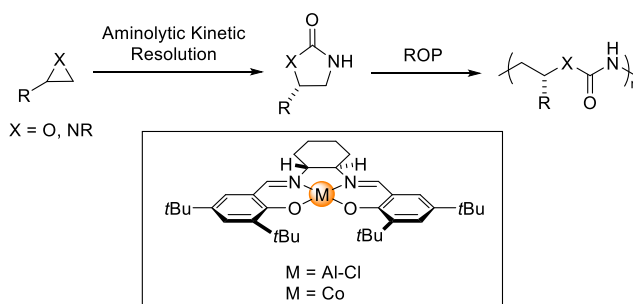


RESEARCH TOPIC FOR THE PARISTECH/CSC PHD PROGRAM

Field: Chemistry, Physical Chemistry and Chemical Engineering**Subfield:** Chemistry and Materials Science**Title:** Synthesis of Biobased Polyurethanes from Renewable Resources: A New Tandem Approach to Polypeptide Analogues**ParisTech School:** Chimie ParisTech | PSL**Advisor(s) Name:** Prof. Christophe Thomas**Advisor(s) Email:** christophe.thomas@chimieparistech.psl.eu**Research group/Lab:** Organometallic Chemistry and Polymerization Catalysis**Lab location:** 11 rue Pierre et Marie, 75005 Paris**(Lab/Advisor website):** <http://www.ircp.cnrs.fr/la-recherche/equipe-cocp/>**Short description of possible research topics for a PhD:**

Tandem catalysis is one of the strategies used by Nature for building macromolecules.¹ However, these biological processes rely on highly complex biocatalysts thus limiting their industrial applications. In the same biomimetic spirit, we want to initiate a research effort to synthesize **biodegradable** polymers² via tandem **catalytic transformations**, where



“activated” monomers are synthesized from raw materials (in one or more steps) and subsequently (co)polymerized. The objectives for this are clear: not only can a reduction in workload, waste and energy consumption be achieved, but also the synthesis of complex products that are otherwise difficult to obtain (*e.g.*, because of thermodynamic hurdles) comes within reach. In other words, the combination of chemistries may allow the direct synthesis of macromolecules with high structural complexity. Therefore, we want to direct investigative efforts toward the synthesis of new **renewable monomers** and the subsequent catalytic conversion of these monomers into their corresponding polymers.³ The general idea is to use a tandem procedure of combining synthesis of new biomass derived monomers with subsequent polymerization by well-defined metal-based catalysts, aiming at novel polymeric materials.

Required background of the student: Polymer Chemistry, Catalysis**A list of 5 (max.) representative publications of the group:**

1. *Nature Comm.*, **2011**, 2, 586.
2. *J. Am. Chem. Soc.* **2017**, 139, 6217.
3. *Angew. Chem. Int. Ed.* **2019**, 58, 12585.