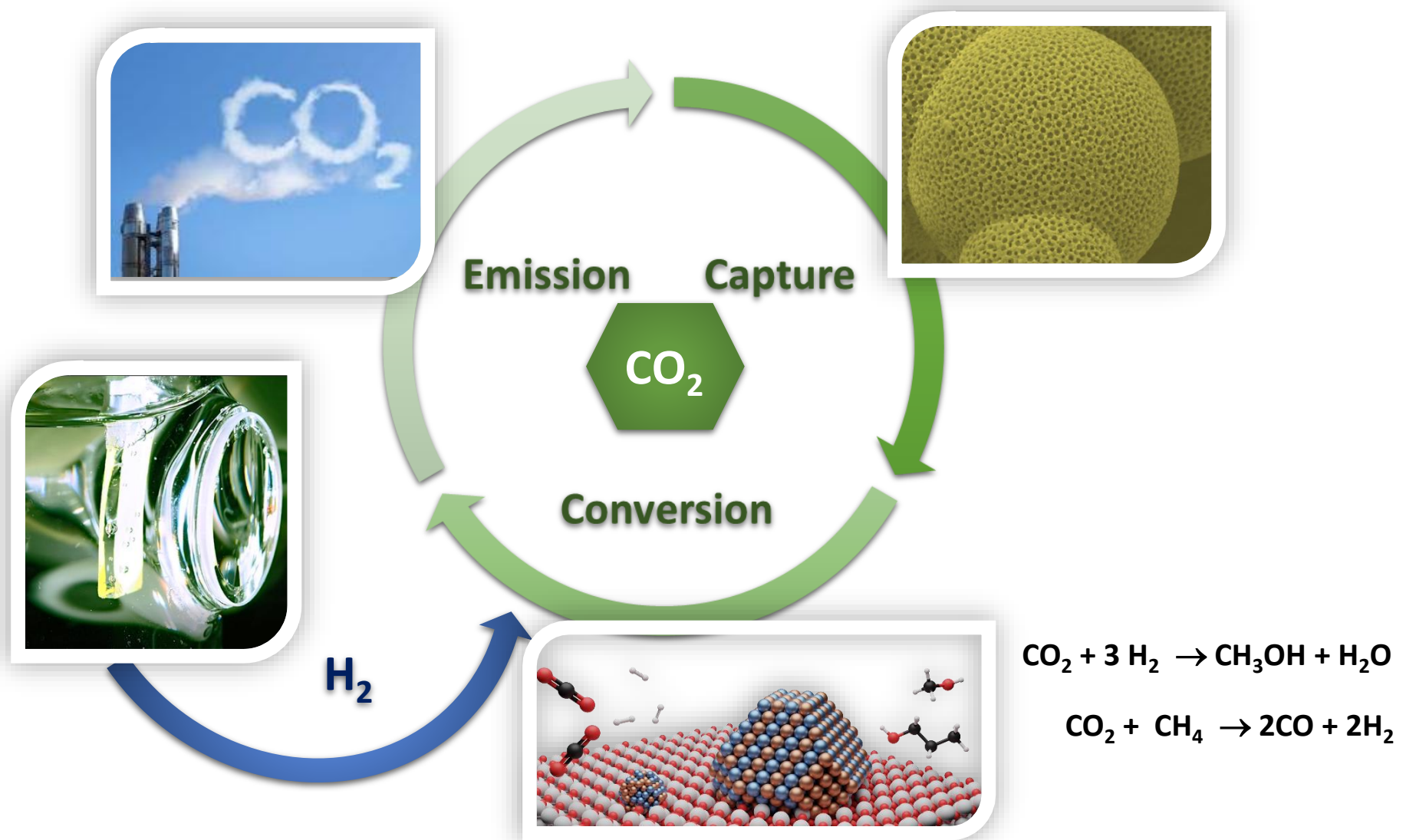
An aerial photograph of Zurich, Switzerland, showing the city's architecture, the Limmat river, and the Grossmünster tower. The image is partially obscured by a blue text box on the left and a smaller inset image at the bottom left.

