



Biofuels through Electrochemical transformation of intermediate BIO-liquids

Project duration Dec 2020 – Nov 2024

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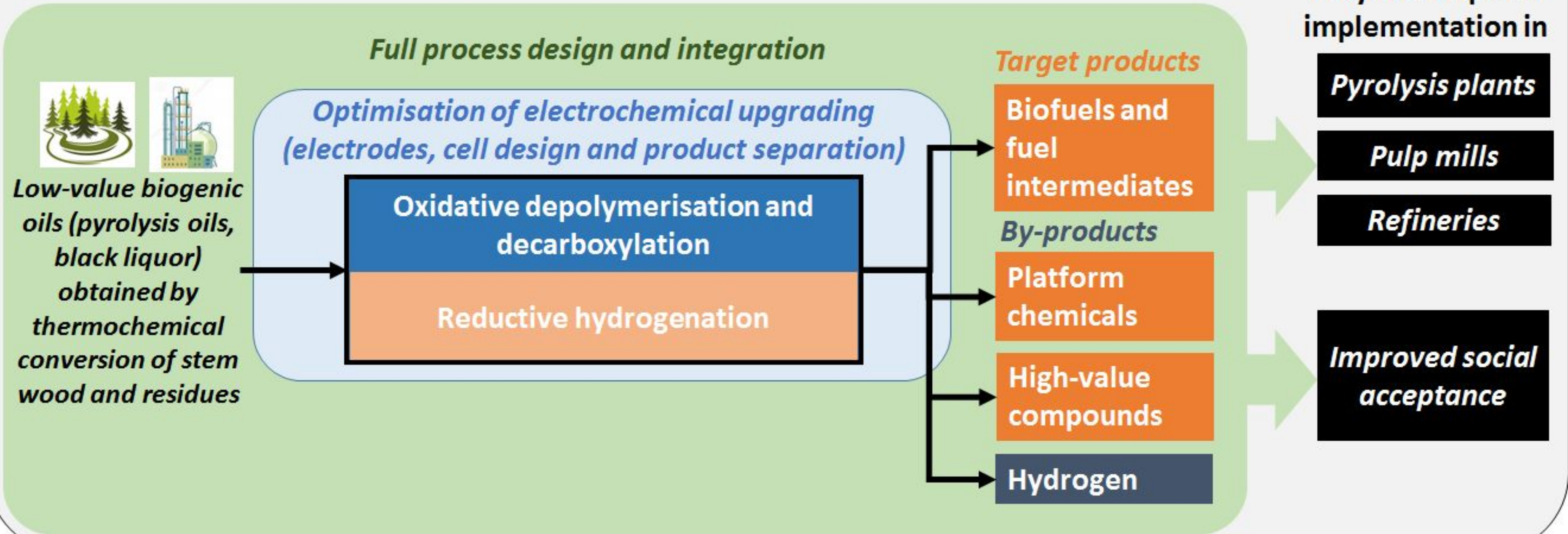
Project focus

EBIO – Flexible combination of thermochemical and electrochemical upgrading process for lignocellulosic biomass to energy dense hydrocarbon conversion with a carbon yield of 60%, contributing to answer European energy challenges

European challenge to develop new renewable energy systems for the future

Current production processes need high temperature and pressure, not optimal for bio-based molecules

Large demand of biofuels and high-value chemicals



Electrochemistry:

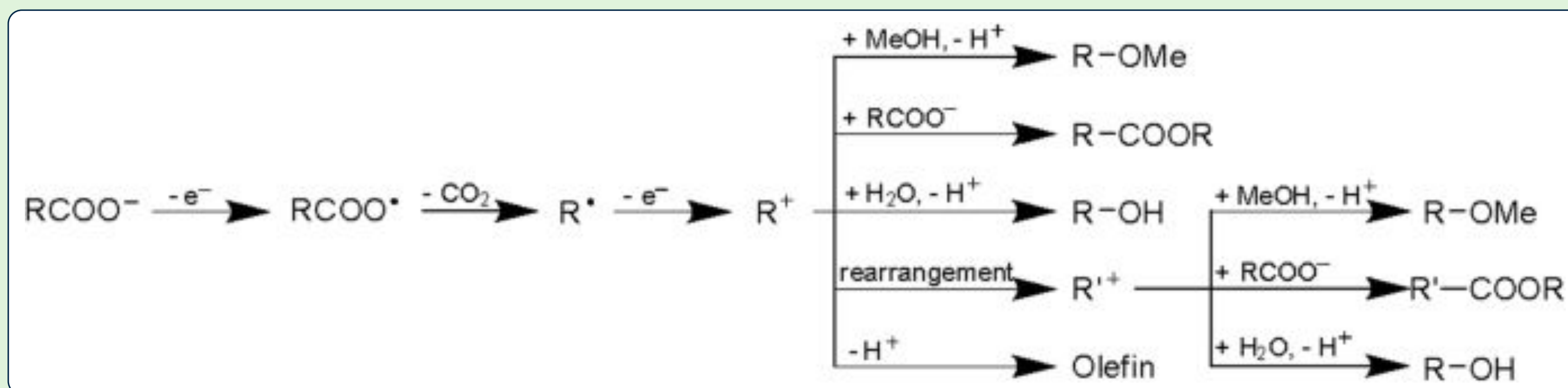
Objective:

