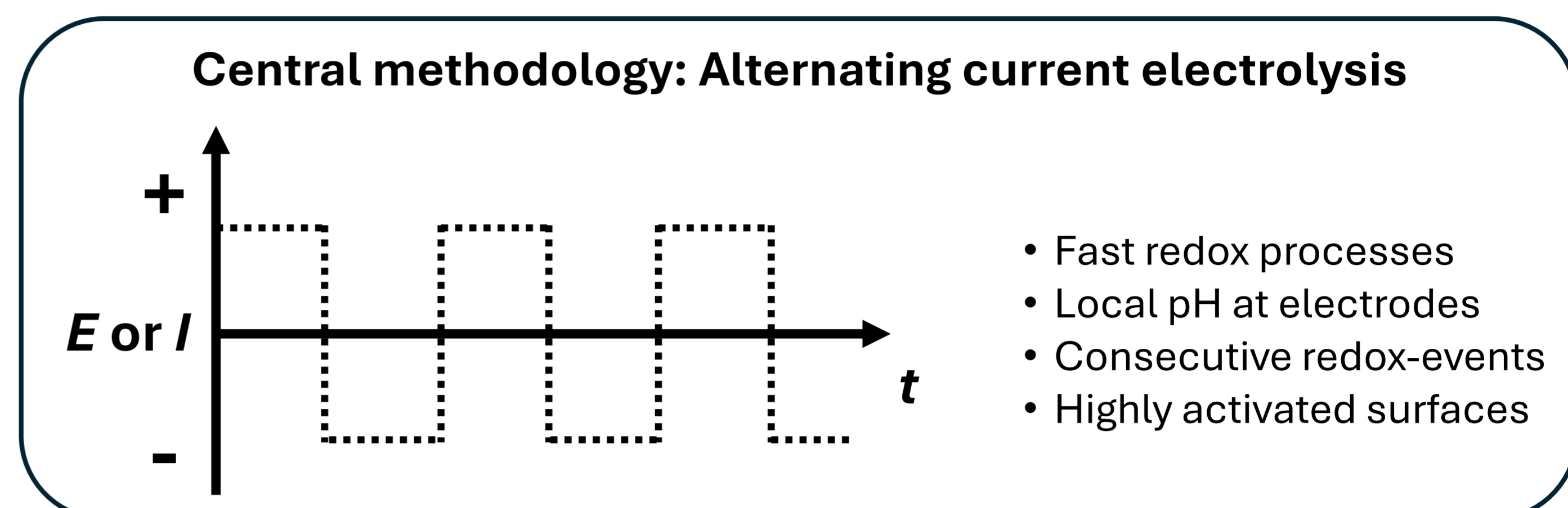
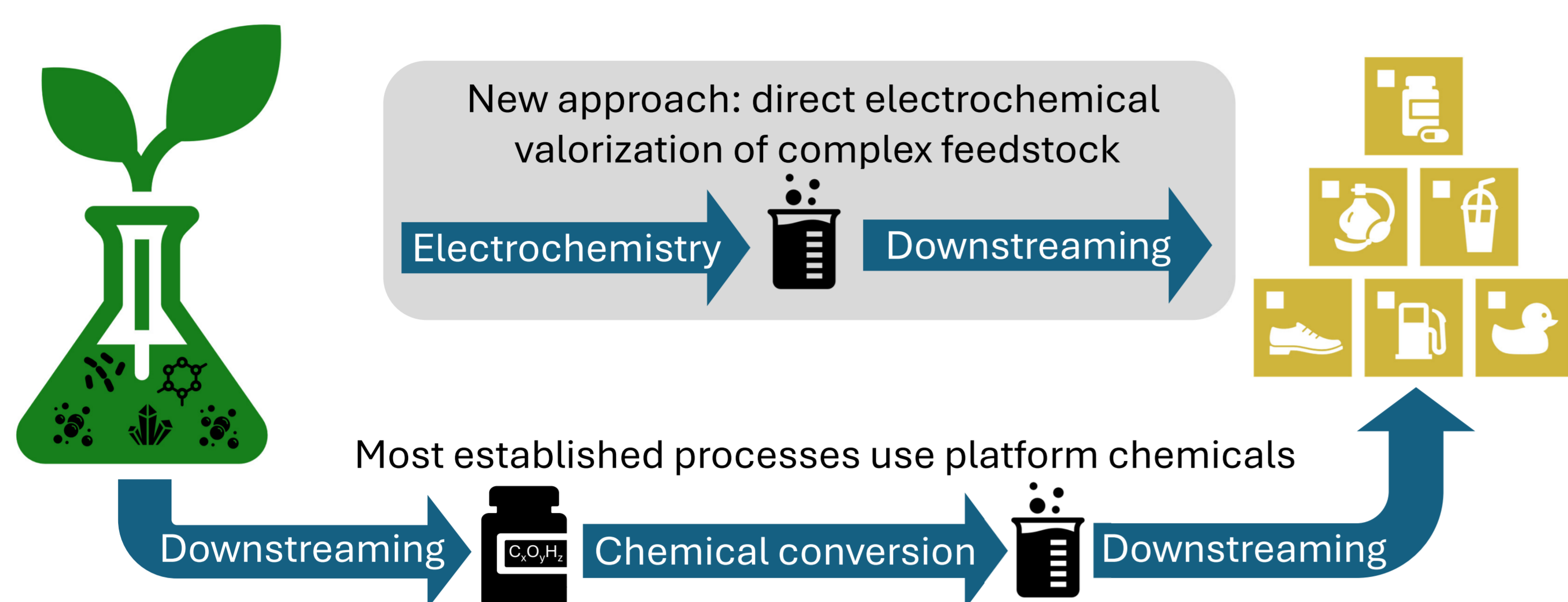


