SusChem 2017 Brokerage Event

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Second Generation Bio-based Raw Materials for Polyurethane Material Development
Green country - Latvia

Population: 1.95 milj.
Area: 64,589 km\(^2\)
Forest: 32,426 km\(^2\) – 50.2%
Latvian State Institute of Wood Chemistry

- Founded in 1946
- 116 employees;
- 38 Dr.
- turnover 2016 - 3.2 milj. EUR

Staff:

17 – Senior Researchers
30 – Researchers
22 – Scientific Assistants
32 – Other scientific personal
15 – Service personal
21 – PhD students
Polyurethane (PU) materials are obtained from the reaction of isocyanate and polyol.

Bio-based polyols are most perspective way how to introduce sustainable materials into PU materials. Depending on chemical properties of the raw materials and production technology a PU material can be obtained with versatile properties and application designations ranging from coatings, adhesives, elastomers, flexible foams to rigid foam thermal insulation and structural materials.

Global PU Production by Type

- Rigid PU foam: 28%
- Flexible PU foams: 27%
- Elastomers: 21%
- Coatings: 15%
- Sealants: 1%
- Adhesives: 5%
- Binders: 3%

21 Mt (2015)
~30 Mt (2020)
Cellulose pulping by-product as raw material for polyol synthesis

**SUSCHEM** – Second Generation Bio-based Raw Materials for Polyurethane Material Development

**Tall oil amidation with diethanolamine**

Pros: cheap process (price 1.5-1.8 EUR/kg); no toxic byproducts; primary OH groups

Cons: low $f_n$; long dangling chains in PU matrix; short soft segments

**Tall oil esterification with triethanolamine**

Pros: cheap process (price 1.5-1.8 EUR/kg); no toxic byproducts; primary OH groups

Cons: low $f_n$; long dangling chains in PU matrix; short soft segments
PROJECT IDEA CONCEPT (OR INDICATE THE TOPICS AND CALLS YOU ARE INTERESTED IN)

- Development of polyol synthesis from second generation bio-based feedstock
- New catalysts for greener chemistry (polyol synthesis using immobilized lipase)
- Development of polyurethane foams using low GWP blowing agents
- Development of polyurethane materials
  - Spray applied thermal insulation
  - Panel insulation
  - Thermal insulation for appliances – refrigerators
  - Pipe in pipe insulation
- We are looking for partners working IN / WITH – footwear, sealants, adhesives, flexible foams industries
- We are looking for partners in building and civil engineering industries

Indicate the relevant H2020 call and the deadline for submission

- **CE-SPIRE-04-2019**: Efficient integrated downstream processes
- **LC-EeB-03-2019**: New developments in plus energy houses
- **CE-SC5-06-2018**: New technologies for the enhanced recovery of by-products
- **CE-SC5-07-2018-2019-2020**: Raw materials innovation for the circular economy: sustainable processing, reuse, recycling and recovery schemes
List here the main expected impacts of your project idea

- Reduction of CO₂ emissions by increasing energy efficiency of buildings
- Replacement of petro-chemical feedstock with green carbon
- 21 Mt total polyurethane material production - mostly petro-chemical feedstock
- Use of locally available raw materials (Norther Europe – Tall oil)
- Reduction of VOCs - Regulation (EC) No 842/2006 - GWP gas regulations
  Polyurethane industry is looking for a economically viable replacement for HFC blowing agents
**EXISTING PROJECT CONSORTIUM/ or LOOKING FOR PARTNERS**

<table>
<thead>
<tr>
<th>Partner</th>
<th>Organisation type</th>
<th>Expertise</th>
<th>Country</th>
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| Latvian State Institute of Wood Chemistry | R&D | Polyol synthesis  
Rigid PU foam thermal insulation | LV |
| Cracow University of Technology | HE | Polyol synthesis  
Rigid PU foam thermal insulation  
Flexible PU foams | PL |
| Warsaw University of Technology | HE | PU elastomers  
Material testing | PL |
| SIA Ritols | SME | Spray applied PU foam producer | LV |
| SIA Adamantan | SME | PU material system producer | LV |
| TOSEDA | SME | PU materials for aerospace application | CZ |
| Institute of Macromolecular Chemistry AS CR | R&D | PU material recycling | CZ |
| Polytechnic Institute of Bragança | R&D | PU materials for footwear | PT |
| LOOKING FOR PARTNERS | SME/R&D | Partners who produce possible second generation renewable raw materials for PU material development (Algae oil, biomass, etc.) | |
| LOOKING FOR PARTNERS | Industry | Partners who are interested in upscaling developed PU materials | |
| LOOKING FOR PARTNERS | SME/R&D | Partners who could help with LCA analysis of the developed materials and products | |
Contact details for project idea(s) :

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