

Everything starts with **chemistry**
We make it more **innovative**



Annual Report **2022**



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Editorial

The projects funded by the European Development Fund (ERDF) program 2014-2020 "Transition" , "Interreg V" and the European Commission Horizon 2020 have been closed out. The projects filed in the new program 2021-2027 "Transition" and "Interreg VI" are still under evaluation by the authorities. They are covering Certech strategic axes for the five years to come as a chemical excellence center: (bio)-chemical process intensification and digitalisation, chemical and mechanical recycling, circular materials, medical applications. They are in line with 4 of the 5 strategic innovation areas of Wallonia (DIS): circular materials, innovation for an improved health, innovations for agile and safer design and manufacturing, sustainable energy systems and housing . This is a unique opportunity to strengthen and develop our expertise to execute our mission of supporting the economic development of the industries from the Region.

Despite a decrease in the public subsidies due to the closing of the 2014-2020 ERDF program, the net results was positive thanks to a 4% growth of the industrial R&D contracts income and a strict cost control process.

In 2022, 204 companies received support in their innovation process, 40 (20%) of which were new prospects. A total of 465 R&D contracts were handled.

I would like to thank all the coworkers for this great achievement, for the support, their commitment and their resilience throughout this year.

Thierry Randoux
General Manager

1. PRESENTATION OF CERTECH ACTIVITIES

Certech is a research and development partner and supplier of analytical and technological services for companies involved with activities related to chemistry: environment and energy; pharmaceutical, medical and health care; polymers; environment and energy; automobile and transport; packaging; construction. Our mission is to provide sustainable innovative solutions to improve or develop products and processes to meet industrial and societal needs.

The research & development strategy is based on the synergies of three main themes, namely: polymer materials technology, chemistry & industrial processes, environment supported by an analytical & technological services platform.



ENVIRONMENT

Our industry partners benefit from more than 40 years' experience, in the field of gas emission, process optimization and improved materials with reduced environmental impact. Research and Development activities include air quality, health and safety, energy, and circular economy.

Certech is approved for the atmospheric pollution control (odour, volatile organic compounds) by regional authorities and is an active member of 11 standardisation committees (AFNOR, EN or ISO).



Air Quality, Health & Safety

Atmospheric pollution and ambient air

In the field of outdoor environment, sampling, on-line measurements, and analysis (odour and gaseous effluents) are offered. Environmental impact is evaluated via simulations of atmospheric dispersion and neighbourhood direct assessment. Remediation pilot equipment based on catalysis or scrubbing is also available. A mobile laboratory is dedicated to carry out environmental diagnostics. It is equipped with several sampling equipment and measuring devices for the analysis of atmospheric emissions and ambient air.

Occupational hygiene

Key expertise in workplace air assessment includes sampling and analysis of dusts, aerosols, microbiological and chemical components, noise, measurement of nanoparticles and biological agents, determination of organic vapours, evaluation of personal protective equipment (PPE), probability assessment of workstation exposure and characterization of ATEX (ATmosphere EXplosive) atmosphere.

Energy and circular economy

The European Green Deal and the accelerating use of renewable energy sources driven by the need to mitigate the effects of climate change has significantly increased market need in the field of energy saving, renewable energy production, storage, distribution, and end-use.

Driven by the concepts of sustainability, expertise in chemistry for renewable energy applications has been built up by working on efficient and green materials, energy production and storage, chemical storage, sustainable and innovative process.

CHEMISTRY AND INDUSTRIAL PROCESSES

In the current era of globalization and capital mobility, European chemical industry has to accelerate its pace of innovation to remain in a leading position. Capitalizing on its core expertise in chemistry, process intensification and continuous flow chemistry, Certech aims to develop factory of the future and smart chemistry platforms adapted to the main industrial chemical sectors: Specialty Chemicals and Life Sciences



Factory of the Future - Intensified/continuous processes

Process Intensification is based on the use of small volume reactors, continuous processes, high temperatures and pressures, better heat, and mass transfer. It leads to improved quality products, increasing yields, reduction of investment costs, lower energy consumption and reduced environmental and safety risks. It is a multidisciplinary approach to improve process technology and the underlying chemistry at the same time.

Micro/Mesofluidic reactors

Multipurpose flow reactors enabling continuous chemical processes are available. Main features of this type of equipment is the outstanding mixing and heat exchange, low internal volume with high residence time allowing the use of low quantities of reactants with an output of 5 kg a day.

Pilot reactors are also available to perform synthesis under strictly controlled experimental conditions in gas, liquid phase but also slurries. Different applications are covered including fine chemicals, green chemistry, polymer chemistry and medicinal chemistry.