- Store electricity in a carbon containing backbone
- Upgrade at mild conditions

Target reactions:

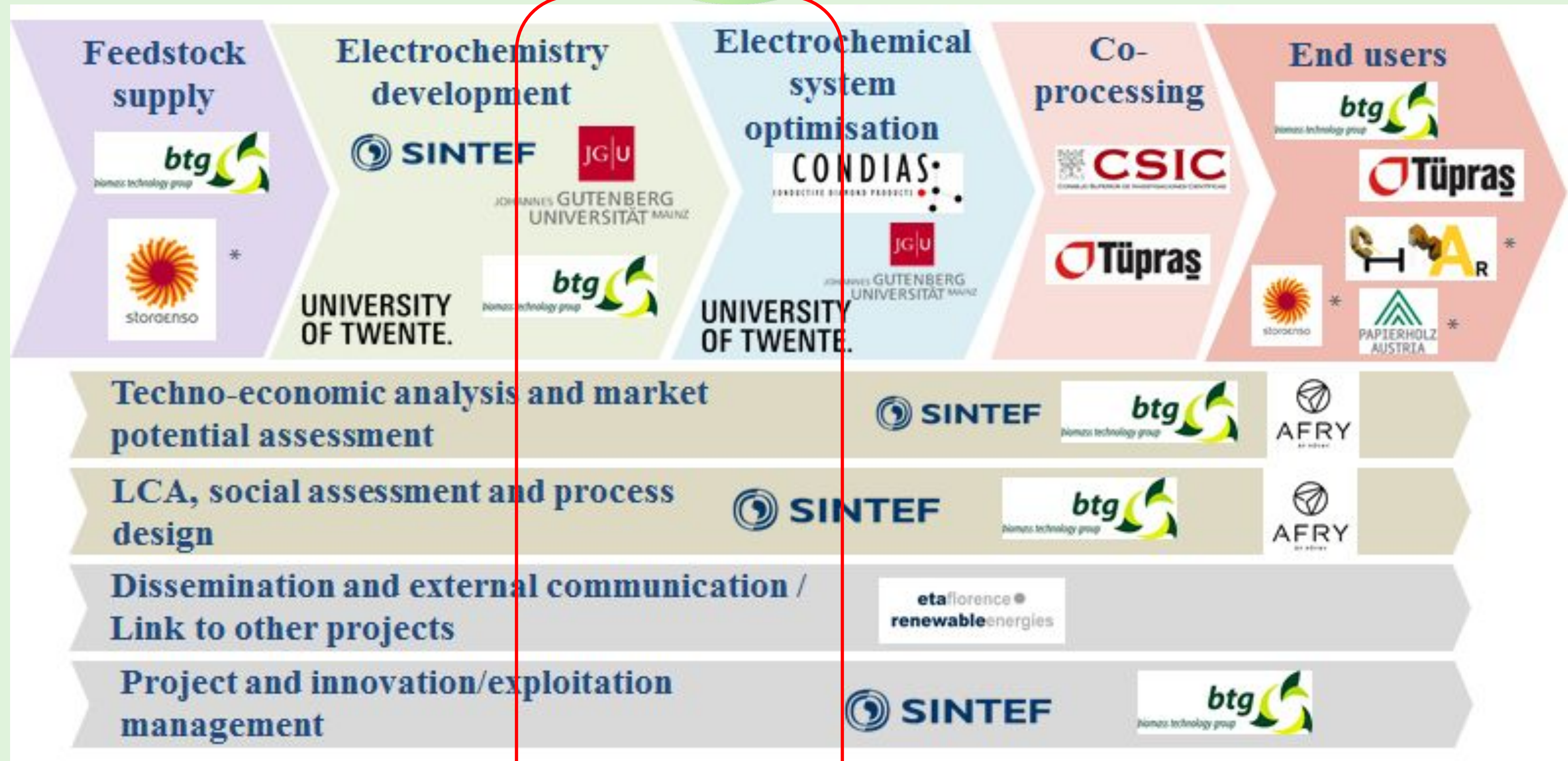
1. Anodic depolymerization of lignin fraction

