

## Conferencia: Unifying Concepts for Homogeneous and Heterogeneous Catalysis: Teaching Non-Noble Metal Catalysts to behave like Noble Ones

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an der Universität Rostock -  
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# Unifying Concepts for Homogeneous and Heterogeneous Catalysis: Teaching Non-Noble Metal Catalysts to behave like Noble Ones

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The cost-effective and waste-free synthesis of materials, life science goods and all kinds of organic products require efficient chemical transformations. In this regard, development of more active and selective catalysts constitutes a key factor for achieving improved processes and providing the basis for a sustainable chemical industry. Despite continuous advancements in all areas of catalysis, still organic syntheses as well as the industrial production of most chemicals can be improved significantly in terms of sustainability and efficiency.

In the talk, it will be shown how new and improved homogeneous and heterogeneous catalysts can be developed by learning from each other. Specifically, the phenomenon of cooperative catalysis will be addressed in the context of non-noble metal-based catalysts. In detail, it will be demonstrated that recently developed molecular-defined as well as nano-structured cobalt and iron catalysts enable catalytic (de)hydrogenation processes with high yields and unprecedented selectivity. Examples which demonstrate the potential of such catalytic processes with bio-relevant metal complexes compared to more traditional catalytic reactions will also include reactions for energy technologies.

## **Selected references:**

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- [2] a) F. Westerhaus, R. Jagadeesh, G. Wienhöfer, M.-M. Pohl, J. Radnik, A.-E. Surkus, K. Junge, H. Junge, M. Beller, *Nature Chem.* **2013**, 5, 607-612; b). K. Natte, H. Neumann, R. V. Jagadeesh, M. Beller, *Nature Communications* **2018**, 8, in press.
- [3] M. Nielsen, E. Alberico, W. Baumann, H.-J. Drexler, H. Junge, S. Gladiali, M. Beller, *Nature* **2013**, 494, 85-89.
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Matthias Beller, born 1962 in Gudensberg, studied chemistry at the University of Göttingen, Germany, where he completed his PhD thesis in 1989 in the group of L.-F. Tietze. As recipient of a Liebig scholarship, he then spent a one-year with K. B. Sharpless at MIT, USA. From 1991 to 1995, Beller worked in industry. Then, he moved to the Technical University of München as Professor for Inorganic Chemistry. In 1998, he relocated to Rostock to head the Institute for Organic Catalysis, which became in 2006 the Leibniz-Institute for Catalysis. The work of his group has been published in >850 original publications, reviews and >90 patent applications have been filed in the last decade. He has received numerous awards including the Otto-Roelen Medal and most prestigious award in Science in Germany, the Leibniz-Price of the DFG. In 2006, he was also awarded “Entrepreneur of the Year” of Rostock and he received the German Federal Cross of Merit. Since then, he received the first “European price for Sustainable Chemistry”, the “Paul-Rylander Award” of the Organic Reaction Catalysis Society of the USA, the Gay-Lussac-Alexander-von-Humboldt-Prize of the French Academy of Sciences and the Emil Fischer Medal of the German Chemical Society. In 2015/16, he was awarded honorary doctoral degrees from the Universities of Antwerp, Belgium and Rennes, France. He also received the Wöhler price for Sustainable Chemistry from the German Chemical Society. Most recently, he was selected as the first non-American scientist for the ACS Catalysis price of the USA.

Matthias Beller is also Vice President of the Leibniz Society – one of the major science organizations in Germany and a member of the German National Academia of Science “Leopoldina” and three other Scientific Academies. He is married to Dr. Anja Fischer-Beller and they have two sons.