Chemical recycling (Plastic to Liquid, Plastic-to-Gas)

Chemical recycling is a process which either breaks down or selectively dissolve plastic waste into their chemical constituents and converts them into useful products like basic chemicals, new polymers/oligomers, or specialty chemicals. Specific skills and equipment able to reach high pressures and temperatures are used in the field of recycling and valorisation of plastic waste materials in a continuous way.

Certech also has a strong expertise in the field of catalytic pyrolysis for waste to hydrocarbons transformation, with potential valorisation for the synthesis of new polymers.

POLYMER MATERIALS TECHNOLOGY

Expertise in polymer and composite materials ranges from analysis and development (formulation, blending...) to transformation and processing, thereby offering a broad and diversified technical and scientific support to partners and customers looking for a global expertise in the field of material science.

To address environmental concerns which have become a major topic for industry these last years, a strong expertise has been acquired in materials and processes with reduced environmental impact, ranging from biobased materials to the mechanical and chemical recycling processes for plastics and composites. This expertise also includes the development of lightweight materials as well as odour and emissions from materials



Odours and emissions from materials and indoor air quality

R&D projects, testing and consulting in the field of materials interaction with the environment are offered. New requirements from end-users (low odour and emission products, non-intentionally added substances NIAS), new directives and regulations (for example new car manufacturers standards, migration concerns, health and environmental regulations) have a clear influence on product market acceptance and have generated a need for reliable laboratory testing conditions. By combining skills in air sampling and analysis with expertise in materials technology, leading edge know-how has been developed in assessing and managing gaseous emissions produced by materials. It includes indoor air quality (IAQ), emissions from transportation or building materials, migration phenomena and organoleptic contamination of packaging materials. Certech works in partnership with suppliers, manufacturers, and end-users in order to achieve materials emission levels that are complying with the market needs. Remediation is also proposed and can involve formulation of less odorous and less emissive products and/or using innovative processes (dry air degassing, devolatilisation and stripping). Certech has been selected as the Belgian expert for the drafting of the European Standard EN13725 "Air quality – Determination of odour concentration by dynamic olfactometry" EN16846-1 "Photocatalysis", ISO 16000 standards "Indoor air" and ISO 12219 "Interior air of road vehicles". Performance evaluations of air purification units are also offered.

(Bio-based) Polymers and composites

Materials and their processing conditions are developed to respond to the most stringent market needs. The intrinsic properties, the cost of raw materials and additives, their origin, processing and manufacturing conditions, health and environmental impact, recyclability are key parameters that are being considered for the development of new materials. Know-how has been acquired in the formulation and modification of oil-sourced and biobased thermosets, thermoplastic materials like wood plastic composites, biobased composites, barrier additives for packaging, functional additives, and biopolymer formulations. Preparation of hybrid materials (sol gel, specialty and multifunctional coatings, zeolites chemistry, lightweight materials, cellular materials) is also one of the key competences.

Expertise has been acquired in the field of material substitution for the plastics and composites sectors aiming at replacing raw materials which are raising potential health or sustainability issues.

Mechanical recycling (Plastic-to-Plastic)

Recycling of materials is one of the most challenging issues from a sustainability point of view. Certech is involved in sorting and separation processes and performs the conversion of solid wastes into new materials. Assistance in material identification, processing, formulation, and evaluation of recycled materials performance is also provided. Odours and emissions associated with recycled polymers can also be managed (sampling, characterisation and remediation).

Lightweight materials: development of polymer foams

Today, environmental concerns play an increasingly central part in all the sectors of activity (building, transport, energy, ...). In that respect there is an increasing need for more performing and lighter materials. For that purpose, foamed polymers are very interesting materials thanks to their thermal insulation property, lower density, mechanical properties, and competitive price. Foamed polymers are found virtually everywhere in a wide variety of applications such as packaging, cushioning of furniture, insulation, structural parts in automotive ...

In order to deliver R&D support to partners, several activities linked to foaming have been implemented: physical and chemical foaming, development and optimization of formulations, development and optimization of processes.

ANALYTICAL & TECHNOLOGICAL SERVICES

Industry partners benefit from the support of a wide range of advanced characterization tools. The analytical equipment covers the physical, chemical but also sensorial properties determination:

- Physical analysis: mechanical, rheological, thermal, dynamic mechanical, morphological, barrier properties, molecular weight distribution, polymer degree of branching;
- Chemical analysis: chemical composition determination of resins and polymers, additives, fillers, qualitative and quantitative determination of complex mixtures, traces analysis, non-intentionally added substances (NIAS), reverse engineering;
- Sensorial analysis: odour and organoleptic properties.

