SusChem 2017 Brokerage Event

Pilot facilities for open innovation in SusChem-AT

Contributions in this presentation from:
• Supporting the technical development from the very early stages in the production cycle to market;

• Developing safety assessment strategies tailored to special requirements in different domains

• Providing access to design (incl. SbD), testing (e.g. (pre-)clinical), safety assessment, and upscaling facilities for different domains; Upscaling specialisation e.g. in (nano)pharma, (nano)medicines, printing, medical parts

• Add on: bridging (nano)safety with production/application along the entire value chain

• Connecting regional strengths to international needs
• Medical technologies (in-vitro Diagnostics, Point-of-care, …)
• Smart Sensor & Actuator Systems (IoT, Automotive, etc.)
• Printed Electronics & Sensors (e.g. wearable sensors, medical sensors, biosensors)
• Process control for Chemistry and Biotechnology, process analytical technologies
• Environmental Monitoring
• Nanomedicine (Nanopharmaceutics/Therapy, Diagnostics, Regenerative Medicine) & NanoSafety along the entire value chain
• Lignocellulosic Biorefinery
EXISTING FACILITIES & PILOTS

Demo buildings / Pilots (examples!):

- Research Center Pharmaceutical Engineering GmbH
- PAYER Medical GmbH
- JOANNEUM RESEARCH GmbH
- Research Center for Non-Destructive Testing RECENDT GmbH
- Technical University Vienna, ICEBE

Key expertise:

→ roll-to-roll-printing
→ large scale synthesis for printed electronics, sensors
→ high resolution printing
→ nanopharmaceutics
→ microfluidic biosensors
→ non-destructive testings
→ Lignocellulosic Biorefinery
Open and upgraded facilities at the EU level for the design, development, testing, safety assessment and upscaling:

- New building with **400 m²** of state-of-the-art facilities
- Pharma standard clean rooms (ISO 7)
  - Occupational Exposure Banding (OEB) Level 4
  - Handling of highly potent substances (~ **100 m²**)
  - Negative pressure and decontamination air locks
- One dedicated VEXAT room
- **Certified ISO 9001** Quality Management
- **Certified ISO 14001** Environmental Management

Highly promising applications in industrial productivity, reliability, environmental performance, durability, reduction of life-cycle & energy consumption
Manufacturing of printed sensors & biomedical consumables in flexible and modular set-up.

- technical, personal, and logistic capabilities for
  - Materials & process development and optimization
  - Gradual ramp-up to pilot production
  - Transfer to full scale industrial production

- ISO 7 & ISO 8 cleanroom production facilities.

- EN ISO 13485 certified and FDA registered for development and manufacturing of medical products
Cost effective manufacturing of Microfluidic Systems

Microfluidic biosensors

Smart cell culture substrates

Pilot facility under development – open to become part of proposal
Lignocellulosic Biorefinery Pilot plant
(Institute of Chemical, Environmental and Biochemical Engineering)

- Fully automated 10 L extraction plant
- Fractionation of lignocellulosic biomass into Lignin, Hemicellulose and Cellulose
- Operating conditions up to 250 °C and 30 bar
- Extracting agents: H₂O, organic solvents, alkaline solvents
  ➔ preferred EtOH/ H₂O mixtures
- Preferred raw material: agrarian / woody side products and wastes
- Online and offline process analytics available
→ Especially interested in: **CE-SPIRE-04-2019: Efficient integrated downstream processes**

Process-integrated chemical analytics – mainly by **vibrational spectroscopy** (IR, NIR, laser-based, Terahertz-spectroscopy, ...).

Determination of contents and concentration.

**In-line** process-integrated.

Results in **real-time**.

Check of ingredients - **process optimization** and safety issues.

Check of product - **quality control** and security issues.

Support of **Product development**.

Support of **Process scale-up**.
• Development of **printable formulations and inks** from functional materials

• Development of **processing techniques** for functional materials formulations (Screen or stencil printing process development; Dispensing and materials deposition process development; Drying and curing process development for printed materials)

• **Intermediate fractions for further processing** (chemical, biochemical, pharmaceutical, food products, …)

• **Process optimization according to raw material and preferred products** (Optimization of extraction agents; Optimization of operating conditions (p, T); Single or multistep (pre-extraction at lower p, T); Optimization of separation of fractions)

• **Upscaling** of processes and **transfer to industrial production scale** including extensive in-process control (IPC) for process optimization, QC and traceability

• **Prototyping** and **pilot series manufacturing** of **injection moulded polymer parts**

• Development of specific **Biorefinery concepts** supported by process simulation, CFD and Life cycle assessment (LCA)

• **Systems integration**, Module assembly, etc.

• **Safety aspects** along the entire value chain (including regulatory, standardisation expertise)
Contact details for project idea(s):

**Andreas Falk**  
office@suschem.at  
Tel.: +43 699 15526601

WEB:  
www.suschem.at  
www.bionanonet.at

Acknowledgment – Thanks to the contributors:

- Bettina Mihalyi/Anton Friedl (Technical University Vienna)
- Martin Smolka (JOANNEUM RESEARCH)
- Stefan Köstler (Payer Medical GmbH)
- Thomas Klein/Johannes Khinast (RCPE GmbH)
- Robert Holzer (RECENDT GmbH)