Advancing materials for efficient and sustainable processes: Closing the CO₂ cycle

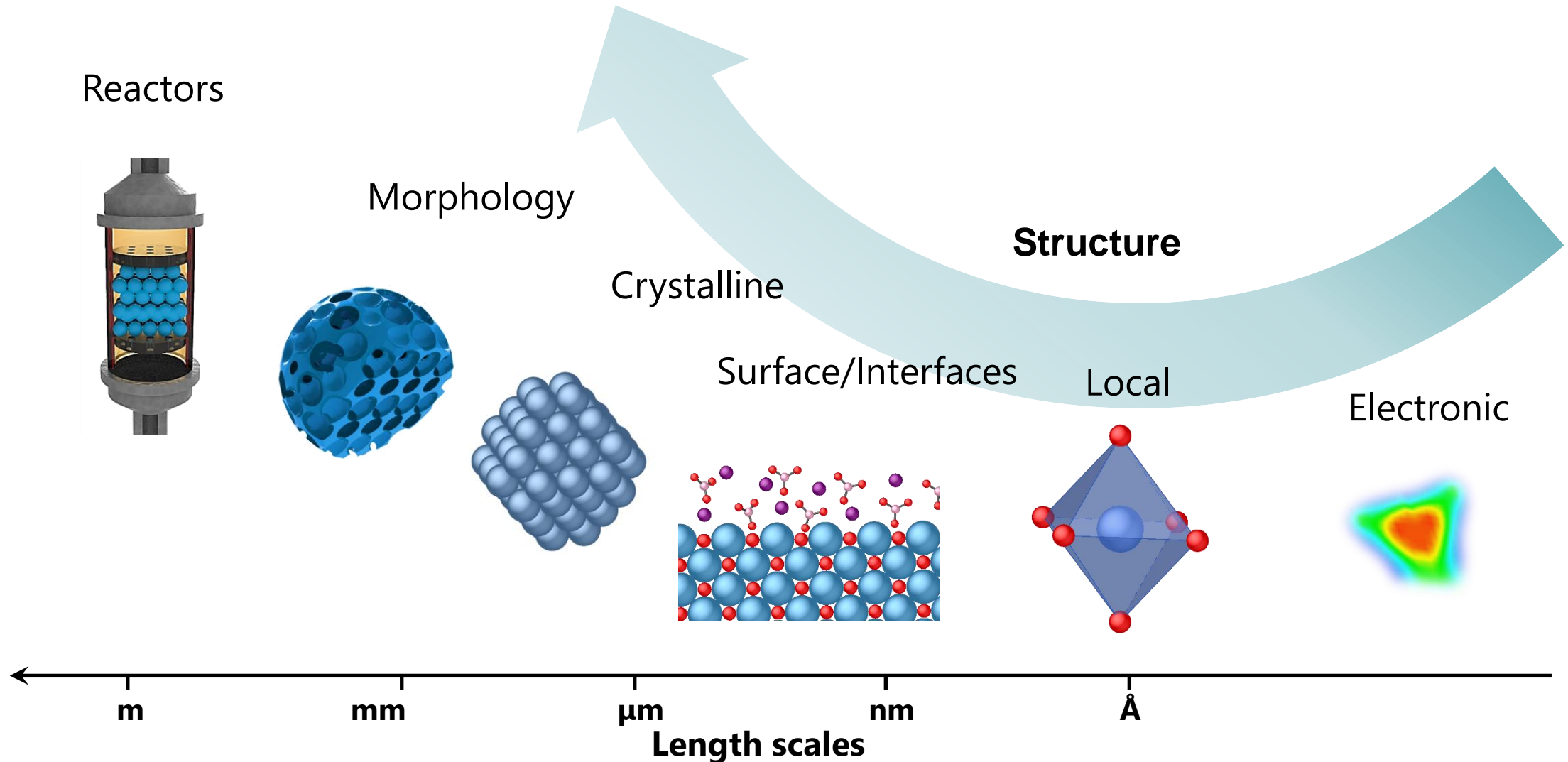
Paula Abdala

Christoph Müller, Felix Donat and Alexey Fedorov
Laboratory of Energy Science and Engineering
Department of Mechanical and Process Engineering