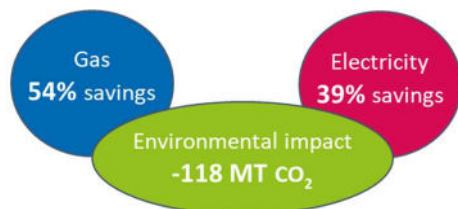


A 1000 m² application hall is available with highly flexible equipment designed for the simulation of industrial processes:

- Polymer Materials: drying, mixing, pelletizing, extrusion, foaming, injection moulding, resin transfer moulding (RTM), compounding. The available output ranges from 5g to a few hundred kg of processed materials.
- Process Intensification: versatile continuous reactors adaptable to project needs, 20 litres continuous reactor for catalytic pyrolysis, autoclaves from 75 to 1000 ml for high temperature and high-pressure chemical treatment, spray-drying.

ECO-RESPONSIBILITY – ENVIRONMENTAL IMPACT

A carbon footprint reduction program has been started in 2017 including installation of solar panels, : upgrade the heating system control, compressors change, optimization of HVAC programs, change lightning from conventional to LED, offices insulation. In the period 2020-2022, gas and electricity savings of respectively 54% and 39% which correspond to 118 MT of CO₂.



2. R&D COLLABORATIVE PROJECTS



In 2022, 14 collaborative projects were in progress, with Certech either as coordinator or partner. The funding sources were the European Regional Development Fund (ERDF, “Transition” and “Interreg V”), Walloon Region (Marshall Plan), Federal Government (Energy Transition Fund) and the European Commission Horizon 2020 framework program.

ONGOING PROJECTS

Project	Description	Partnership	Funding
Flow4Syn	Flow chemistry process to convert biobased feedstocks	Certech, UCLouvain, ULiège	ERDF Transition
Flow4Reactors	Microstructured and catalytic intensified reactors	Certech, CRIBC, UCLouvain, ULiège	ERDF Transition
Flow4Solids	Continuous process for the synthesis, drying and final shaping of solids	Certech, UCLouvain, ULiège	ERDF Transition
IntiCosm	New biobased compounds for cosmetic formulations	URCA, Université Lille, ULiège, UGent, Certech, Vito	Interreg V FWVI supported by the ERDF
PSYCHE	Conversion of plastic waste into chemical compounds of interest via gasification	UGent, Certech UCLouvain, CNRS, ENSCL	Interreg V FWVI supported by the ERDF

Project	Description	Partnership	Funding
ECOLISER	Eco-binders for soil treatment, waterproofing and roads	CTP, INISMa, ULiège, ULB, CRR, Certech, Materia Nova	ERDF Transition

Project	Description	Partnership	Funding
EMRA DEMO2FACTORY	Demonstration platform for SMEs in the field of materials technology characterization	Materia Nova, CRIBC, CTP, Certech	ERDF REACT-EU
HipperPACK	Development of bio-based new packaging (tray, lid and stopper) resistant to high hydrostatic pressure.	Industrial Partnership, Certech, Celabor, Materia Nova	Marshall Plan Wagraim
PUR4UP	Design of new finished products incorporating high quality recycled plastics from end-of-life vehicles (ELVs) and waste of electrical and electronic equipment (D3E)	Industrial Partnership, Certech, ULiège	Marshall Plan Mécatech
MMAtwo	New innovative process for recycling end-of-life PMMA waste	12 EU partners, Certech	EU Horizon 2020
PEPS	To boost the cross-border potential of additive manufacturing processes	CRITT MDTs, Ecole Mines Douai, Armines, Certech, Materialia, Plastiwin	Interreg V FWVI supported by the ERDF
DOUDOU	Cross-border development of innovative materials-how to give higher value to plastic waste?	Ecole Mines Douai, Armines, Plastium, CTP, TEAM2, Plastiwin, Flam3D	Interreg V FWVI supported by the ERDF



NEW PROJECTS

Project	Description	Partnership	Funding
SFP Liner	Development of a flexible class A structuring liner-resin system for metal pipes network distribution (high temperature application and drinking water) with extended lifespan (50 years)	Industrial Partnership, Certech, Celabor, Centexbel, ULiège	Marshall Plan Greenwin
H2.be	Easy hydrogen storage with advanced, innovative, safe and cost effective materials	Certech, UCLouvain, industrial partner	Energy transition fund (Federal Government)

SFP Liner

For several years, water supply network operators have been looking for solutions in order to develop a structuring liner able to rehabilitate tangled and difficult to access metal pipes, whose advanced degree of corrosion leads to a significant loss of mechanical properties. Corrosion generates numerous leaks having significant economic, environmental and safety impact. There is, to date, no liner which is capable of being structuring and flexible at the same time.

The objective of the project is to develop structuring class A liner resin systems that are both capable of adapting to changes in direction (bends) of an entangled network, while supporting pressure, temperature stresses and suitable for drinking water and steam transport applications.

