Group	:	Dynamic Polymers
Project	:	**Dynamic Branching for Circularity (DYNABRANCH)**
Supervisors	:	Natalia Bornosuz and Maarten M. J. Smulders

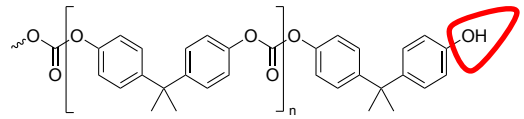
Introduction

This project is devoted to dynamic covalent chemistry. Dynamic covalent chemistry consists of covalent bonds that can exchange when exposed to certain stimuli. This dynamic equilibrium can be controlled with different bond-specific stimuli, such as heat or light. By using reversible dynamic covalent bonds in polymer networks, the resulting material can have interesting properties, such as improved recyclability, self-healing behaviour, etc.

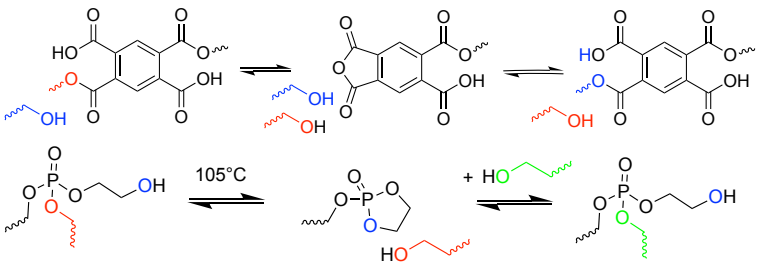
The aim of the project is to develop dynamic covalent polymers based on polycarbonate (PC), by integrating a dynamic covalent bond within the polymer structure. The aim of this is to enhance the performance properties of PC after recycling. Two types of dynamic transesterification chemistries are studied for this purpose: pyromellitic dianhydride chemistry and phosphate triester chemistry.

The objects of the project:

Polycarbonates with terminal hydroxyl groups



Transesterification chemistry



Research topics

There are several possible research topics within this project, such as:

- Synthesis and characterisation of polycarbonate modified with dynamic covalent motifs based on transesterification mechanism;
- Characterisation of dynamic behaviour of polycarbonate dynamic networks including recyclability;
- Study of compatibility of developed dynamic covalent chemistries with commercial polycarbonates.

Techniques to be used

In this project a number of different techniques are used to produce and study materials.
Examples of these techniques are:

- Organic synthesis
- Polymer synthesis
- Polymer processing (e.g., hot pressing)
- NMR, FTIR
- GPC
- DMA, rheology.

More information

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