Revolutionizing Nitrogen Fixation and Functionalization

Start Time: Friday, April 5, 2024

End Time:

On March 25 2024, the German Research Foundation (DFG) has awarded former UniSysCat spokesperson Matthias Driess a research project entitled "Nitrogen Fixation, (Electro)Reduction, and Functionalization based on Silicon Systems" as part of the Reinhart Koselleck program, amounting to one Million Euros. Reinhart Koselleck projects provide more freedom for particularly innovative and, in a positive sense, risky research.

Against the background of exceptional scientific achievements, recognized researchers are given the opportunity to conduct highly innovative, higher-risk projects. This includes the activation of extremely inert dinitrogen, which is converted into vital raw materials such as fertilizers, a domain previously dominated by transition metals such as iron and molybdenum.

The Driess group aims to fundamentally change this through a new research approach. The major challenge lies in enabling the energy-intensive nitrogen fixation and functionalization at room temperature and atmospheric pressure based on non-metallic and non-toxic silicon, the second most abundant element in the Earth's crust. Newly designed molecular bis-silylenes with reducible cooperative divalent silicon atoms are synthesized and employed for this purpose, which can directly functionalize dinitrogen under mild reaction conditions.