H2.be

The aim of this project is to develop a material and its manufacturing process to store renewable energy by transforming the seasonal excess electricity produced into sustainable hydrogen. Today this mode of storage is energy consuming due to the hydrogen production mode and storage under high pressure with the use of multiple compressors. The target material should have the capacity to adsorb high amount of hydrogen at atmospheric pressure and room temperature. The manufacturing process will be continuous and intensified using safe raw materials.

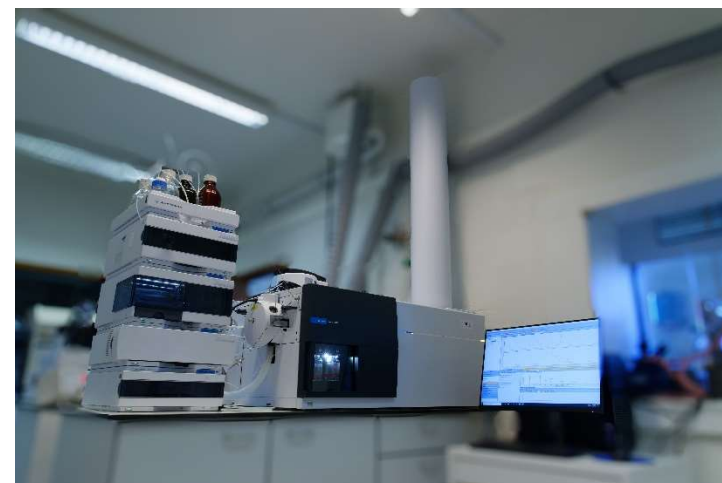
NEW EQUIPMENT

Project EMRA DEMO2FACTORY (REACT-EU)



HPLC-QToF-MS:

An Agilent Q-TOF 6546 mass spectrometer (MS) detector for high performance liquid chromatography (HPLC) was acquired. The instrument allows the investigation of compounds with higher molecular weights (up to 10000 daltons) using atmospheric pressure chemical ionization (APCI). The detector also has a better sensitivity and a better identification power to deal with unknowns thanks to its higher resolution, higher mass precision and the possibility to apply the collision-induced fragmentation. This instrument is particularly well suited to characterize recycled plastic materials containing legacy additives, degradation products from additives and polymers (NIAS = Non-Intentionally Added Substances), usually in low concentrations. Analytical methods are also being developed with the QTOF detector to identify and quantify the oligomeric fractions having molecular weights lower than 10000 daltons in the framework of REACH-polymer requiring registration (PRR) requirements.



Rotational Rheometer:

This new equipment was commissioned for the characterization of the rheological behaviour in the molten state of filled or unfilled polymeric materials. The instrument covers the range of low shear rates and can be configured according to several methods to characterize polymers in the molten state or in solution. Different geometries are available: Couette for low-viscosity liquids, plate-plate or cone-plate for polymer melts, and torsional tests for solid samples. To cover a maximum of applications, the force sensor is separated from the motor, which makes it possible to carry out controlled tests in deformation and stress. Temperature scanning (between -160°C and 600°C) makes it possible to measure the transitions. The instrument software also allows for more complex data interpretation with calculation modules for the application of the principle of temperature-time superposition (TTS) and for measuring the molecular weight distributions of polymers (MWD). The pressure cell, an accessory available at Certech, allows the measurement of the viscosity of solutions at temperatures close to or above the boiling point of the solvent (200°C) or under supercritical conditions (150 bars).



Platen press:

A platen press was acquired for shaping all types of thermoplastics, including commodity, engineering and high-performance polymers. The platen press has a maximal clamping force of 600kN, a maximal temperature of 400°C and can produce parts up to 30 centimeters by 30 centimeters wide. This equipment can quickly generate samples according to standards using a limited quantity of raw material. Programming can be carried out on request with precise control of the heating and cooling ramps to obtain high quality sample with controlled cooling history.



3. INDUSTRIAL PROJECTS & SERVICES

R&D CONTRACTS and SERVICES

Certech collaborates with industrial companies in their development projects and fosters technological innovation. Concrete solutions, in-depth assistance and technical advice are provided by teams with recognised skills and knowledge. Semi-industrial and pilot equipment are also made available to industrial partners.

