

Internship Position – University of Bordeaux Chemistry and Physical Chemistry of Polymers

Industrial collaboration

Laboratoire de Chimie des Polymères Organiques (LCPO), ARKEMA

New Debondable PU Adhesives

This 6-month internship is part of a collaboration between the [LCPO](#) and the company [ARKEMA](#). It will take place at LCPO facilities, in Bordeaux, under the joint supervision of both partners.

ARKEMA

ARKEMA is a leading company in the field of bio-economy and ecological transition. Its ambition is to become a global leader in specialty materials while placing sustainable development at the heart of its strategy and innovation. A particular focus is placed on circular economy principles, bio-based materials, lightweighting, and more sustainable industrial processes. As a responsible industrial actor, ARKEMA has set itself ambitious climate goals: to reduce greenhouse gas (GHG) emissions by 50% by 2025 (relative to 2012 levels) and to achieve carbon neutrality by 2050. To reduce its environmental footprint, ARKEMA relies on several approaches, such as the use of decarbonized energy, the development of less energy-intensive processes using biotechnologies, and above all, the use of low-impact raw materials, including those derived from polymer recycling, CO₂ capture and utilization, and bio-based synthons from biomass.

Scientific and Industrial Context

Polyurethanes (PUs) and silyl-modified polymers (SMPs) are versatile materials containing both organic and inorganic functional groups, enabling the formation of highly reactive polymer networks. These polymers serve as key components in adhesives, sealants, and coatings, and are widely employed across DIY, construction, and industrial applications for both indoor and outdoor use. The performance properties of PU and SPUR adhesives can be finely tuned through the careful selection of monomers and formulation strategies. However, in most cases, the resulting bonded interfaces are permanent, posing significant challenges for separation and recycling. Developing sustainable end-of-life strategies for these materials remains a critical technical and economic challenge in sectors such as automotive, energy storage, and flexible packaging.

Project Description

The objective of this project is to develop debondable adhesives based on hydrolysable weak points introduced into the SPUR or PU polymer chains. We aim to demonstrate that our formulations respond to external stimuli, such as temperature, light/UV, electricity, microwaves, ultrasound, magnetic fields, solvents, or the pH of aqueous solutions, which can weaken the adhesive layer or interface. We will also show that our modified adhesives maintain their properties under normal service conditions and only undergo controlled weakening when triggered intentionally. Initially, the intern will conduct a literature review to identify already published and patented solutions. Subsequently, the most promising approaches will lead to the synthesis of PU and SMP polymers, which will be characterized both in terms of performance properties and their ability to be weakened under specific stimuli.

Candidate Profile

The candidate, enrolled in the second year of a Master's program or the final year of an engineering school in chemistry or polymer chemistry, should possess a solid foundation in organic and polymer chemistry. Proficiency in characterization techniques is also required. The candidate must demonstrate a strong motivation for research and exhibit excellent laboratory skills.

Candidature

Interested candidates are invited to submit a CV and a short motivation letter to the following contacts: Thomas Vidil (thomas.vidil@enscbp.fr), Henri Cramail (henri.cramail@enscbp.fr)