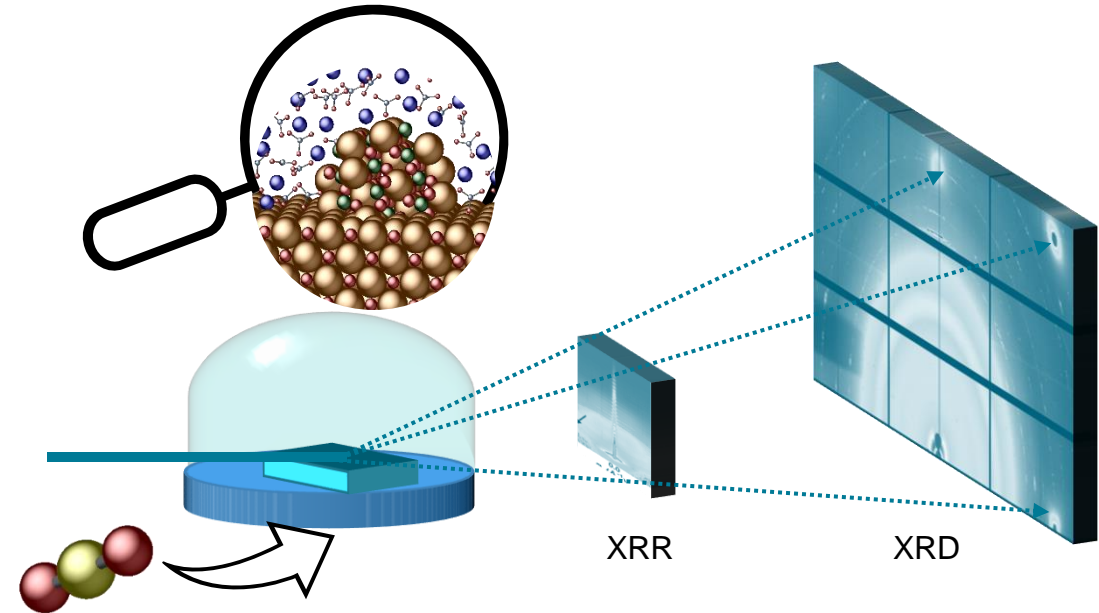
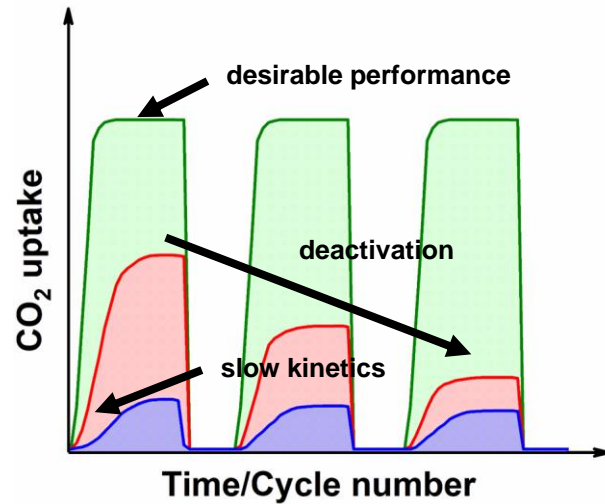
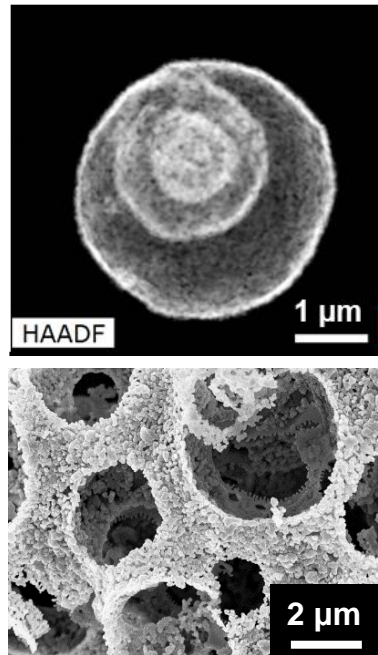
Closing the CO₂ cycle