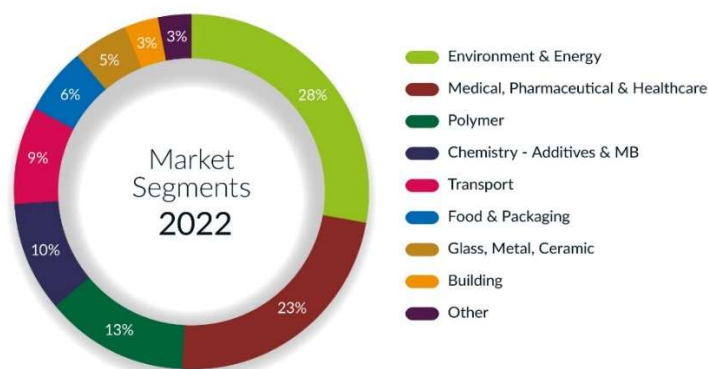
Experts are available for companies looking to improve their products/processes or looking to develop new products/processes. Support projects include feasibility studies, assistance or collaboration on R&D projects, technological transfer or the introduction of new products and processes, help with drafting new specifications, etc. This guidance activity is supported by literature survey, which enables experts to stay permanently up to date about the scientific and technical progress made within their field of competence which presents a high potential for industrial innovation.

Services activities include analytical support using a wide range of advanced equipment, problem solving, quality control and regulatory assessment.

In 2022, 204 companies received support in their innovation process, 40 (20%) of which were new prospects. A total of 465 contracts were handled.

Certech INDUSTRIAL TURNOVER BREAKDOWN INTO SEGMENTS

Major market segments for 2022 include environment and energy (28%), medical, pharmaceutical, and healthcare (23%), plastic industry (polymer producers and end-users 13%), chemicals (10%), transportation (9%), and food and packaging (6%).



FINANCIAL SUPPORT to INDUSTRY

Technology vouchers/Technical feasibility studies (Wallonia)

The “Chèques Technologiques” program is a financial support tool for SMEs developing a new product, process or service that requires scientific validation. In an exploratory phase, Certech carries out tests, calculations, and initial analyses.



Chèques-entreprises

This initial exploration can be followed by *technical feasibility studies*: carrying out tests, energy balances, development of control methods, optimization of test protocols, laboratory tests, life cycle assessment, etc.

In 2022, support to 3 companies was provided using the so-called “Chèques Technologiques” mechanism.

KMO Portefeuille (Flanders)

Certech is eligible for technological consulting and contracting supported by Flanders via the KMO-Portefeuille. KMO-Portefeuille is a subsidy measure for Flemish SMEs who may receive subsidies up to 4000 euros per calendar year.



Research tax credit (France)

The accreditation by the French authorities to the Research Tax Credit (CIR) is valid for the period 2020-2024. This mechanism provides a tax advantage to companies subject to income tax. CIR finances all R&D activities: basic research, applied research and experimental development.



SUCCESS STORY

MMAtwo project funded by the European Commission under Horizon 2020



The aim of this 4 years R&D project was the development of an innovative process for recycling end-of-life and post-industrial wastes of poly(methylmethacrylate) (PMMA), by converting these difficult-to-recycle wastes into a high quality secondary raw material: second generation methylmethacrylate (MMA) or rMMA.



As follow-up to the project, Trinseo, a specialty material solutions provider and Japan Steel Works Europe (JSW EU), a group company of The Japan Steel Works, Ltd. (JSW), a manufacturer of industrial and plastics machinery, announced on October 13, 2022 a collaborative effort on chemical recycling of polymethyl methacrylate (PMMA). The cooperation between Trinseo and JSW is a testament to the importance of circularity in the industry. Both companies were engaged in the MMAtwo project for the past four years. Heathland, acquired by Trinseo earlier this year, was the coordinator of the MMAtwo consortium.

The analysis protocol of rMMA and rPMMA, one of the innovations carried out by Certech in this project was recognized by the European Commission Innovation Radar.



QUALITY

Renewal of the ISO 9001:2015 quality management system certification for the period 2022-2025.



Approval in force for the period 2019-2023 by the Walloon Authorities for the sampling, analysis, and research in the field of air quality (including odours), as well as for measurements by dynamic olfactometry and odour detection threshold with human assessors.

Car Manufacturers accreditation according to the technical requirements of ISO 17025 to measure odours and VOCs on materials and parts:

PSA/Stellantis accreditation for the following tests:

- VOC analyses according to D10 5495-E
- Aldehydes and Ketones analyses according to D40 5535-E
- Odour according to D10 5517-G



Renault Nissan accreditation for the period 2021-2024 for the following tests:

- VOC and aldehydes & ketones analyses from materials after conditioning in micro-scale chamber according to RNES-B-20116 v1.1
- VOC, aldehydes & ketones, odour analyses from entire parts after conditioning in 1 m3 chamber test according to RNES-B-00114 v1.1 (formerly D49 3027-C and D49 3085-B) and RNES-B-00096 v1.1 (formerly D49 3046-C)
- Odour from materials according to RNES-B-00096 v1.1 (formerly D49 3001-E)
- VOC analyses according to D42 3109-C and D413144-A
- Aldehydes and Ketones analyses according to D40 3004-A



