



Haute école d'ingénierie et d'architecture Fribourg
Hochschule für Technik und Architektur Freiburg



INSTITUTE OF CHEMICAL TECHNOLOGY

ChemTech

Applied Chemistry for Industrial Purposes

ChemTech

Institute of Chemical Technology

Hes·SO

Institute of Chemical Technology (ChemTech)

The research activities at ChemTech cover the fields of fine chemistry and pharmaceutical products, monomers and polymers, nano-materials, sustainable energy vectors, process automation, control and optimization, as well as physical and chemical characterization. Technological innovation in the development of chemical processes and characterization methods, coupled with applied research focused on a sustainable balance between economic, ecological and social factors, make ChemTech a key partner in the chemical and chemistry-dependent industries.

ChemTech benefits from its close collaboration with the other institutes based at the University of Applied Sciences and Arts Western Switzerland, the University of Fribourg and the Swiss Federal Institutes of Technology. The researchers at ChemTech specialize in technology transfer from fundamental research-based molecular innovations to implementation of optimized industrial processes. Our collective applied-research activities bring solutions to the chemical industry as a whole.



Core competences

The primary innovation theme investigated at ChemTech is the intensification of chemical processes. Employing advanced skills in chemistry and molecular characterization, process development and scale-up, as well as chemical engineering, automation and control, the researchers at ChemTech focus on creating safer, environmentally cleaner and energy-saving processes. The techniques necessary to achieve these goals exist, but they are often too complex and costly to be implemented industrially. ChemTech strives to render them more robust and universally adaptable, with the aim of making this technology more readily accessible and applicable to the industry.





Research Focus Areas

- **Chemical Process Development** : elaboration of new synthesis paths, creation of products with innovative functionalities, process scale-up and thermal safety assessment, chemical production, chemical engineering, process automation, control and optimization, nanomaterials, energy storage, recycling and waste revalorization.
- **Flow Chemistry** : conversion of batch or fed-batch processes into continuous processing, development of micro-reactors, reduction of the thermal risk of processes, screening and optimization of reaction conditions.
- **Characterization Technology** : development of new methods of chemical and physical characterization, in particular surface chemical imaging, spectroscopic and thermal investigations, environmental analysis, instrument development and the creation of on-line monitoring strategies for chemical processes.



Key Equipment

- **Chemical labs and pilot plant** with reactors ranging from 0.5 to 630 liters (ATEX zone) with special equipment such as distillation columns of up to 40 theoretical plates; short-path distillation apparatus, centrifugal contactor separator, high temperature tube furnace for thermal processes under controlled atmosphere
- **Fully-automated bench-scale bioreactor** for Process Analytical Technology (PAT) studies with NIR and Raman online sensors
- **Micro-reactors for flow chemistry** and reaction screening, such as Ehrfeld-type and in-house built
- **Analytical laboratories** with advanced chromatography instruments (UPLC, GC, LC-MS and GPC...) and trace metal analysis ICP -OES, MP (Microwave Plasma-Atomic Emission spectrometer).
- **Characterization laboratory** with confocal Raman spectrometer and Scanning Electron Microscope (SEM-EDX) for surface characterization and micro-scale chemical imaging, Time-Correlated Single Photon Counting fluorimeter (TCSPC) for ultrafast kinetics
- **Differential scanning calorimeters (DSC), and high-temperature TGA coupled to a mass spectrometer** (TGA-MS, up to 1600°C) for thermal analysis and reaction calorimeters (RC1 and EasyMax) for process safety evaluations



Research Team

The ChemTech team, comprising **12 professors** and **15 scientific staff**, will ensure that optimum solutions are found for your company.



Contact and information

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