

Double-dynamic polymers

➤ New generation of prepolymer block with double-dynamic comprising a combination of two orthogonal reversible sets of bonds (reversible covalent and supramolecular)



KEYWORDS

- Double-dynamic chemical bonds
- Thermosets
- Self-healing
- Reversible adhesion
- Recyclability

PATENTS

- EP18306356.9 filed on Oct 16th, 2018

INVENTORS

- Nicolas Guiseppone et al. Institut Charles Sadron (UPR22-CNRS)

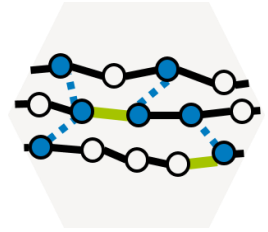
TECHNO-STATUS

Under Development
22-months ongoing
Conectus investment for proof of concept

Project start date:
November 2018

TECHNOLOGY

- **Double-dynamic polyurethane elastomers**
- Combining different chemistries of different time scales to adapt to the whole range of the polymer reorganization dynamics
- Implementing **simultaneously two kinds of dynamic chemical bonds** (i.e. supramolecular and reversible covalent bonds with controlled relaxation times) within a series of well-defined polyurethane backbones



APPLICATIONS

- Coating
- Adhesion
- Composites
- Additives
- Raw materials



INNOVATION ADVANTAGES

- Improves **mechanical performances** and **recyclability**
 - Adds thermoplastic properties to thermoset polymers
 - Adds better recyclability to thermoset composite
 - Enhanced self-healing and reversible adhesion properties
- The recycled material has similar properties as the initial
- No side reactions during the healing process

DEVELOPMENT STATUS

- Actual TRL level: 3 (proof-of-principle)
- Targeted TRL level: 6 (demonstrator: scale up kg)