## Abstract

The environmental and economic problems related to the petrochemical-derived polymers have driven the academic research toward the development of green and degradable alternatives to conventional plastics. The aliphatic polyesters can be considered a sustainable alternative to conventional polymer of petrochemical origin. The ring opening polymerization (*ROP*) of cyclic esters catalyzed by metal complexes allows obtaining aliphatic polyesters with controlled molecular masses using mild reaction conditions and avoids the formation of small molecule byproducts.[1] In my PhD project I focused on developing new catalytic systems for the *ROP* of cyclic esters based on group *IV* or *Al* metal complexes. The chosen metals are nontoxic, biocompatible and non-expensive, characteristics much sought after in the academic, industrial and medical fields.[2]

In particular in this project I developed new catalysts in which the metal is supported by linear bidentate, tetradentate and tridentate ligands that exhibit amide functions coupled with thioether groups (*NS*, *NSSN* and *NSO*). I have focused my attention on this type of ligands because amide donor ligands have been proven to be well-suite ligands for early transition metals. It is worth to note that the efficiency of group *IV* and *Al* complexes with amide ligands in the *ROP* of cyclic esters was barely explored.[3]

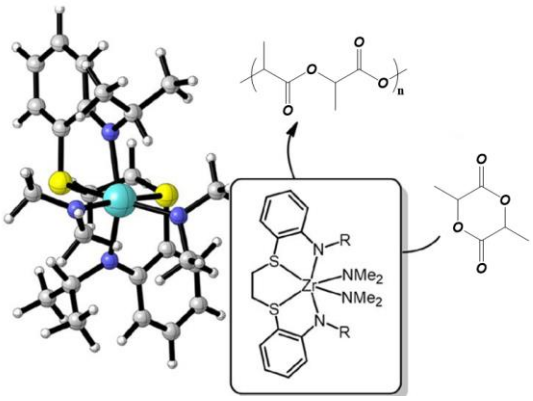


***Figure 1: complex example of this project***

Synthetized ligands and complexes were characterized by Mass and NMR spectroscopy, and when possible, by X-ray diffraction analysis. The catalytic performances of the complexes in the *ROP* of cyclic esters, such as L-Lactide, were extensively investigated and all, both those of group *IV* and *Al*, have been shown to be active in the polymerization. The obtained polyesters were characterized by NMR spectroscopy, gel permeation chromatography (GPC) and differential scanning calorimetry (DSC).


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