, *Organometallics*, **2015**, 34, 2819-2825 (Iron Complexes of a Macrocyclic NHC/Pyridine Hybrid Ligand).

- 11) M. R. Anneser, S. Haslinger, A. Pöthig, M. Cokoja, J. M. Basset, F. E. Kühn*, *Inorg. Chem.*, **2015**, 54, 3797-3804 (Synthesis and characterization of an iron complex bearing a cyclic tetra-*N*-heterocyclic carbene ligand: An artificial heme analogue?).
- 12) A. Raba, M. R. Anneser, D. Jantke, M. Cokoja, W. A. Herrmann,* F. E. Kühn*, *Tet. Lett.*, **2013**, 54, 3384-3387 (Facile and scalable preparation of 2-imidazolylpyridines).

Die Arbeitsgruppe im Dezember 2016



Arbeitsgruppenseminar