2. Anodic decarboxylation of acids



3. Cathodic reduction of carbonyl groups

Value chain and partners

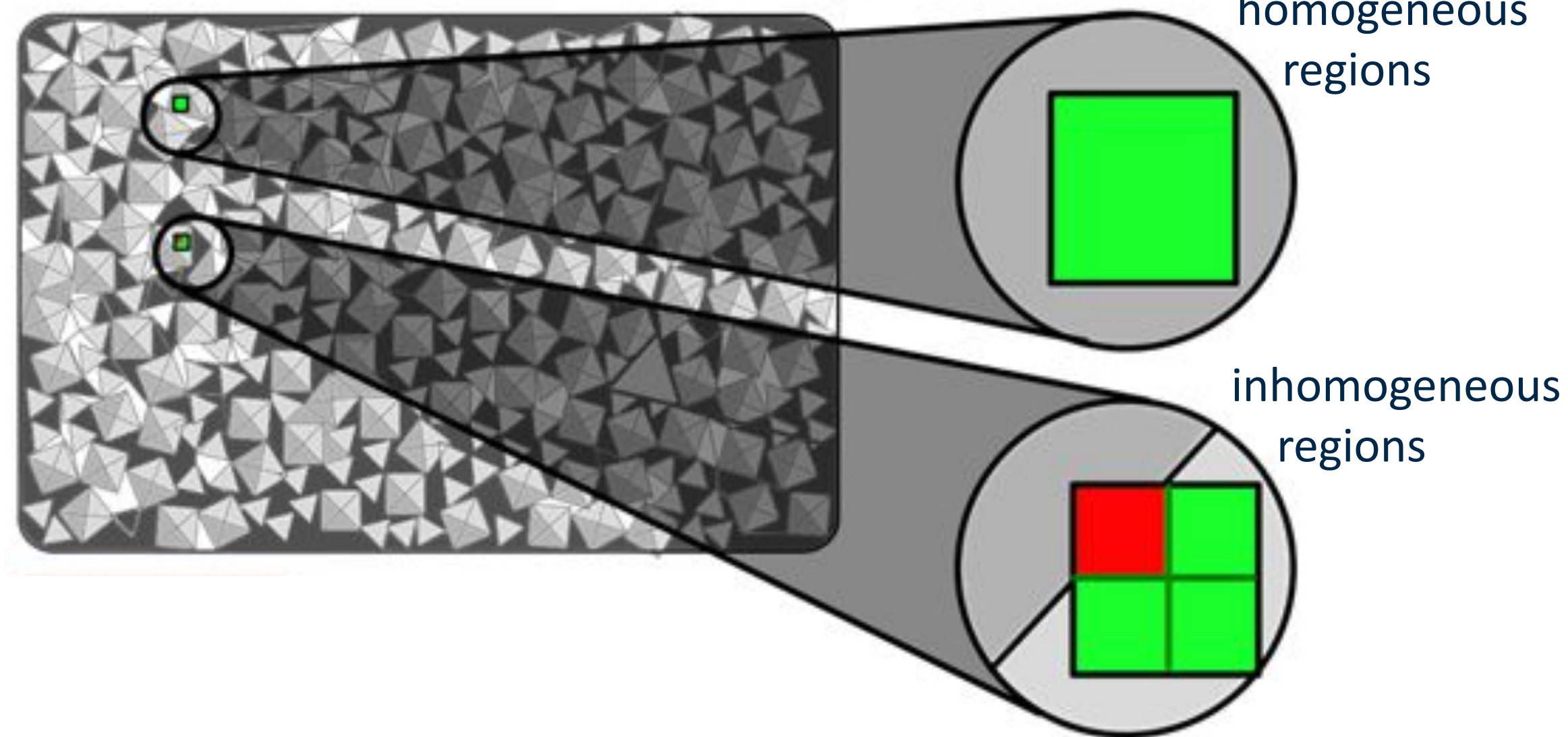


Current
research
focus

Technical research focus

Production, characterization and testing of scalable electrodes and cells

- Variation of materials properties
- Implementation of automated characterization methods
- Development of novel production methods



