SUSCHEM
European Technology Platform
for Sustainable Chemistry

SusChem 2017 Brokerage Event

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Second Generation Bio-based Raw Materials for Polyurethane Material Development

suschem.org

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

Staff:

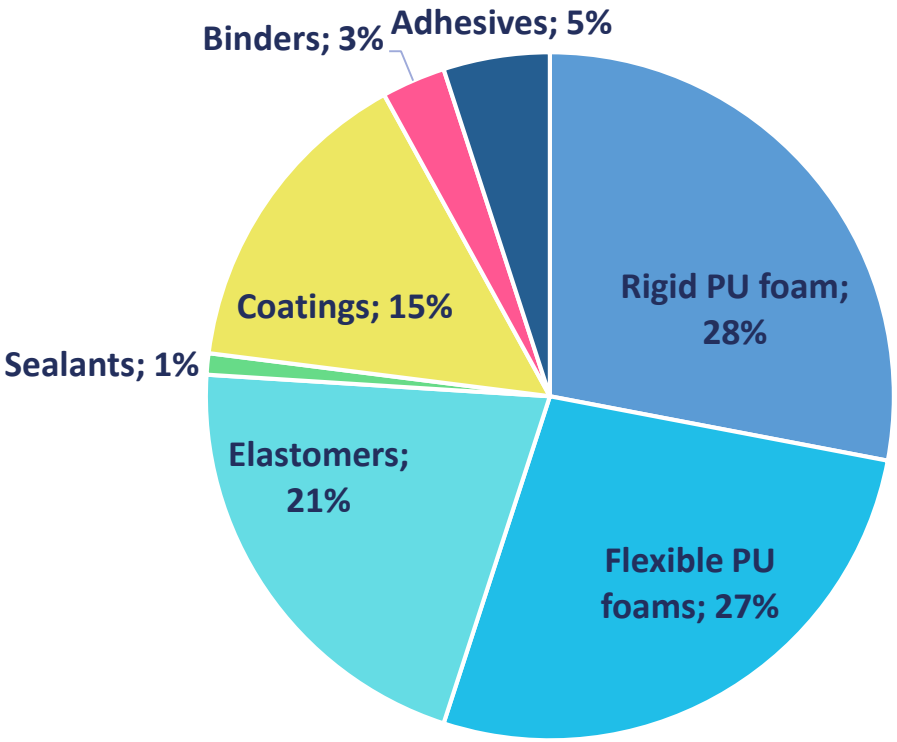
17 – Senior Researchers
30 – Researchers
22 – Scientific Assistants
32 – Other scientific personal
15 – Service personal

21 – PhD students

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

Polyurethane material application

- 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.



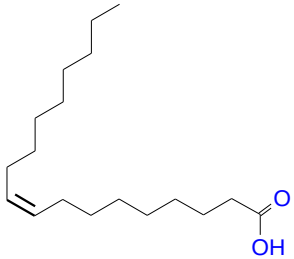
Global PU Production by Type

21 Mt (2015)
~30 Mt (2020)

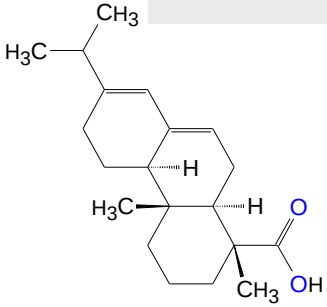
A. Austin, Sustainability in the PU Industry – Past, Present, Future, In conference materials, SusPolyurethnae, Amsterdam, October 2016

Cellulose pulping by-product as raw material for polyol synthesis

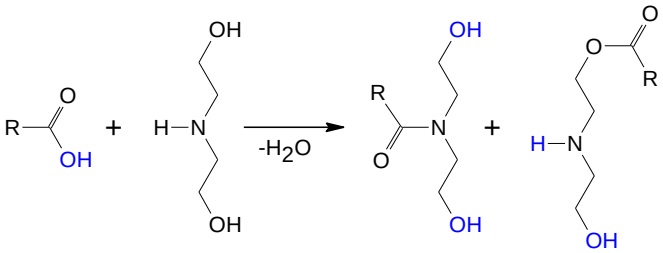
Fatty acids



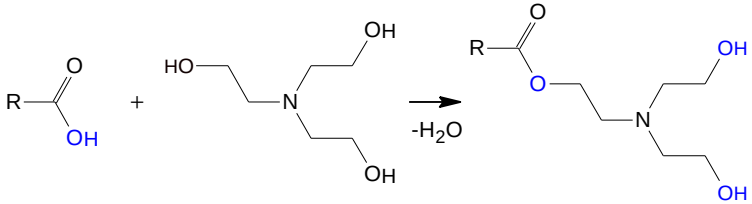
Rosin acids



Tall oil amidation with diethanolamine



Tall oil esterification with triethanolamine



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

POLYLABS

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 loking 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**

EXPECTED IMPACT

List here the main expected impacts of your project idea

- Reduction of CO_2 emissions by increasing energy efficiency of buildings
- Replacement of petro-chemical feedstock with green carbon
- 21 Mt total polyurethane material production - mostly perto-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

Partner	Organisation type	Expertise	Country
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	

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Contact details for project idea(s) :

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