Success Story

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BOKU and BEST: research for green fuels and a sustainable industry

In April, Matthias Kuba will take up the endowed professorship for thermochemical synthesis gas production at the Institute of Process and Energy Engineering at BOKU Vienna. His focus is on the development of innovative technologies for the production of green gases, sustainable fuels and recyclable chemicals.

The chemical industry and related production companies work with complex process chains in which numerous individual technologies are linked. Sustainable innovations, often summarized under the term “biorefinery”, must be considered in an integrated manner. The interlinking of different process steps represents a major challenge.

The key to sustainable processes

One focus of Kuba's research is the use of fluidized bed systems. In these, biogenic waste material is converted into high-quality synthesis gas at over 800 degrees Celsius. Once this gas has been purified, various synthesis processes can be used to produce synthetic natural gas substitutes, sustainable fuels and chemical products. “Such technologies make a significant contribution to the defossilization of industry,” says the process engineer. The professorship at BOKU, endowed by BEST - Bioenergy and Sustainable Technologies GmbH, deepens the cooperation between basic university research and industry-related technology development and sustainably strengthens the innovative power in this future-oriented field.

Scaling and teaching

In addition to laboratory research, Kuba is also dedicated to scaling up such processes in the new BOKU pilot plant to demonstration scale, which is available with the Syngas Platform Vienna. The aim is the industrial implementation of complete process chains from biogenic residues to marketable end products. “By developing technologies from laboratory scale to industrial demonstration, BOKU's research is brought close to large-scale implementation,” explains Kuba. Close cooperation with industrial partners ensures practical research with a measurable impact. At BOKU, Kuba also develops courses with a process engineering focus. He has already received the “Best Teaching Award” at TU Wien for his innovative didactic approaches, which are linked to industry in a practical way.

Academic career

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Matthias Kuba studied process engineering at the Vienna University of Technology and already dealt intensively with thermochemical synthesis gas production in his master's thesis. In his doctorate, carried out at BEST, he researched ash chemistry and process optimization of fluidized bed processes. After a post-doctoral research phase in Sweden, he headed the research group for thermochemical gas production at BEST and later became co-head of the "Syngas Platform Technologies" division. In 2024, he habilitated at the Vienna University of Technology in the field of "Process engineering for the thermochemical conversion of biomass and residues".

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