Upgrading complex renewable feedstock in an electrified biorefinery under application conditions

Nils Kurig¹, Elias Klemm²

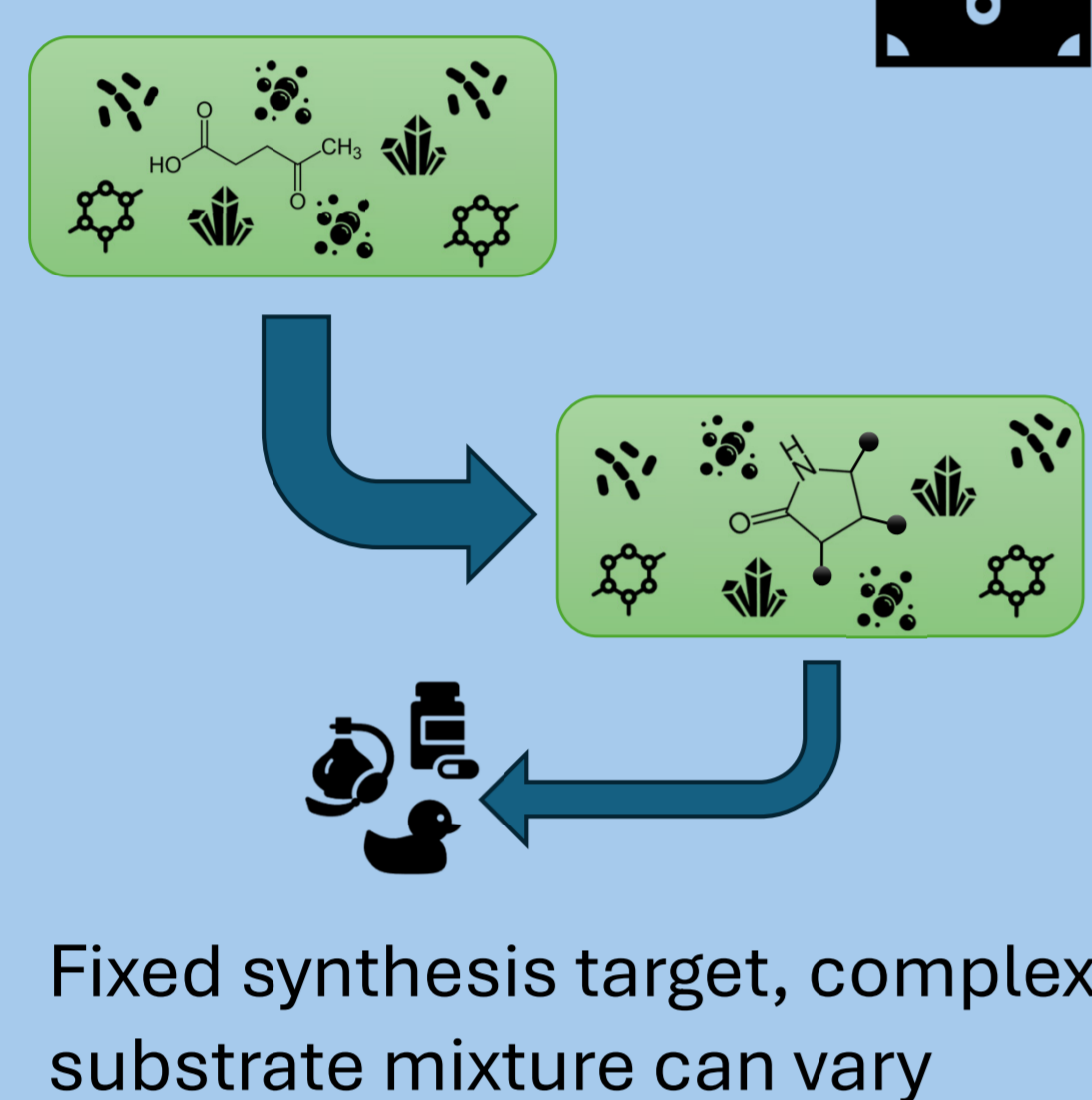
¹Friedrich-Alexander-Universität Erlangen-Nürnberg, Chair of Power-to-X Technologies, 90762 Fürth, Germany

