



Technip Energies Lyon
Research Center

Founded in 2002, Processium designs and develops advanced processes to help achieve net zero and improve manufacturing competitiveness in sustainable chemicals.

Breakthrough Innovations

In 2023, Technip Energies acquired Processium, a leader in process development. With advanced laboratory and piloting facilities, Processium specializes in the development and optimization of chemical processes, industrial biotechnology and biobased industry applications.

Innovation is central to Processium's development strategy. Collaborating with Technip Energies' operating centers, labs and clients, the company invests in breakthrough research and technologies to:

- ▶ Expand its expertise
- ▶ Develop new digital tools
- ▶ Implement cutting-edge laboratory and pilot-scale devices

Additionally, Processium is actively involved in critical environmental and technological projects, often working with universities and industrial partners.

Our Markets

Processium offers specialized services for the development of novel processes. We support our clients in all sectors where an industrial process is critical.



NEW CHEMISTRY

Processium's services help create more competitive chemical products with less environmental impact by using new catalytic routes, intensified technologies and new molecules.



CIRCULAR ECONOMY

We focus on the development of cutting-edge technological solutions for the chemical recycling of plastics, as well as new hydrometallurgical processes for the recovery of rare metals.



BIOBASED PRODUCTS

For biobased products, we use extraction and catalytic processes to transform lignocellulosic biomass. We also use enzymatic and sugar fermentation processes to find alternatives to current production routes or to make new products.



DECARBONIZATION

We develop innovative carbon capture and utilization processes to transform carbon into a wide range of valuable chemicals, helping to decarbonize our environment.

Our Specialized Services

PROCESS ASSESSMENT

Goal: Selecting the best process solution

We perform evaluation of process alternatives using digital tools, including Techno-Economic Assessment (TEA) and Life Cycle Analysis (LCA).

Criteria	Process 1	Process 2	Process 3
CAPEX	Red	Green	Green
OPEX	Green	Yellow	Red
Complexity	Yellow	Green	Green
Robustness	Green	Green	Red
Purity	Yellow	Green	Red

DATA ACQUISITION & MODELING

Goal: Measuring key data for robust process design

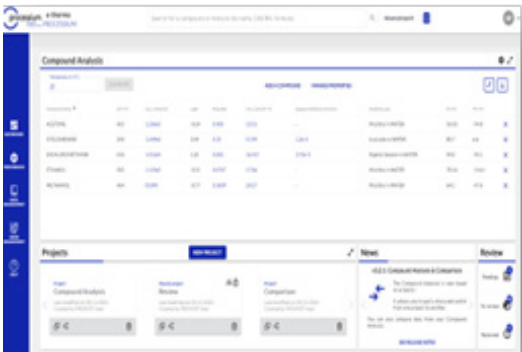
When critical data is missing, we gather it ourselves, including physical properties, thermodynamic and kinetic data. Our experts develop the best models for process applications.



DATA MANAGEMENT WITH E-THERMO™

Goal: Securing property data

Our clients can securely store their physical and chemical property data in e-thermo™, a digital platform developed by Processium for private databank management. This web-based software allows users to store, visualize and compare data with easy export to Excel or Aspen Plus.



PROCESS DESIGN

Goal: Generating reliable sizing and costing

Once fundamental data is gathered, data modeling is implemented using simulation software to create a reliable representation of future industrial processes, optimized per client specifications.



EXPERIMENTAL VALIDATION

Goal: Validating design using lab/pilot equipment

To validate technologies, we conduct feasibility tests and proof of concept (PoC) in our lab and pilot hall. We downscale the process and compare the calculated results with experimental data to ensure accurate interpretation of the process design. This experimental phase also enables the production of representative samples.



SUPPORT FOR INDUSTRIALIZATION

We facilitate the transition from lab-scale to industrial implementation by:

- ▶ Designing and constructing pilot plants
- ▶ Transferring process technology to engineering companies or CMOs
- ▶ Assisting in process startup
- ▶ Improving existing industrial processes



Our Equipment

At Processium, we continually invest in improving our equipment and acquiring new devices based on individual client needs. We recently opened a fermentation lab to aid the development of new technologies for converting renewable resources into valuable products. Fermentation bacteria can convert renewable feedstocks such as sugar, glycerol or CO₂ into molecules currently produced from fossil sources or new molecules used for innovative applications. Before moving to large-scale production, it is essential to test and optimize the fermentation step in a laboratory.



KEY EQUIPMENT WE OWN OR CAN ACCESS THROUGH AFFILIATIONS:

Physical Properties	Reactions	Separation & Purification	Analysis
Static cells for measuring vapor-liquid equilibrium	Batch reactors	Batch centrifuge	HPLC (Uv-Vis, RI, ELS)
Ebulliometer	Continuous reactors (CSTR, fixed-bed, static mixers)	Vacuum and pressure dead-end filtration	GC (MS, FID, TCD)
Dilutor	Microwave reactor 2,45 GHz	Membrane filtration (organic et ceramic) - microfiltration, ultrafiltration	US-Vis spectrophotometry
Cells for measuring phase equilibrium	Micro reactors, meso reactors, tubular reactors	Crystallizers	Ion chromatography
Differential scanning calorimetry (DSC)	Corning low flow	Vacuum dryer	Laser granulometry (Malvern Mastersizer 3000)
Isothermal calorimeter (Calvet C80)	COBR	Vacuum oven	NMR
Viscometer	Robinson-Mahoney	Microwave extractor	ICP
Densimeter	Kobelco	Adsorption columns	Scanning electron microscope (SEM)
Autoclave	Ehrfeld	- Continuous liquid-liquid extraction column - Wiped film evaporator - Short path evaporator - Batch distillation columns – vacuum, pressure, cryogenic, heteroazeotropic	



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