The Chemistry and Processes of Polymerisation group is one of the two teams that form the Chemistry, Catalysis, Polymers and Processes laboratory (C2P2 UMR 5265). The CPP provides a unique blend of chemistry and reaction engineering to propose new synthetic pathways, products and to enhance the understanding of how polymers are made.

**SCIENTIFIC APPROACH**

The economic and social importance of polymers is tremendous. In many ways polymers are quite possibly the ultimate modern material, being used in every type of product imaginable: from electronic components to paint; from the human body to children’s toys. In order to make these materials, it is absolutely necessary to choose and understand the chemistry used to synthesise them, as well as to master and control the processes in which the chemistry is implemented.

The focus of the LCPP is to associate both polymerisation chemistry and polymer process engineering, and to use our expertise in both fields to:

- Develop innovative means of controlling properties at a molecular level through the use of new chemistries and new processes.
- Strive to ensure that what we learn how to do with chemistry is not lost in the process.
- To provide our industrial partners with tools and process that they will need in the near to long term.

**OUR RESEARCH**

The CPP is organised around three main poles:

- Polymerisation Chemistries
- Complex Colloids
- Processes of Polymerisation

Most of the activities in the CPP group deal with polymerisation in dispersed media - in other words the creation, manipulation and understanding of how polymer particles are formed in continuous phases.

The multifaceted nature of the research done in our group means that we have developed a strong sense of internal and external collaborations over a wide range of fields.
Polymerisation Chemistries
Our research in the field includes the study of:
• Olefins Polymerisation catalysis;
• Polycondensation;
• [Controlled] free radical polymerisation;
• Creation of macromolecular architectures.

Complex Colloids
Strategy for the elaboration of organic/inorganic colloids in-situ.

The study of the creation and use of colloidal particles plays a major role in the CPP. Here, activities include:
• Polymerisations in dispersed systems
• Hybrid colloids
• Self-assembly
• Living polymerisation techniques in dispersed media.

Processes of Polymerisation
Here we use chemical engineering tools to understand and quantify:
• Particle nucleation and stabilisation of emulsions
• Commercialisable means of making miniemulsions
• Heat and mass transfer in olefin polymerisations
• Development of sensors and reactors for the study of polymerisations.

SOME OF OUR PARTNERS
BASF, Arkema, Solvay, Sherwin Williams, Saint Gobain, CEA, DPI, Total, Michelin, INEOS, Lafarge, Kaplan Energies, ...
The LCPP team is also part of the Labex iMUST

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Figures
Left: High pressure reactor for olefin polymerisation
Right: Emulsion Polymerisation reaction

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