²Institute of Technical Chemistry, Faculty of Chemistry, University of Stuttgart, 70550 Stuttgart, Germany

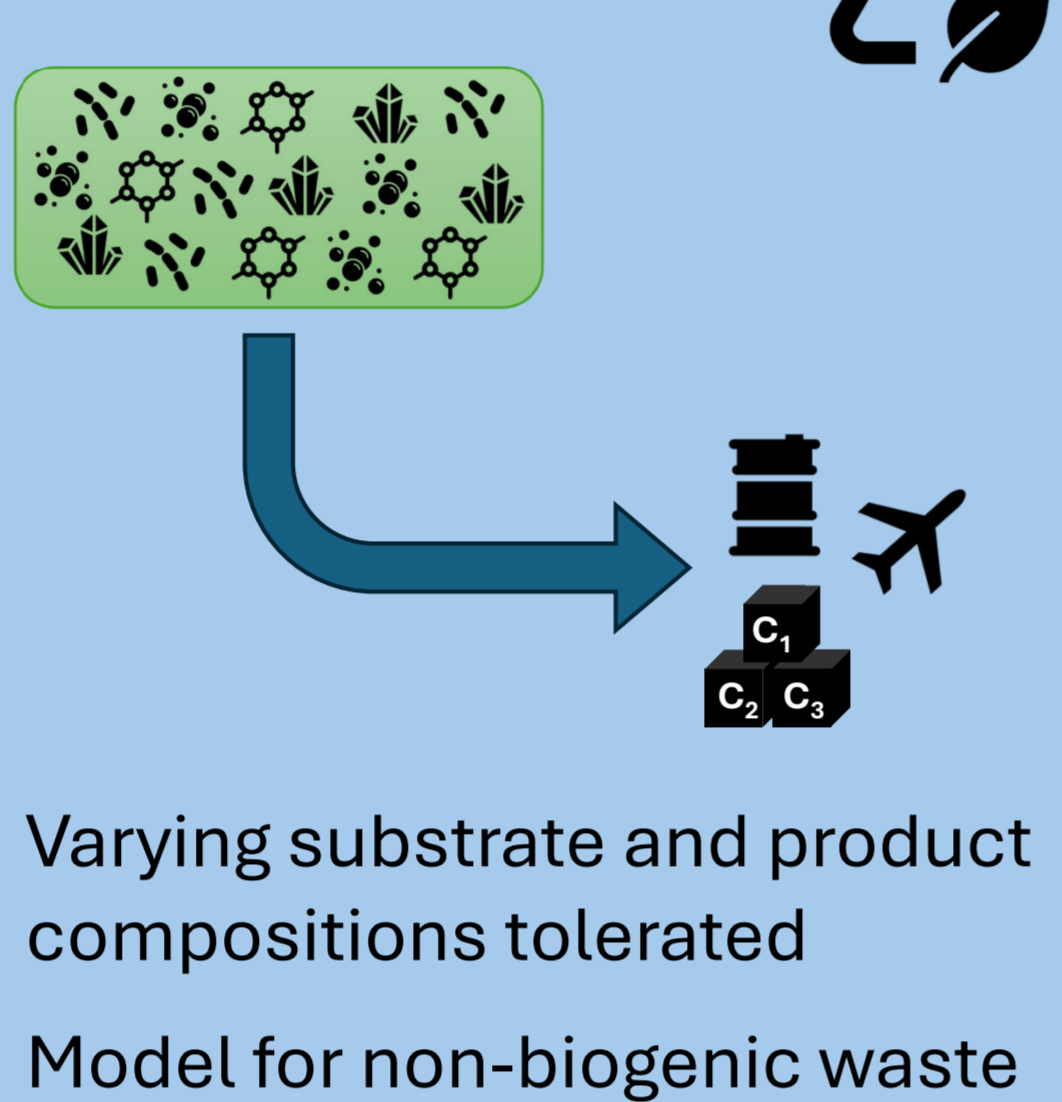


