C2P2
CHEMISTRY, CATALYSIS, POLYMERS & PROCESSES

| GROUP

C2P2 - CHEMISTRY AND PROCESSES OF POLYMERISATION (CPP) GROUP

UMR 5265, CPE LYON - CNRS - UNIVERSITÉ CLAUDE BERNARD LYON 1

Group Coordinator

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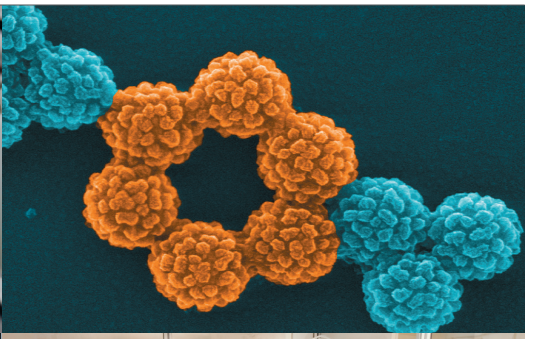
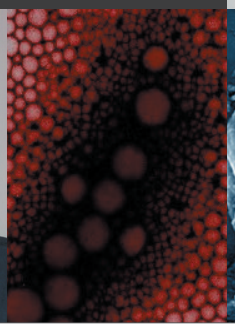
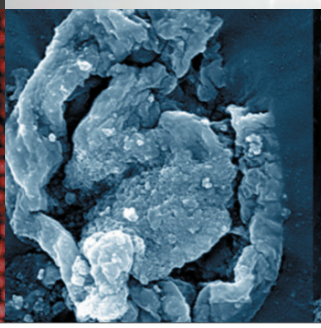
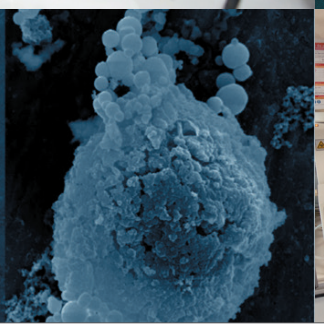
CNRS Research Director









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.

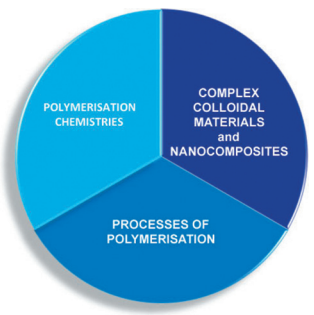
The focus of the LCPP is to associate both polymerisation chemistry and polymer process engineering, and to use our expertise in both fields to:

- 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.

| Figures

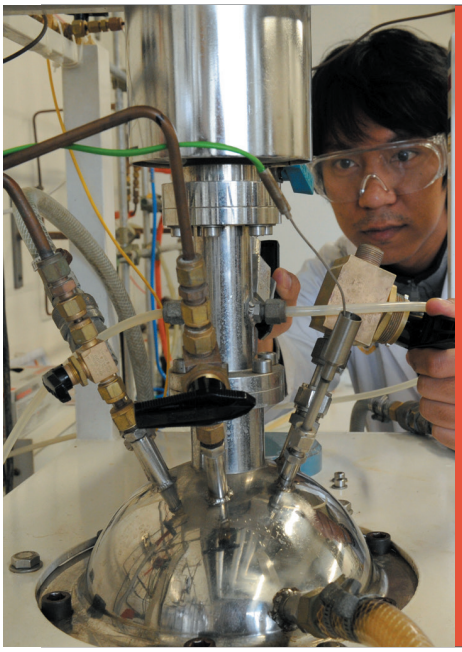
Left: Bimodal latex for high solid content applications

Centre, top: Chemistry bench

Centre, bottom: Polyethyelene particles after 300 ms of reaction

Right, top: Nanostructured latex particles

Right, bottom: High temperature GPC



| EQUIPMENT

Some of our relevant equipment includes:

› High vacuum systems for solid catalyst preparation
› Gas phase and slurry phase reactors
› High pressure equipment
› Pressurised parallel reactors
› High Temperature SEC
› TREF-CRYSTAF
› Triple-detection SEC (THF, DMF)
› DSC, TGA
› FTIR and UV-vis Spectroscopy
› Access to liquid and solid state NMR
› QELS and laser diffraction particle size analysers
› Access to TEM and SEM

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 miniemulsionstions
- 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

STAFF

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Figures

Left: High pressure reactor for olefin polymerisation

Right: Emulsion Polymerisation reaction

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