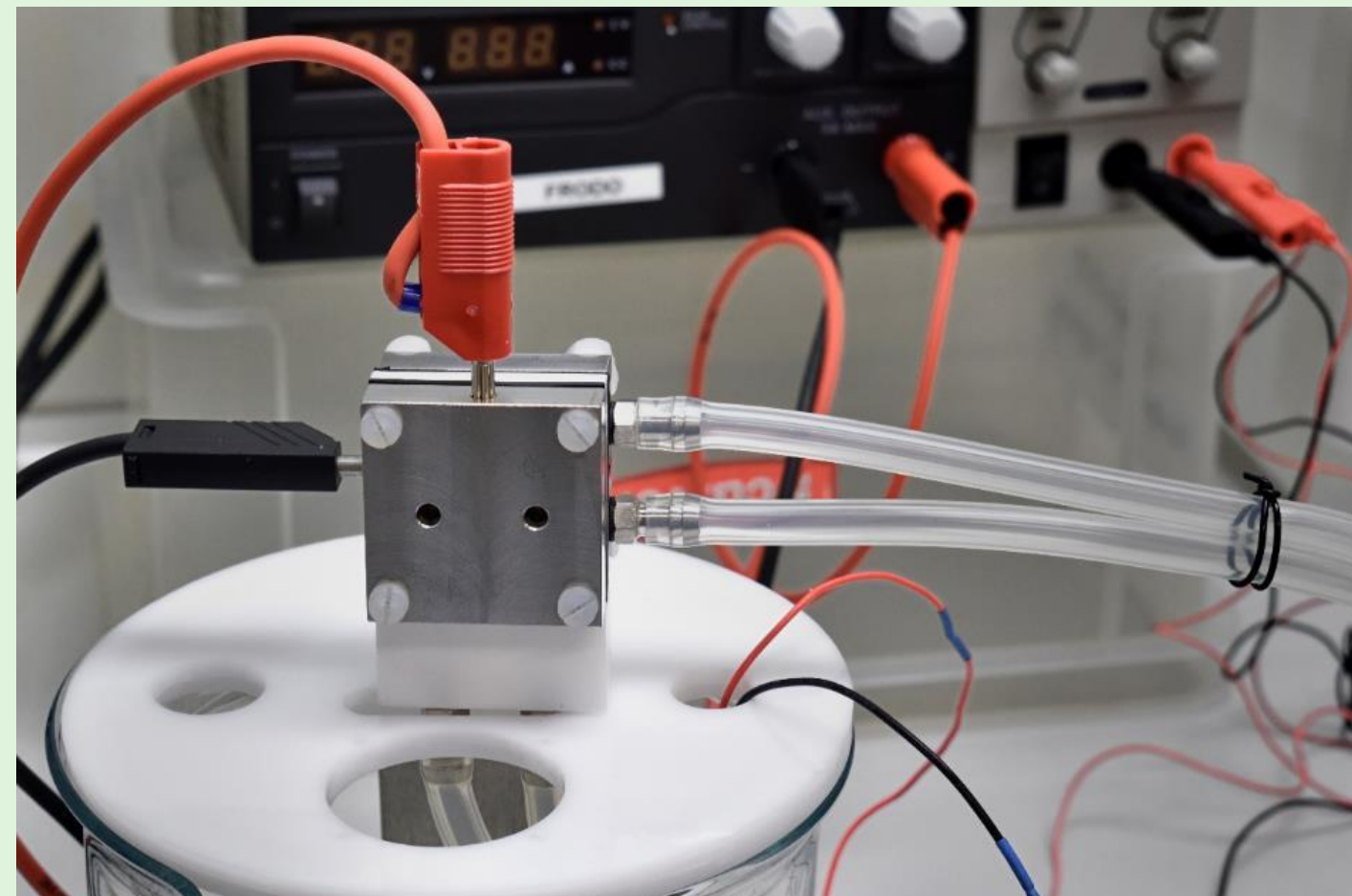
Electrochemical upgrading

- Lignin depolymerization
- Decarboxylation of acids
- Hydrogenation of oxygenates