Biogenic value chains

High added-value



Waste upgrading



New Kolbe pathway:
Biradical recombination



Reductive amination
in acidic conditions



Reductive amination
towards pyrrolidones

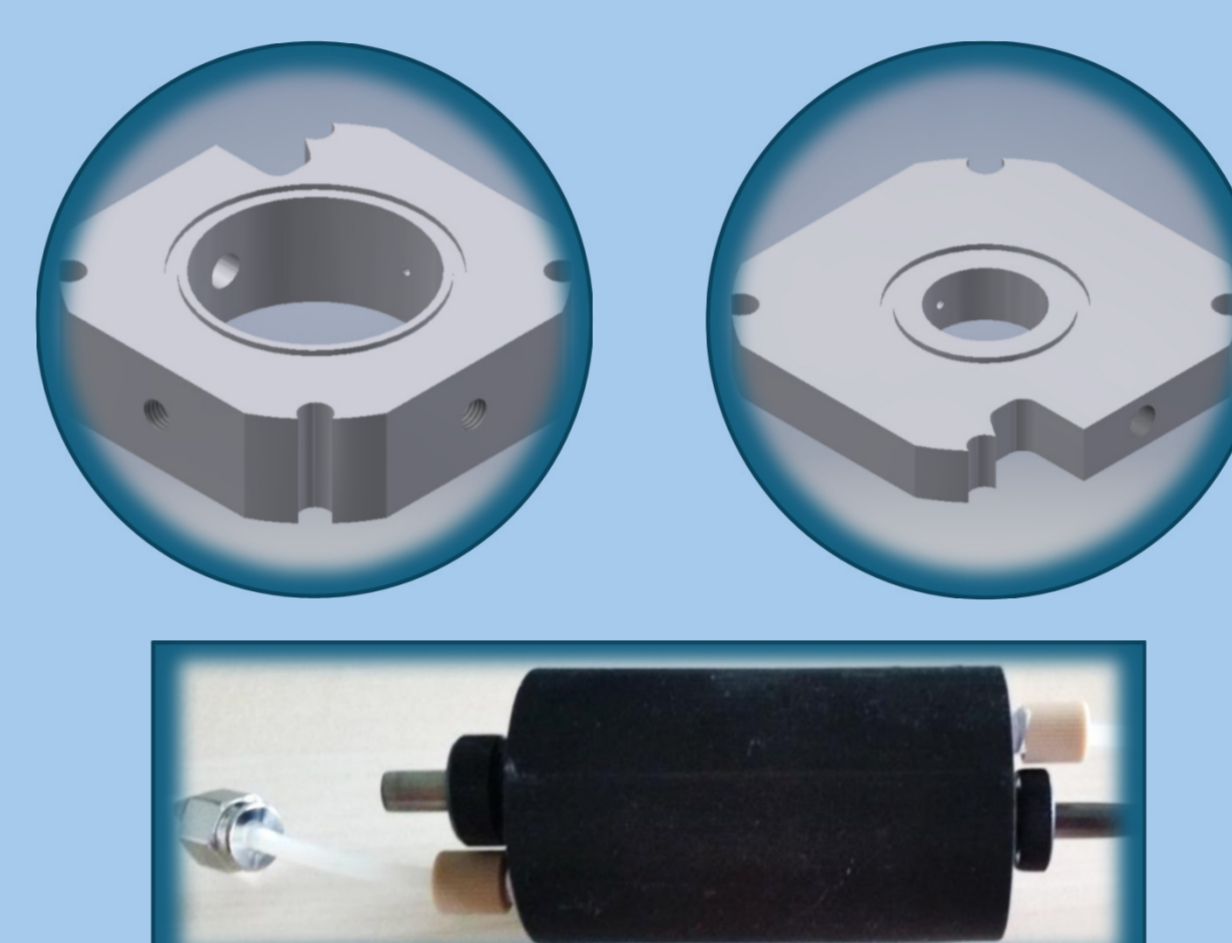


Acrylonitrile from biomass
using Kolbe electrolysis



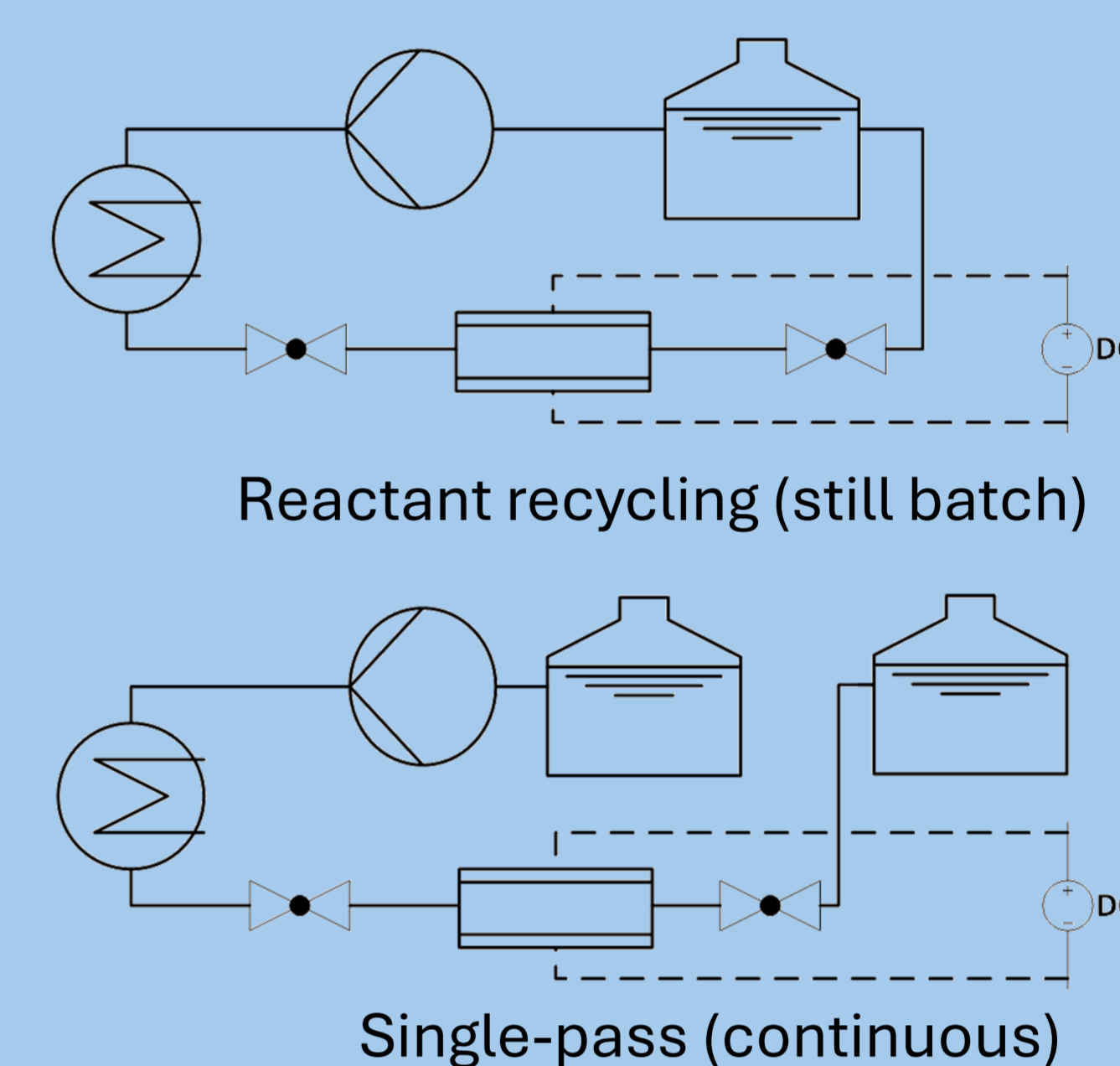
