

August 2023

Green and Sustainable Chemistry - New Research Group from Rostock and Magdeburg Develops the "Perfect" Chemical Reaction

Certain chemical building blocks, known as fine chemicals, are indispensable for the production of active pharmaceutical ingredients, crop protection products, detergents and many other products in our daily lives. In the future, these high-quality substances are to be produced according to the principles of "green and sustainable chemistry". This is the goal of a new research group involving the Universities of Rostock and Magdeburg, Magdeburg's Max Planck Institute for Dynamics of Complex Technical Systems, and Rostock's Leibniz Institute for Catalysis. The research group is being funded by the German Research Foundation (DFG) for an initial period of four years with around 3 million euros.

"Green and sustainable chemistry" means producing fine chemicals in the future with almost no waste and in a renewable way. This is a challenge in this field, because the products are usually very small production volumes that require complex synthesis pathways with multiple reaction steps, resulting in lots of by-products. With funding from the DFG, the participants aim to completely redevelop the chemical processes and production of two selected classes of substances - from the molecular "design" of corresponding catalysts and starting substances to the pilot process. The substances in question are biologically important amino acids and amino alcohols that play an important role as pharmaceutically active compounds, among other things.

According to the DFG, the goal is "stably running production systems in which all process stages are optimally coordinated," which includes decisions on the use of catalysts, solvents, additives, separation materials, apparatus types and operating conditions. "It is about nothing less than developing the "perfect" reaction for the production of fine chemicals," emphasizes LIKAT Director Professor Matthias Beller. "This means a complete reaction cascade in which all starting materials and additives are to be converted without waste under the mildest possible temperatures and pressures." "At the same time, modern membrane processes are used for integrated separation steps," adds Professor Udo Kragl from the Institute of Chemistry at the University of Rostock.

Chemists from Rostock contribute to the cooperation, among other things, their expertise in the field of chemical catalysis and in membrane processes. In addition, the DFG group benefits from the Rostock chemists' deep analytical understanding in the exploration of chemical processes down to the molecular level. This is ensured, among other things, by so-called *in-situ* and *operando* spectroscopy, with which the chemists can observe the catalysts at work, so to speak.

Contact:

Prof. Dr. Matthias Beller
Head of Department „Applied
Homogeneous Catalysis”
Leibniz Institute for Catalysis
E-Mail: matthias.beller@catalysis.de



Prof. Dr. Udo Kragl
University of Rostock
Institute for Chemistry
E-Mail: udo.kragl@uni-rostock.de