Engineering from the atom- over morphology- to reactor-scale to maximize materials' performance

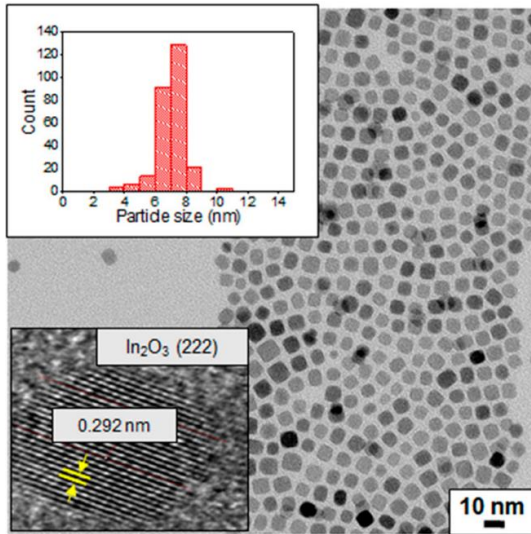


CO₂ capture

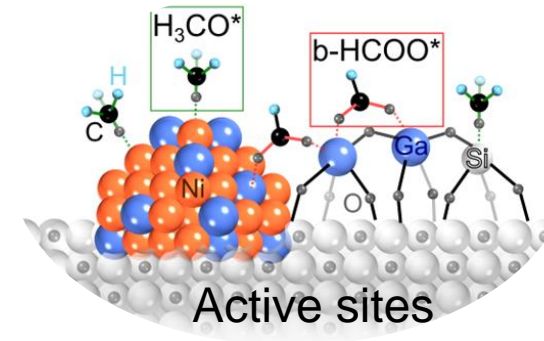
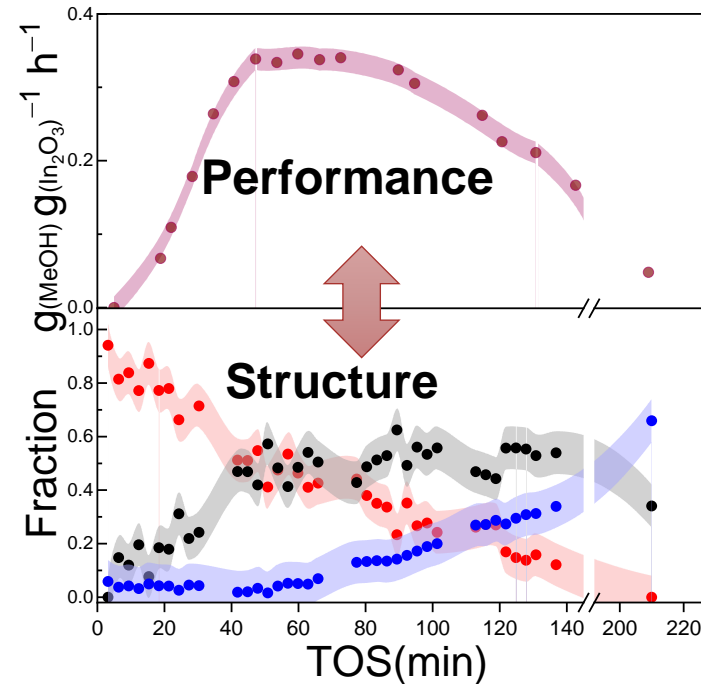


- Development of efficient, yet cost-effective solid CO₂ sorbents based on CaO and MgO.
- Development of materials for direct air capture.
- Coupling CO₂ capture with CO₂ conversion.