RENAULT NISSAN MITSUBISHI

Toyota Motor Europe recognition as an authorized laboratory to perform testing on parts /materials according to the following standards was granted for the period 2023-2025:

- TSM0505G-1A: Smell Quality of non-metallic materials
- TSM0508G: Volatile Component measurement method using sampling bag
- TSM0512G: Part volatile component measurement method using large sampling bag



PARTICIPATION in TECHNICAL STANDARDISATION COMMITTEES



Thanks to its expertise based on R&D activities, Certech is an active member of several technical standardisation committees dealing with air quality, odours, volatile organic compounds (VOC) and photocatalysis.

Certech is helping industry professionals to:

- understand the aspects related to technical and scientific standardisation and regulations;
- stay up to date with methods and trends in standardisation and regulations in their specific sector;
- Implement the standards in their daily activity.

ISO/TC 146	Air quality
CEN/TC 264	Air quality
CEN/TC 386	Photocatalysis
AFNOR B44/A	VOC and odours, photocatalytic materials, chamber recycling test

4. PARTICIPATIONS and COLLABORATIONS

PROFESSIONAL BODIES



www.essencia.be



www.idea.be



www.wal-tech.be



www.src.be



www.valbiom.be



www.ccih.be



www.4spe.org



www.gn-meba.org



www.gfsv.net

CLUSTERS



www.greenwin.be



www.polemecatech.be



<https://www.wagralim.be>



www.polymeris.fr



www.clusters.wallonie.be



www.clusters.wallonie.be



<https://www.bioeconomyforchange.eu/> <https://www.cbe.europa.eu/>

COLLABORATIONS



Certech is an Authorised Partner Laboratory from Agilent Technologies. The collaboration covers all aspects of molecular weight and chemical composition distribution by gel permeation chromatography (GPC), temperature rising elution fractionation (TREF) and odours and emissions from materials using thermal desorption gas chromatography mass spectrometry (TDS-GC-MS).



Member of the Editorial Board of the International Journal of Polymer Analysis and Characterization (IJPAC) and referee for the following journals: ACS Applied Polymer Materials, ACS Catalysis, Catalysis Communications, Catalysts, ChemCatChem, Chemistry Eur. J., Macromolecules, Molecules, Nanomaterials, Organic Letters, Polymer Chemistry, Polymers, RSC Advances, Synthesis

Guest Lecturer at UCLouvain university (*Sustainable treatment of industrial and domestic waste; Safety in the industry; Techniques d'échantillonnage et analyse de l'air*) and Savoie University (*Process Intensification-Flow Chemistry-Sustainable Chemistry*)

5. PUBLICATIONS, LECTURES & ATTENDANCE at CONFERENCES & TRADE SHOWS

Patent:

- Capsule comprising insulin-secreting cells for treating diabetes: EP3946254 ; S. Lablanche, P.-Y. Benhamou, E. Tubbs, A. Moisan, H. Egelhofer, V. Persoons, F. Rivera, F. Bottausci, M. Pierron, G. Orlando, R. Tamburrini, K. Glinel, E. D. Giol, A. Fernandes, A. Jonas

Scientific Papers:

- Enhanced characterization of the chemical structure of high-density polyethylene by size exclusion/thermal fractionation on poly(styrene-co-divinylbenzene) columns; A. Boborodea, P. Boulens, *International Journal of Polymer Analysis and Characterization*, DOI: 10.1080/1023666X.2022.2154907
- Revealing the Organization of Catalytic Sequence-Defined Oligomers via Combined Molecular Dynamics Simulations and Network Analysis; S. Kardas, M. Fossépré, V. Lemaure, A. E. Fernandes, K. Glinel, A. M. Jonas, M. Surin, *J. Chem. Inf. Model.* **2022**, 62, 2761-2770.
- Encapsulation of vitamin C by glycerol-derived dendrimers, their interaction with biomimetic skin membrane and their cytotoxicity; Bacha, C. Chemotti, J.C. Monboisse, A. Robert, A. Furlan, W. Smeralda, C. Danblon, J. Estager, S. Brassart-Pasco, J.P. Mbakidi, J. Prsic, S. Bouquillon, M. Deleu, *Molecules*, **2022**, 27, 8022
- Synthesis and activity of ionic antioxidant functionalized PAMAMs and PPIs dendrimers; K. Bacha, J. Estager, S. Brassart-Pasco, C. Chemotti, A. E. Fernandes, J.-P. Mbakidi, M. Deleu, S. Bouquillon, *Polymers*, **2022**, 14(17), 3513.
- Sequence Rules the Functional Connections and Efficiency of Catalytic Precision Oligomers; J. Li, Q. Qin, S. Kardas, M. Fossépré, M. Surin, A. E. Fernandes, K. Glinel, A. M. Jonas, *ACS Catalysis* **2022**, 12, 2126-2131.

