

May 2022

Simple Access to Complex Molecules - LIKAT and Rostock University with New Professorship for Electrochemistry

Rostock is currently establishing a research field that is one of the most sought-after scientific disciplines internationally: electrochemistry. For this, Robert Francke received a Heisenberg Professorship funded by the DFG. The appointment was made jointly by the Leibniz Institute for Catalysis, LIKAT, and the University of Rostock.

The experts' "run" on electrochemistry is related to its great potential: The direct use of electricity in chemical reactions should make it possible to produce basic and fine chemicals in a much more environmentally friendly and resource-saving way than before. Prof. Dr. Robert Francke: "Put very simply, we apply an electrical voltage in the reaction vessel and use it to sustainably produce valuable chemical compounds." Research is being conducted into the production of both complex chemical compounds and simple molecules, such as hydrogen, a protagonist of the energy transition, which is also produced under voltage: by electrolysis of water.

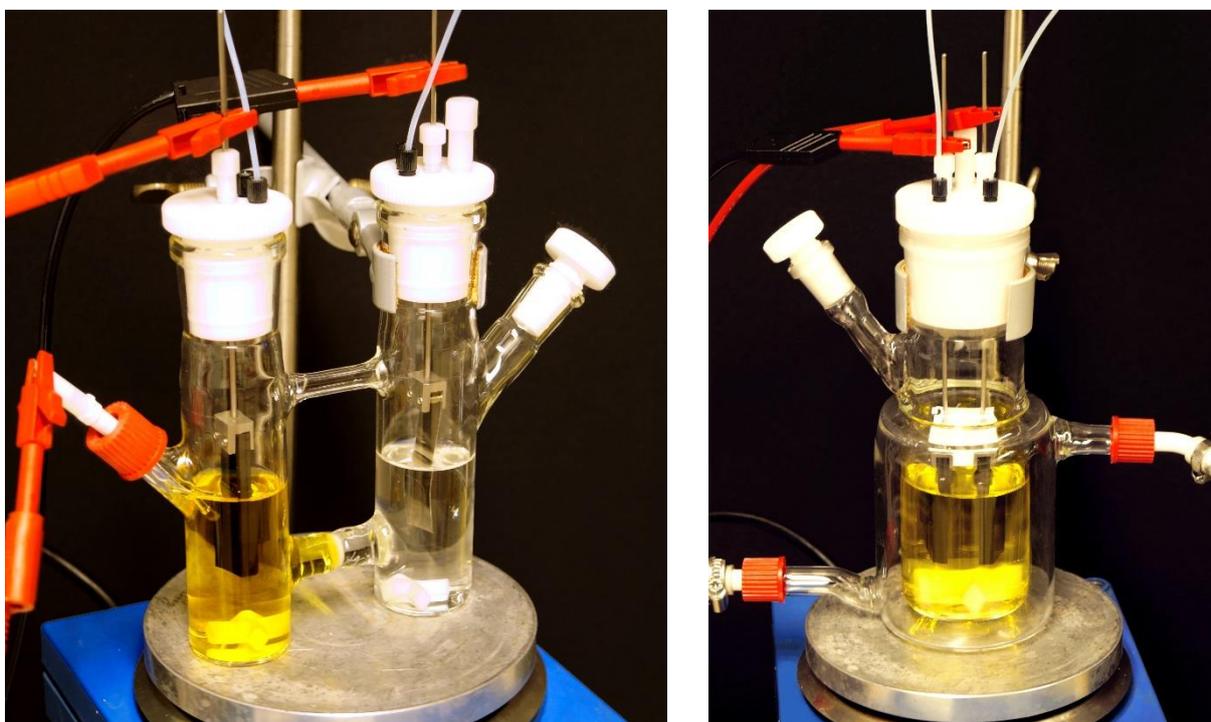


Prof. Dr. Robert Francke receives Heisenberg Professorship for Electrochemistry. The appointment was made jointly by the Leibniz Institute for Catalysis and the University of Rostock. (Photo: LIKAT/Nordlicht)

Robert Francke has already been conducting research in the field of preparative electrochemistry for ten years, which gives the group in Rostock a head start in terms of experience and understanding. One example is his findings on the electrochemical extraction of so-called hypervalent bromine compounds. These are highly reactive reagents that appear very attractive for the production of fine chemicals, for example, but are difficult to handle and research because of their strong reactivity. Prof. Francke: "Their synthesis has so far required special equipment and hazardous chemicals, which is why hardly any research laboratories have dealt with them."

Under electrochemical conditions, however, they can be obtained and converted into important reactions at room temperature and "in a safe and controlled manner," as Robert Francke explains. This new method provides "simple access" to these reagents for a wide range of groups worldwide, who can now conduct research on them.

Robert Francke studied and received his doctorate in chemistry at the University of Bonn and then worked at the University of California Santa Barbara. In 2014, he joined the University of Rostock as a research group leader focusing on organic electrosynthesis and molecular electrocatalysis. Since 2021, he has headed the department "Electrochemistry and Catalysis" at LIKAT. This area now comprises one and a half dozen researchers, most of whom are young people working on their master's degrees or doctorates.



An experimental setup common in preparative electrochemistry: A voltage is applied between two electrodes, which enables the electrochemical reactions to take place. In the left picture, the cathode and anode are in a reaction vessel divided by a separator ("divided cell"), whereas in the right picture both electrodes are in a single vessel ("undivided cell"). Photos: LIKAT/Francke

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