Thermocatalytic CO₂ conversion



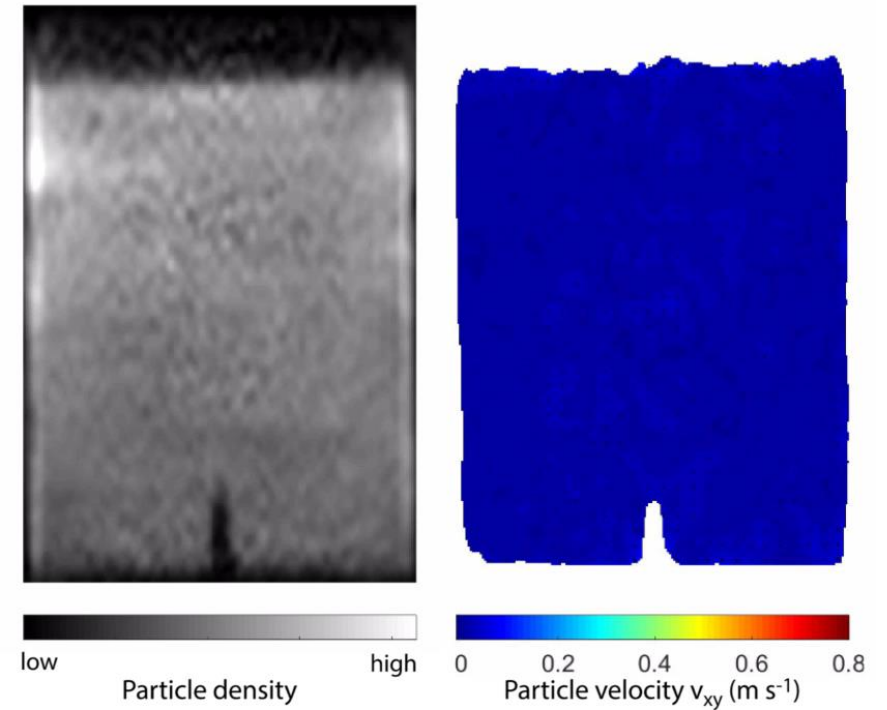
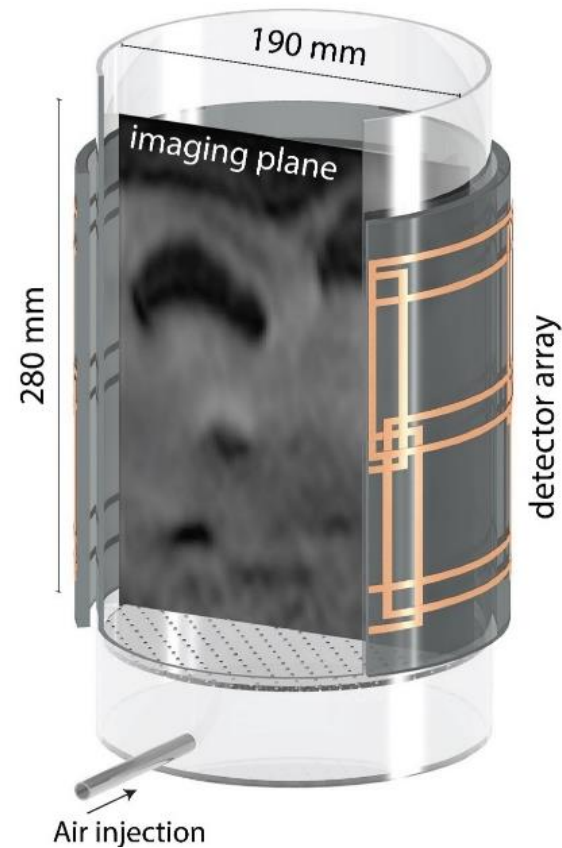
Synthesis



Rational design

- Development of metal oxide and metal-based catalysts for CO₂ conversion into methanol, olefins, alkanes, synthesis gas or higher alcohols.
- Elucidation of catalytic active sites.
- Development of countermeasures against catalyst deactivation.

Probing the gas and particle dynamics in chemical reactors





Thank you for your attention!

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