Lectures:

- Plastiwin Webinar: Emissions and odours from pilot scale recycled methyl methacrylate and derived polymers - Clément Lemenu, Webinar, April, 12 2022
- MMAtwo Project Workshop: Emissions and odours from regenerated (P)MMA, C. Lemenu, Webinar, July, 12 2022
- MMAtwo Project Final Conference : Crude MMA purification – F. Boutros, C. Lemenu, Brussels (B), September 28 2022
- MMAtwo Final Conference: Emissions and odours from regenerated PMMA – Ph. De Groote, C. Lemenu, Brussels (B), September, 28 2022

- International conference on green chemistry and white biotechnology: From intensified to intelligent processes – J. Estager, Liège (B), September 28-29 2022
- Arcop colloque 2022 : Qualité de l'air, un facteur toujours important – L. Bilteryst, Namur(B), Octobre, 6 2022
- GN-MEBA - JOURNEES PEDAGOGIQUES : Les dérives en imagerie MEB : origine et correction. Principe, apport et mise en œuvre de l'imagerie au MEB, – A. JADIN, Jussieu (F) – Decembre 1-2 2022

They let us talk about us:

- essenscia Wallonie événement 26 avril 2022 : video : Certech la durabilité au cœur de l'intensification des procédés.

Conference and Trade show Attendance

Event	Date	Location
Législation environnementale wallonne - regard sur 2021 et perspectives (Sertius)	27-01-22	webinar
Réunion AFNOR grande enceinte	31-01-22	videoconference
13th Virtual Multidimensional chromatography Workshop (MDCW)	31 to 02-02-22	webinar
Avoiding errors in declaring personnel costs in Horizon 2020 grants	16-02-22	webinar
1ère rencontre de l'économie circulaire	17-02-22	webinar
Webinaire Plastiwin/Celabor: purification des polymères en vue de leur recyclage	22-02-22	webinar
Réunion AFNOR grande enceinte	28-02-22	videoconference
Workshop projet Interreg SAFESIDE : développement de solution de caractérisation	01-02-22	webinar

spectroscopique à distance et portable pour détecter la nature de gaz dans l'air		
Réunion plénière AFNOR	10-03-22	videoconference
Chemical recycling workshop	16-03-22	Brussels (B)
Les matériaux isolants en MEB (Stage EA02-CNAM)	23-03-22	webinar
4th European Congress on Eco-Plasturgy and Sustainable, smart, and safe plastic materials	23-03-22	webinar
Rencontre des acteurs de l'hydrogène en Wallonie (Cluster Tweed et Skywin).	30-03-22	Charleroi A6K (B)
France Innovation Plasturgie	05 to 08-04-22	Lyon (F)
Webinaire Plastiwin/Certech: Recyclage chimique du PMMA	12-04-22	webinar
Webinaire Greenwin: Circular Design in Plastics: opportunités et menaces	28-04-22	webinar
Webinaire Plastiwin/UMONS : L'utilisation de matières plastiques recyclées dans le procédé d'extrusion - challenges et opportunités	03-05-22	webinar
Événement annuel Interreg FWVI	05-05-22	Les Mazures (F)
Psyche Interreg Project "guest lecture"	09-05-22	webinar
Journées du Groupe Français de Spectroscopie Vibrationnelle 2022	18 to 20-05-2022	Nivelles (B)
Salon EMPACK 2022	19-05-22	Namur (B)
Plasturgie & environnement	18&19-05-22	Douai (F)
Circular Design in Plastics (Plastiwin & essenscia), Réunion plénière du cluster Plastiwin	31-05-22	Gembloux (B)

Workshop on advancement of polymers exposure science	31/05&01/06/2022	Bruxelles (B)
AFNOR B444A, grande enceinte	09-06-22	Paris (F)
Journée d'information sur les programmes Interreg VI en Wallonie (organisée par WBI)	13-06-22	Namur (B)
Synthesis of hydrogel microspheres using microfluidic	15-06-22	Webinar
Plastic Recycling Show	22&23-06-22	Amsterdam (B)
Workshop: biomaterials for health	28-06-22	Mons (B)
Second webinar MMAtwo Project	12-07-22	Webinar
Workshop Advances in separation science	16-09-22	Gembloux (B)
Evènement de clotûre projet Interreg Et'Air	22-09-22	Roubaix (F)
MMAtwo Project Final Conference	28-09-22	Bruxelles (B)
From Exposure to Human Health: New Developments and Challenges in a Changing Environment	25&29-9-2022	Lisbon, Portugal
Opportunités et challenges dans le recyclage des plastiques	28-09-22	Mons (B)
Green Chemistry and White Biotechnology Conference	28&29-09-22	Liège (B)
Creating a real circular economy for waste plastics based on high quality advanced upcycling.	29-09-22	Doel (B)
RIC Technology Day	04-10-22	Waterloo (B)
Le recyclage chimique des matières plastiques	04-10-22	webinar
Colloque Arcop (association royale des conseillers en prévention)	06-10-22	Namur (B)
Circular Design in Plastics : vers la Plasturgie Circulaire	07-10-22	Namur (B)

