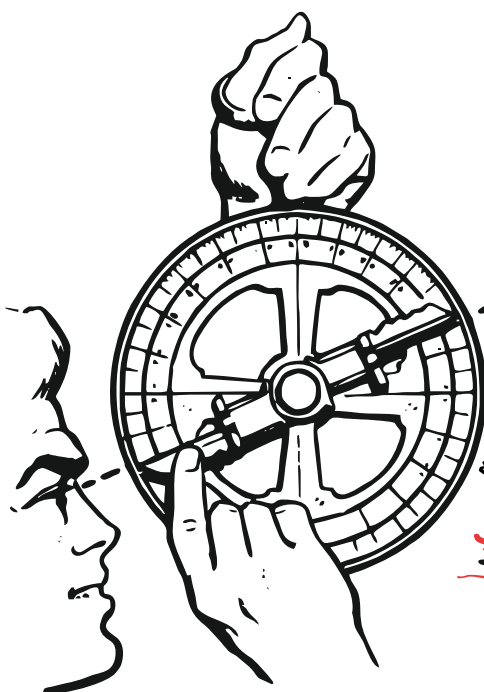




**Łukasiewicz**  
Institute of Heavy  
Organic Synthesis  
BLACHOWNIA



**HORIZON**  
**europe**

TOPIC ID:  
**HORIZON-JU-CBE-2025-IA-05**

**SSbD bio-based polymers/copolymers unlocking new market applications**

**Fully-biobased non-isocyanate polyurethanes (NIPU)**

Type of project: IA

Call opening date: 4 April 2025

Call deadline: 17 September 2025

## ABOUT US

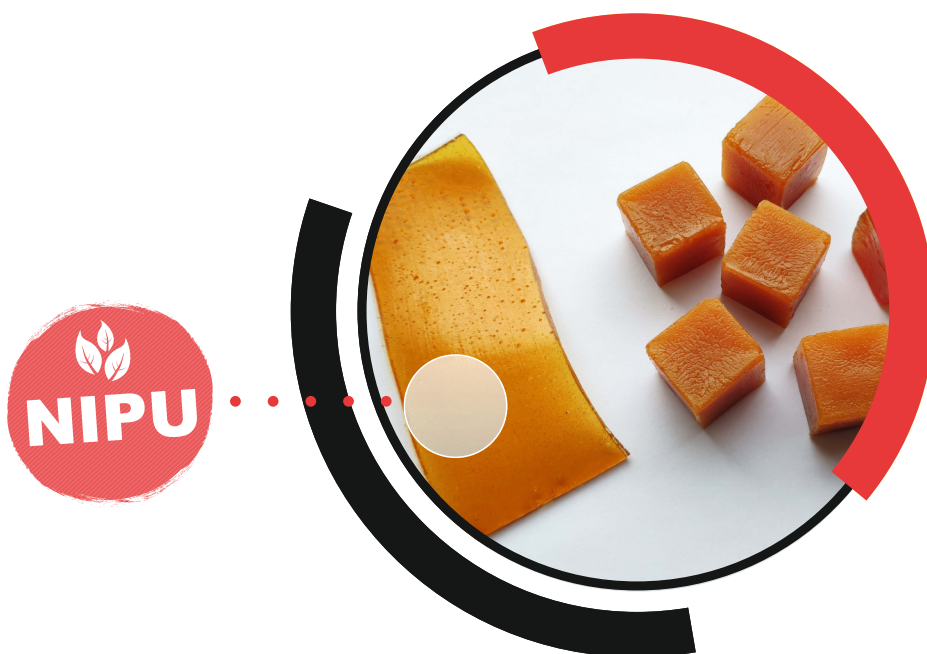
Advanced Materials Research Group of Łukasiewicz Research Network – The Institute of Heavy Organic Synthesis "Blachownia" specializes in developing of:

- technologies for producing and modification of bio- and fossil-based basic epoxy resins, epoxy vitrimers and glycidyl ethers,
- technologies for producing and modifying formaldehyde-free lignin resins,
- developing technologies for manufacturing polyurethanes (isocyanate and non-isocyanate),
- new types of fiber-reinforced, multi-material and high-filled biocomposites (prepregs, SMC, BMC)
- modification and processing of materials based on thermoplastic biopolymers,
- bio-based materials (alginates, starch, cellulose, chitosan, etc.) for coating applications, including PFAS-free, antibacterial and water/oil resistant coatings,
- plastic materials recycling.


## OUR IDEA


Approximately 90% of the global production of polyurethanes is based on two isocyanate compounds: methylenediphenyl-4,4'-diisocyanate (MDI) and 2,4-diisocyanatotoluene (TDI). Due to their high reactivity, MDI and TDI exhibit strong irritant and toxic effects, both during application and synthesis, which involves highly toxic phosgene as a raw material. For these reasons, in the near future, the use of isocyanates will become more difficult due to legal and health-related concerns.

ICSO developments address green chemistry based, sustainable-by-design production of polymeric materials, proposing bio- and waste-based, isocyanate-free alternatives to traditional polyurethanes. Polyhydroxyurethane polymers, also known as non-isocyanate polyurethanes (NIPU, PHU) are obtained by reacting cyclic carbonates with polyamines containing primary amino groups. This offers a sustainable pathway to replace isocyanate and polyol-based polyurethanes in some applications, like foams, adhesives and coatings.



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