

The Laboratory's main research activities fall into the following general areas:

- Simulation, design, parameter and state estimation, optimization and control of polymerization processes (knowledge-based production).
- Novel, cost-effective, environmentally-friendly scCO₂-based polymerization processes for the synthesis of high-purity, high molar mass and high-performance polymers.
- Structure-property relationships of advanced functional polymeric materials and 'niche' applications of functional materials.
- Functional nanostructures (e.g., self-assembly systems, liposomes, nanogels, molecularly imprinted polymers) for novel nanotechnology applications (e.g., targeted delivery systems, gene therapy, selective recognition, separation, composite electrocoatings, etc.).
- Molecularly imprinted polymeric nanoparticles (MIPs) for selective recognition and separation of biological materials (e.g., aminoacids, peptides).
- Novel hybrid polymeric/inorganic nanoparticles for composite electrocoatings.
- Novel functionalized enzyme-containing vesicles for food and drug applications.
- Sustainable biosynthetic / biocatalytic processes for the production of advanced functional polymeric materials.