October 2024

Catalysts for "Green Chemistry" in Vietnam - Cooperation between Rostock and Hanoi

At the Leibniz Institute for Catalysis in Rostock, LIKAT, Quyen Phung Phan Huyen from Vietnam is developing photocatalysts that are activated by light alone and drive chemical reactions. In the area that the chemist is researching as part of her doctorate, which involves special redox reactions for pharmaceuticals, a continuous supply of heat, often at high temperatures, has been required to date.

Quyen Phan Huyen's catalysts therefore help to reduce energy consumption. What's more, these new catalysts work on the basis of organic molecules rather than metals, as is currently the case. "Expensive and often toxic metals could remain in the ground in future," says the PhD student. "This not only saves on their environmentally harmful processing. It also relieves the burden on chemical production." This is because intermediates for pharmaceuticals have to be laboriously purified of the metallic catalyst components each time.

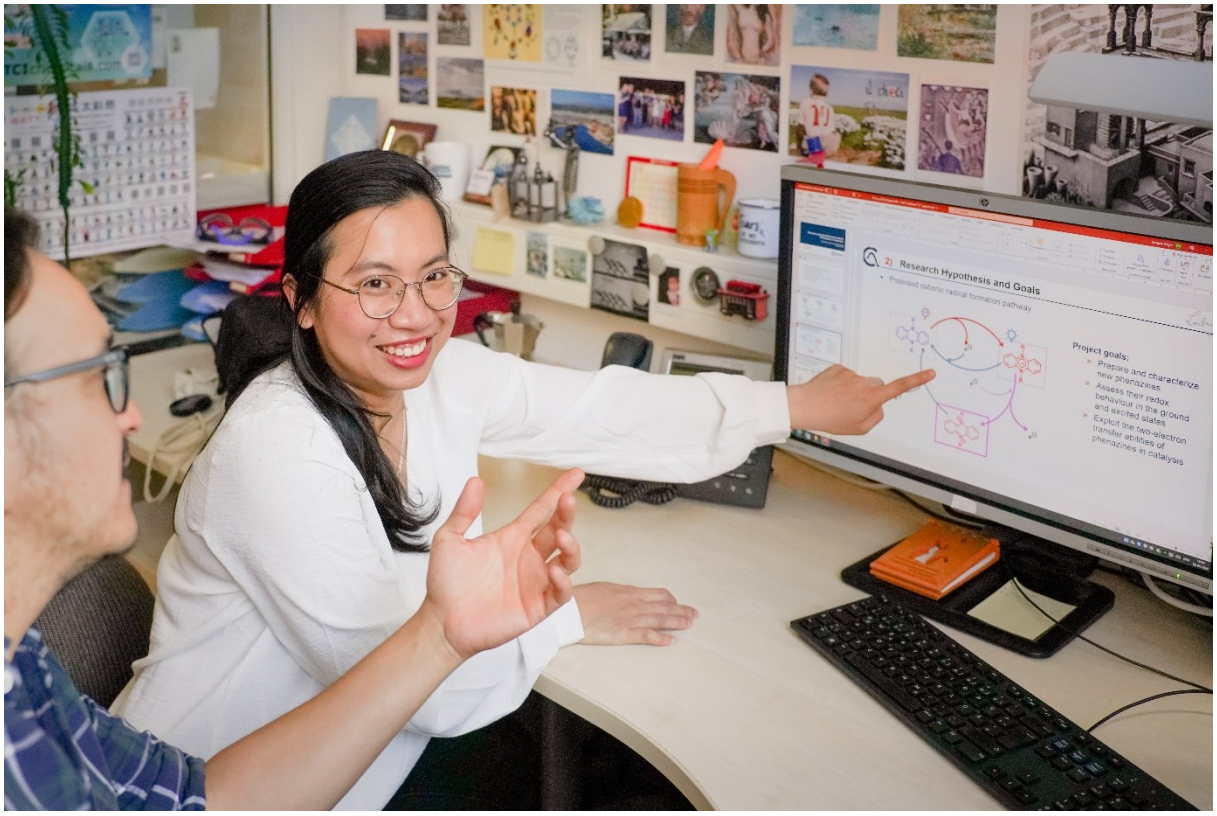

Fig. 1: Quyen Phan Huyen with her doctoral supervisor Esteban Mejía.

In Line with the UN Sustainable Development Goals

Quyen Phan Huyen is breaking new ground in "green chemistry", and that is also the plan. Her doctorate is part of the *RoHan Catalysis SDG Graduate School* cooperation program, which has linked the universities of Rostock and Hanoi since 2016. It focuses consistently on the UN *Sustainable Development Goals* (SDGs for short).

Vietnam is one of the fastest growing economic regions in the world. GDP rose by eight percent in 2022. RoHan is intended to help ensure that this happens in line with the SDGs, as Quyen Phan Huyen's doctoral supervisor, LIKAT chemist PD Dr. habil. Esteban Mejía, emphasizes: "To achieve this, the country also needs new catalytic technologies."

A good hundred Master's students and PhDs

So far, RoHan has supported more than a hundred Vietnamese Master's and PhD students, coordinated by Esteban Mejía, who has been a visiting professor at Hanoi University of Technology for a year, and Dirk Holmann from Rostock University. Mejía says: "Only the very best, like Quyen, are allowed to complete their PhD in Rostock." In theory, the young people from Vietnam are often "incredibly strong". They then learn the most advanced experimental techniques and the highest safety standards in Rostock and, for the past two years, at the specially founded *German-Vietnamese Catalysis Center* at the TU Hanoi.

In Vietnam, Quyen Phan Huyen taught chemistry at high school alongside her Master's degree. This is another reason why she has a keen interest in the history of science. She speaks with great appreciation of the findings of German chemists such as Wöhler, Haber and Bosch. Her students are always amazed when she explains the history of the synthesis of urea or ammonia, for example. "For them, Germany seemed primarily associated with the world wars." Now they associate it with great ideas.

Benefits beyond catalysis

Esteban Mejía also sees great potential in the work of his doctoral student outside of catalysis. "With her findings, we could do without metals and toxic substances wherever redox reactions play a role in the future. For example, in electrolysis or batteries." Interest in organic-based electronics is growing in laboratories around the world. At LIKAT, the chemist and his doctoral student are working on joint projects with colleagues in electrochemistry.

RoHan will continue to be funded by the DAAD and the German Federal Ministry for Economic Cooperation and Development until 2025, with a total of 4.5 million euros. Quyen Phan Huyen's research stay is also covered by these funds. The young chemist speaks with great gratitude about this opportunity. Next year, she will defend her dissertation and return to Vietnam - also with the RoHan network in her luggage.

Contact:

PD Dr. habil. Esteban Mejía

Group leader "Polymer Chemistry & Catalysis"

Esteban.mejia@catalysis.de

0381 1281 362