

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

Industrial collaboration

Laboratoire de Chimie des Polymères Organiques (LCPO), ARKEMA

New Bio-Based Water-Soluble Polyesters

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

This internship fits within a broader innovation strategy focused on the development of eco-designed polymer materials. The project has two main objectives: (i) First, to replace solvent-based polyesters with water-soluble alternatives for food packaging applications, thereby reducing volatile organic compound (VOC) emissions and the carbon footprint of industrial processes. (ii) Second, to address the environmental persistence of plastics by introducing labile bonds into the polymer backbone, enabling controlled degradation into recyclable or bio-assimilable oligomers.

These materials hold strong potential for use in applications such as automatic dishwasher detergents, flexible packaging, and water treatment, sectors where the risk of environmental release is higher.

Project Description

In the first phase, the intern will carry out a literature review to identify existing solutions for rendering polycondensates, particularly polyesters, water-soluble or water-dispersible. The goal will be to identify strategies such as copolymerization with diols and diacids bearing hydrophilic or ionic functional groups. This analysis will help rank the approaches based on their industrial feasibility. In the second phase, the intern will synthesize modified bio-based polyesters according to a set of specifications provided by ARKEMA. Aqueous solutions or dispersions will then be prepared and characterized using standard analytical techniques. Finally, application testing will be performed at ARKEMA's facilities.

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), Frédéric Peruch (peruch@enscbp.fr), Henri Cramail (henri.cramail@enscbp.fr)