Reaction engineering

Cell development



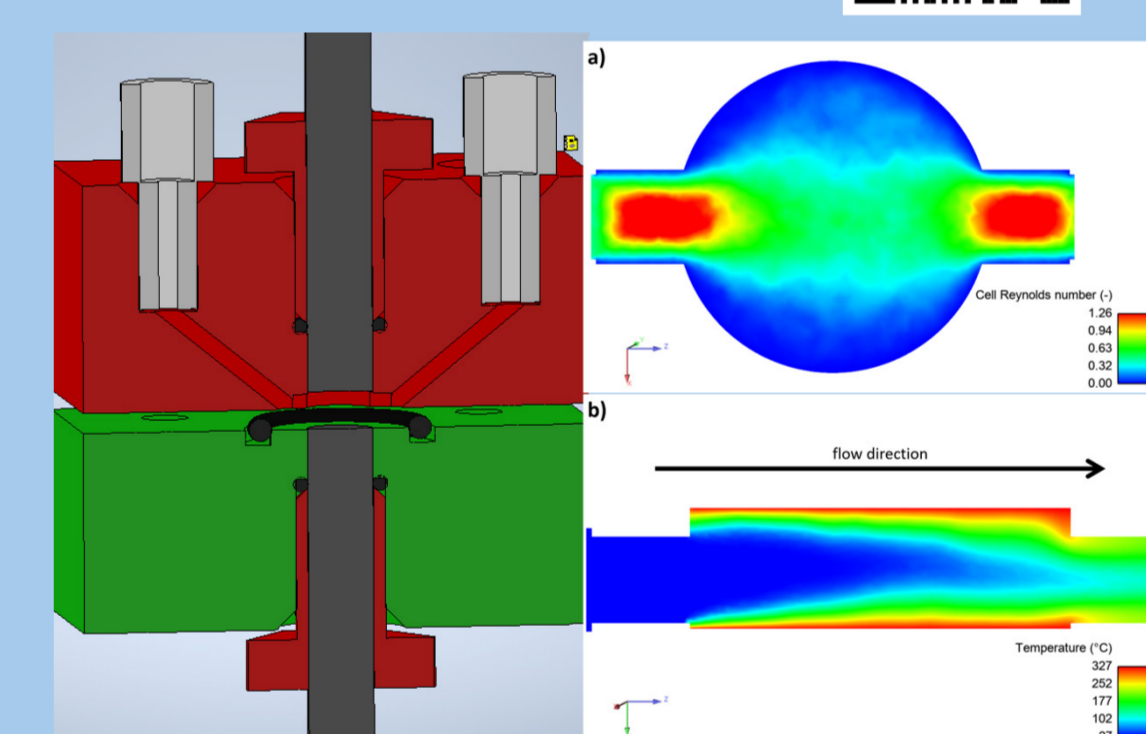
How can the product distribution be controlled by reaction engineering?