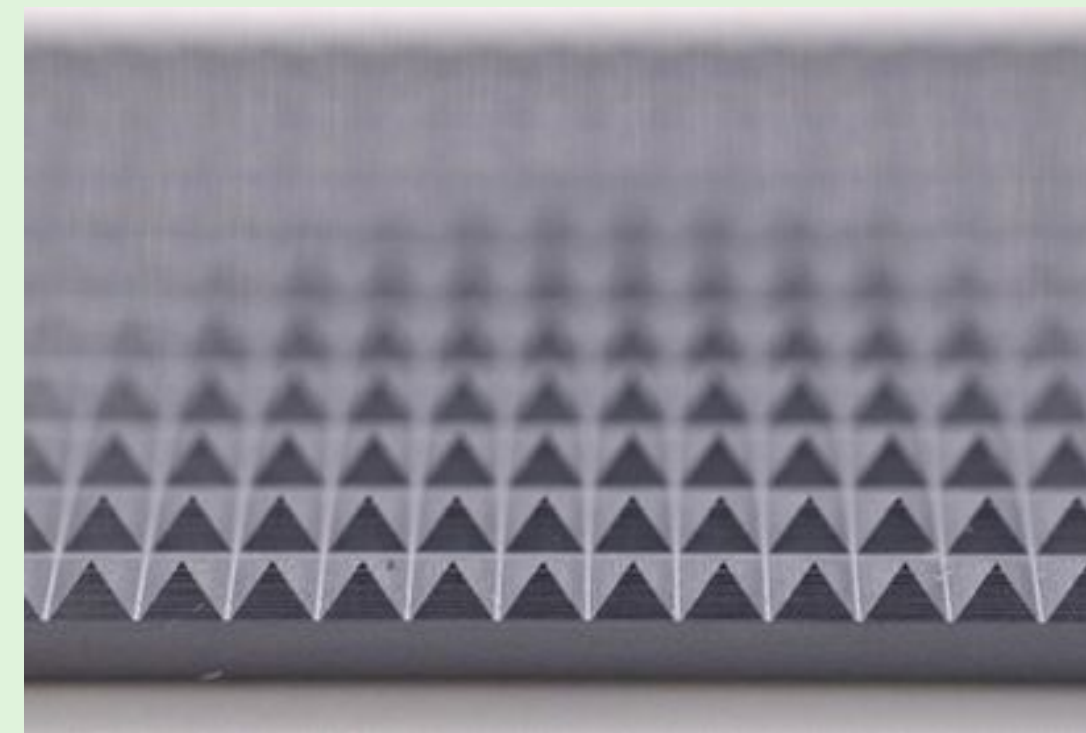
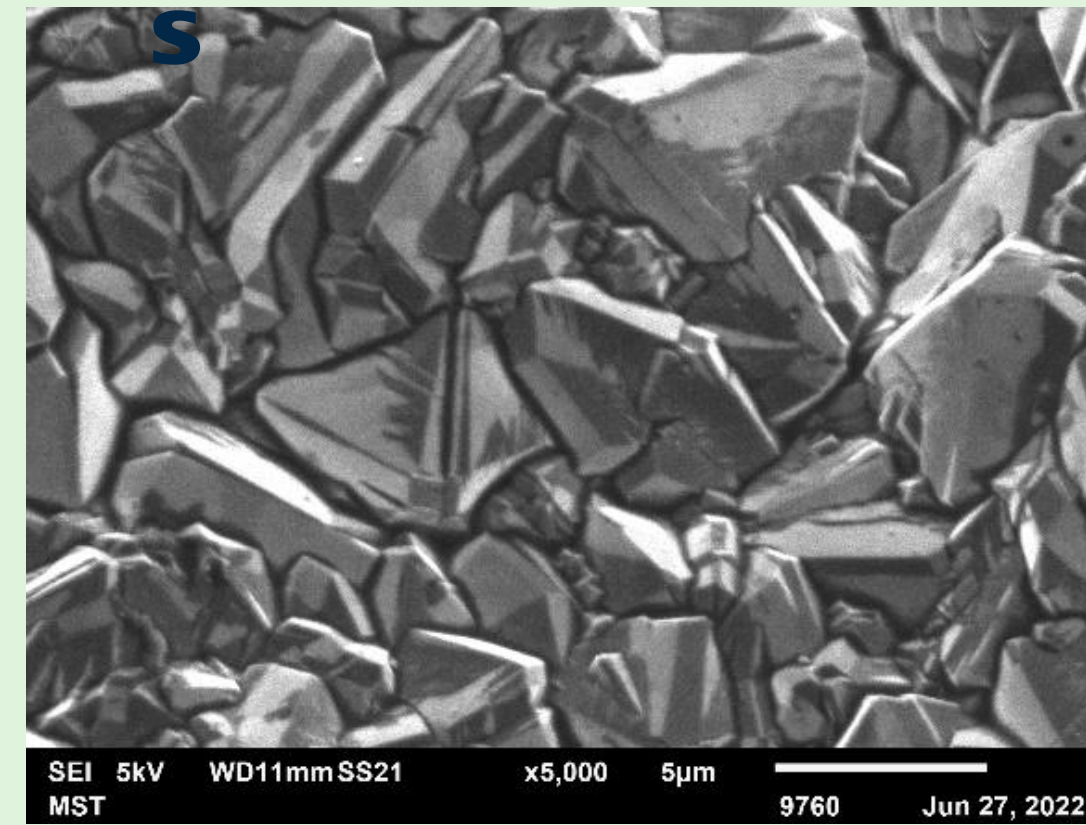
Toolbox