Atelier de présentation des appels 2023-2024 du Programme Horizon Europe - Cluster 4 (Circular economy - waste - materials and Advanced material and resilient manufacturing)	18-10-22	Webinar
Evènement de clotûre des projets Interreg PEPS et Doudou	18-10-22	Douai (F)
Webinaire Plastiwin/Centexbel: L'Alliance Européenne Plastique Circulaire & Certification des matières recyclées	08-11-22	Webinar
Lancement programme Interreg VI France-Wallonie-Vlaanderen	17-11-22	Mons (B)
Solutions énergétiques et bas-carbone pour l'industrie des plastiques - séance plénière Plastiwin	17-11-22	Gembloux
Innovations et tendances dans la plasturgie après le salon K2022	24-11-22	Webinar
GNMEBA - Réunion Pédagogique	01&02-12-22	Paris (F)
Webinaire Plastiwin/Celabor: Analyses et limites d'utilisation des plastiques recyclés	07-12-22	Webinar
Visite du nouveau Centre de tri Val' Up	08-12-22	Ghlin (B)
Evènement de clôture projet Interreg InTiCosm	19-12-22	Pomacle (F)

6. KEY FIGURES

Balance sheet

Assets	2022	2021	Liabilities	2022	2021
Fixed assets	1.154.502	1.077.185	Reserves	5.708.096	5.650.082
Scientific equipment and installations	1.154.502	1.077.185	Social reserves	2.228.173	2.228.173
			Accumulated reserves	3.007.703	2.996.915
			Investment subsidies	472.220	424.995
Current assets	8.363.705	8.564.839	Provisions for contingencies and losses	196.190	241.695
Accounts due within one year	3.187.943	2.331.559			
Cash investments	3.067.230	3.179.990	Debt	3.613.921	3.750.247
Cash	1.767.701	2.791.777	Accounts payable after one year	1.466.935	1.466.935
Adjustments (accrued income)	340.831	261.513	Accounts payable within one year	2.088.017	2.193.227
			Adjustment accounts	58.069	90.085
Total assets	9.518.207	9.642.024	Total liabilities	9.518.207	9.642.024

Income statement

Income statement	2022	2021	Workforce	2022	2021
Turnover	4.457.838	4.264.821	Total Headcount	34	35
Contract operations	2.482.213	2.385.468	Total FTE	31,7	32,7
Public research subsidies	1.212.580	1.109.650	FTE Scientists	28,3	29,3
Depreciation subsidy allowances	370.414	406.353	FTE Technicians	1	1
Other revenues	392.631	363.351	FTE administrative staff	2,4	2,4
Expenses	3.619.520	3.436.996			
Supplies and services	923.757	801.826			
Salaries	2.695.762	2.635.170			
Depreciation, provisions, and loss of value	704.029	731.800			
Financial revenues	1.030	950			
Financial expenses	118.467	19.352			
Other expenses and Taxes	6.063	17.469			
Net Result	10.788	60.153			

7. Certech Management

General Assembly - Board of Directors

				Industry	
General Assembly	UCLouvain	Eric Gaigneaux			Board of Directors
		Nathalie Burteau			
		Karine Glinel			
		Jean-Christophe Renauld			
	TotalEnergies	Jean-Pierre Dath	Chairman	√	
	Umicore	Eric (Erynn) Robert		√	
	Dow Silicones	Serge Creutz		√	
	Cargill	Stéphane Biltresse		√	
	Veolia	David Benanou		√	
	GMA Consult	Gisèle Maréchal		√	
	it4ip	Yves-Jacques Schneider		√	
	Grando	Yves Charlier		√	
	IDEA	Maïté Dufrasne		√	
		Philippe Busquin			
	Guest	Thierry Randoux	General Manager		
SPW-EER	Emmanuel Delhaye	Observer			
UCLouvain	Thomas Pardoën				

General Management

General Manager	Thierry Randoux
Business Manager-Deputy General Manager	Catherine Henneuse

Auditor

Avisor scrI	Dorothee Hurteux
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