From stirred beaker to flow



Which reactor parts must be modular for challenging substrates that foam or clog?

Microreactors



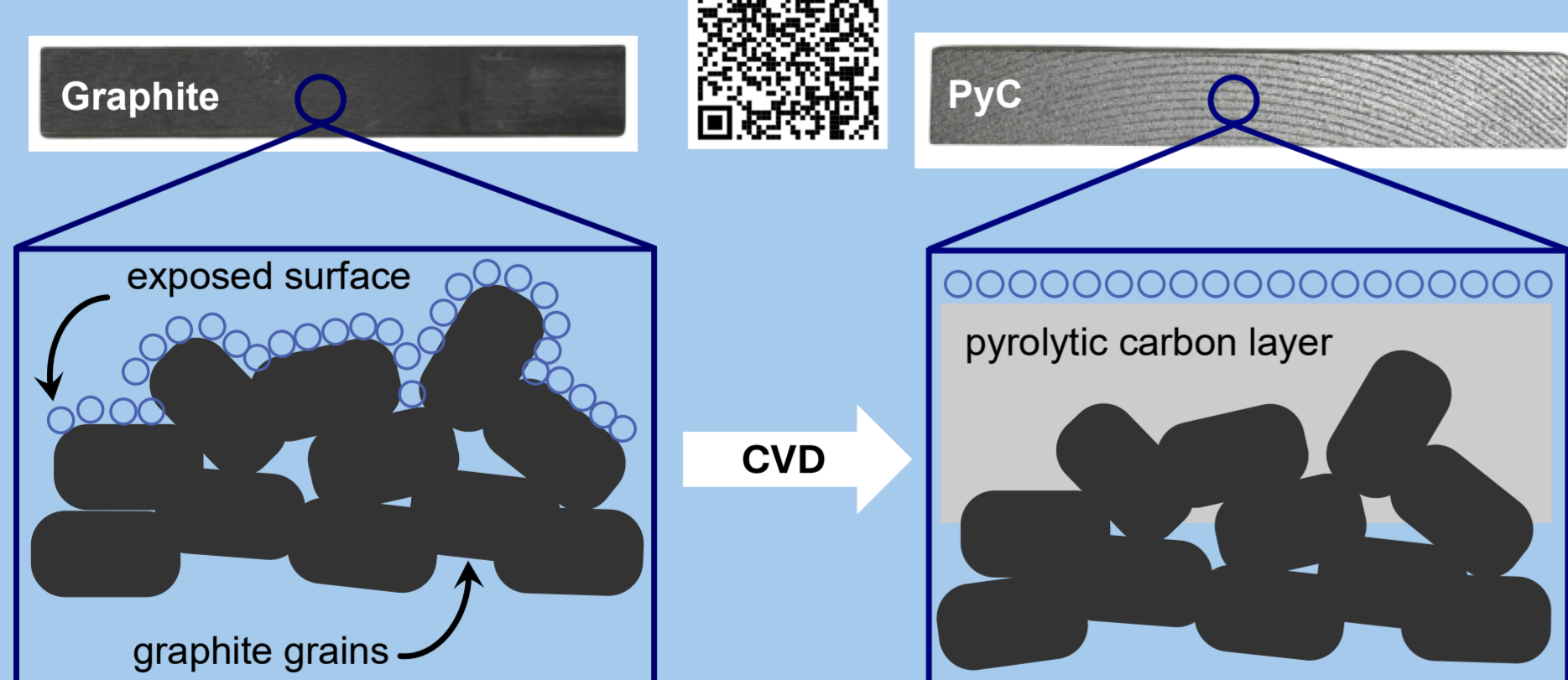
Electrode development

Surface modification to generate desired reactivity

- (Ru_(1-x)Ti_x)O₂ for Kolbe
- Amorphous carbon for rapid alternating polarity (rAP)



Which components of complex biogenic feedstock affect electrode surfaces?



How can surface deactivation be mitigated or reversed?

What opportunities can be generated through using inert electrodes and redox mediators?