Cells/rigs



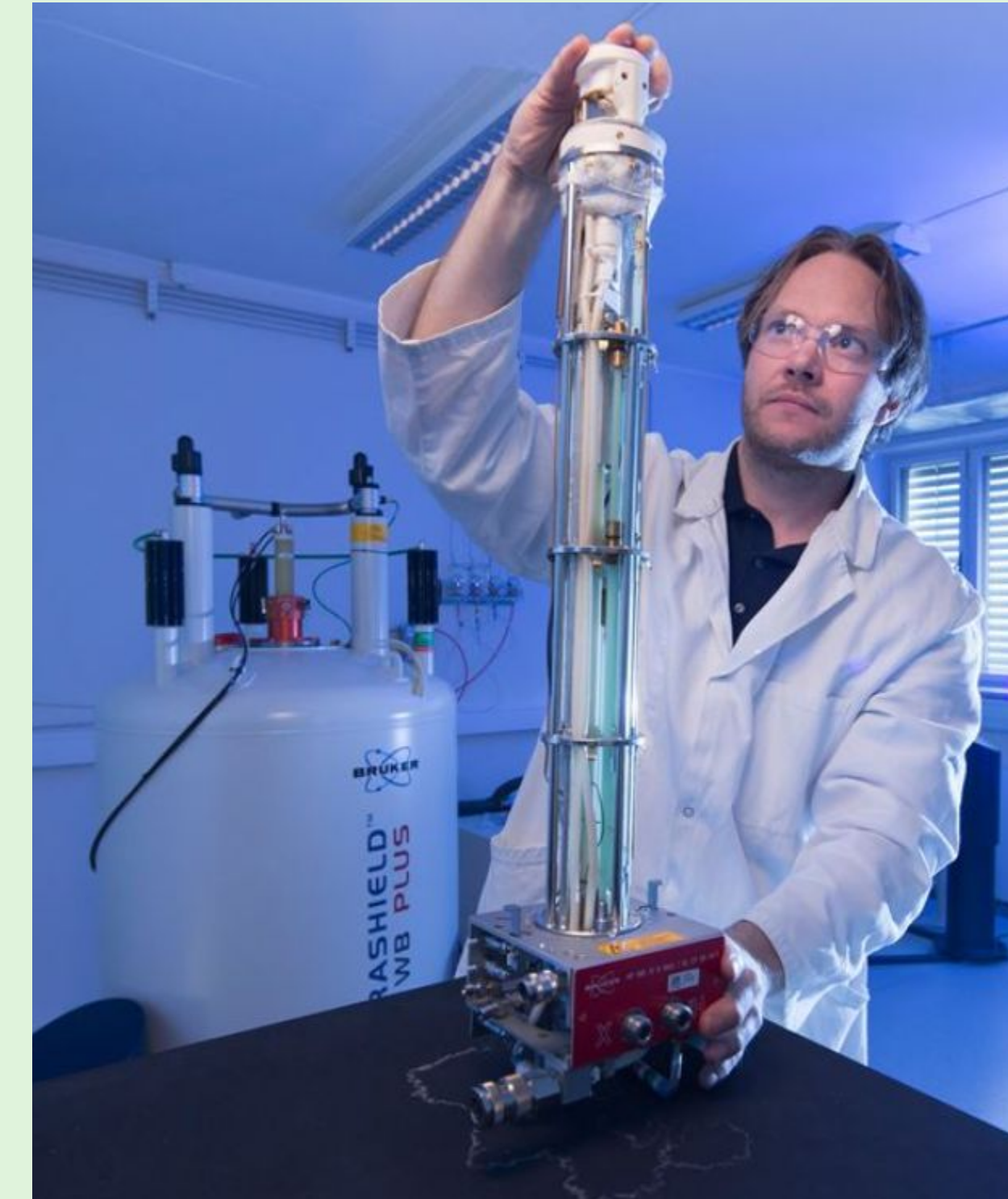
Cells in batch and continuous bench and pilot systems