University of Stuttgart



Nils Kurig
Electrified Biorefinery
(Planned junior research group)



University of Hohenheim

Data-driven engineering

AI-assisted processing of data from diverse sources



FAIR data

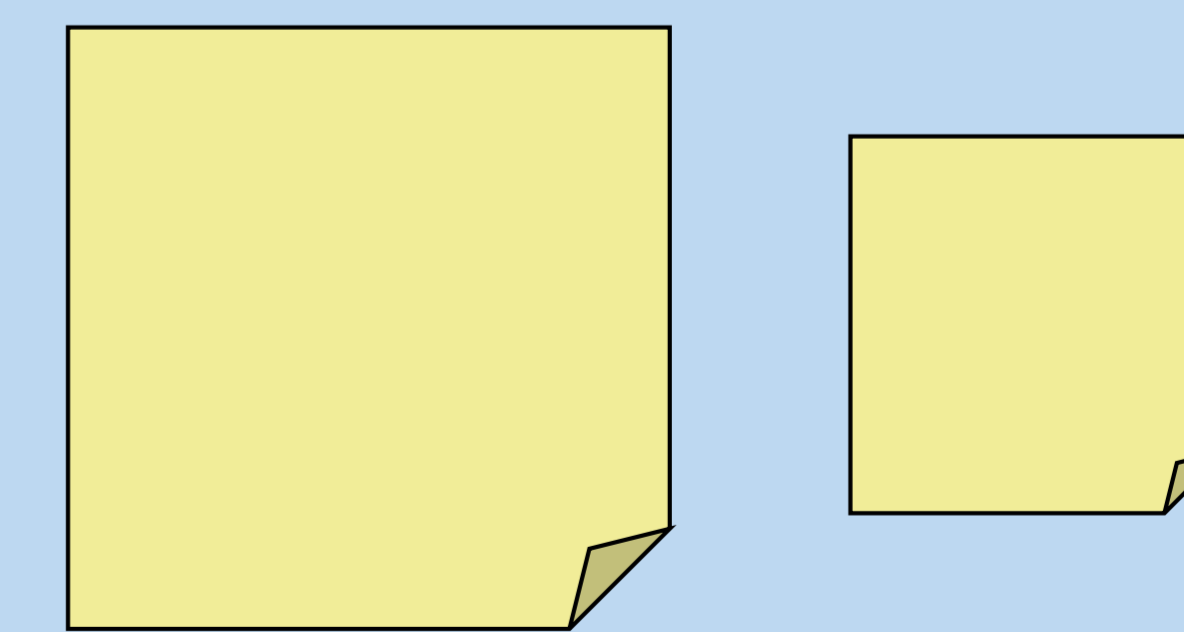


ML-driven optimization of high-dimensional parameter spaces



The junior research group intends to deepen and extend its expertise in this area.

Opinions and recommendations:



Short CV

Scientific career

Since 03.2026	Guest scientist hosted by Prof. Bastian Etzold, Chair for Power-to-X Technologies at FAU
02.2024 – 02.2026	Postdoctoral fellow with Prof. Phil S. Baran, Department of Chemistry, Scripps Research, La Jolla, California/USA
11.2022 – 01.2024	Electrochemistry group leader with Prof. Regina Palkovits, Chair for Technical Chemistry, RWTH Aachen University
01.2019 – 10.2022	PhD student with Prof. Regina Palkovits, Chair for Technical Chemistry, RWTH Aachen University, Defended 14.04.2023 (summa cum laude)

Engagement in the scientific system

Since 2025	Spokesperson of the Young Reaction Engineers, DECHEMA Reaction Engineering Section
Since 2023	Peer-reviewer for >10 publications (<i>Angewandte Chemie</i> , <i>Nature Communications</i>), a project proposal, and jury member for multiple awards
Since 2021	Scholarship committee member of the Studienstiftung des deutschen Volkes e. V.

Scientific results

Total number of publications: 16 (First author: 9 h-index: 8)
Invited talks: 11 (+2 scheduled)
Conference contributions: 21 (Oral: 11 Poster: 10)

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- S. D. Mürtz, N. Kurig, F. J. Holzhäuser, R. Palkovits, *Green Chemistry* **2021**, 23(21), 8428–8433.
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