Electrode



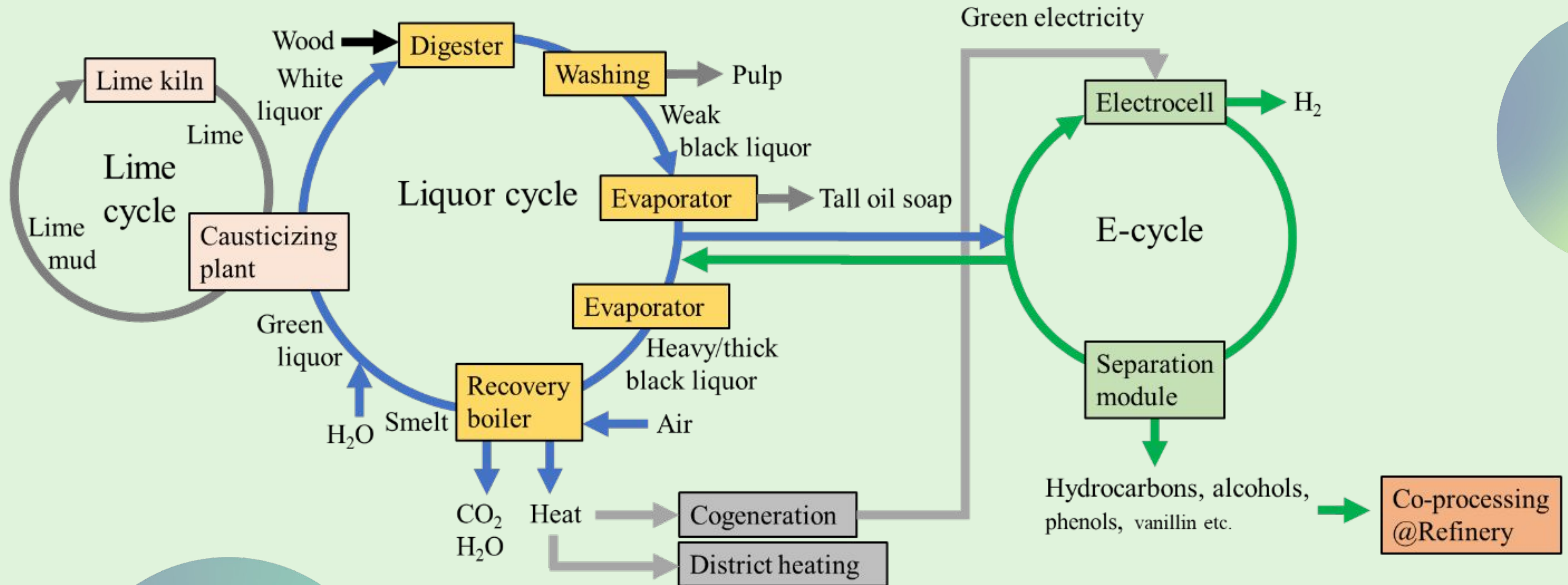
Carbon-based: Graphite, BDD
Metal-based: Ni, Cu, Pt

Analysis



Online:
GC, MS
Offline:
NMR, LC-MS, LC-TOF-MS, LC-MS-MS,
GC-GC-MS, GPC, SEM, TEM

EBIO concept - Development and integration of electrochemical processes for bio crude upgrading



EBIO case studies – Societal impact of a full-scale process



- Discussions with stakeholders, surveys
- Assessment of societal impact
- Identification of impact categories, criteria and possible indicators
- Description of sectoral economic linkages





**SUSTAINABLE
PLACES 2022**
Sep. 6 - Sep. 9, 2022 | Nice, France



EBIO

**Thank
you!**

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