



centre  
de ressources

# certech

technologiques

en chimie

## materials formulation & technology

outstanding performance

renewable origin

hybrid materials

sol gel

## environment

health

& safety

recycling

Energy from chemistry

## process intensification

Innovative reaction media

Green chemistry

Catalysis

Microtechnologies

Pilot plants

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LETTER TO CERTECH STAKEHOLDERS

2010 revenues followed a pattern similar to 2009. Environmental services continued to suffer from adverse market conditions. Other activities of the center remained relatively stable, with interesting spikes of organic synthesis activity for medical applications.

Results have been adversely affected by non recurrent expenses associated with the construction of **Certech** demonstration hall as well as extraordinary insurance expenses.

Last year has seen a major overhaul of the centre strategy. Interviews of stakeholders, industrial partners as well as major public and private organisations were carried out with the help of expert guidance. The outcome of the research placed focus on product and process improvement, with significant investments to be targeted in pilot and demonstration equipment.

Product improvement shall address mainly the fine tuning of synthetic organic and inorganic materials, with their environmental impact, from cradle to grave.

The commissioning of **Certech** demonstration hall has resulted in a complete reshuffling of **Certech** facilities. This challenge could fortunately be met without measurable disruptions in service activities.

At the same time, the organisation of the centre has been adapted in order to better respond to future societal and industrial needs.



A handwritten signature in blue ink, appearing to read 'H. May'.

**Henri May**  
General Manager



A handwritten signature in blue ink, appearing to read 'F. Blondel'.

**François Blondel**  
Chairman of the Board

■ CERTECH ■

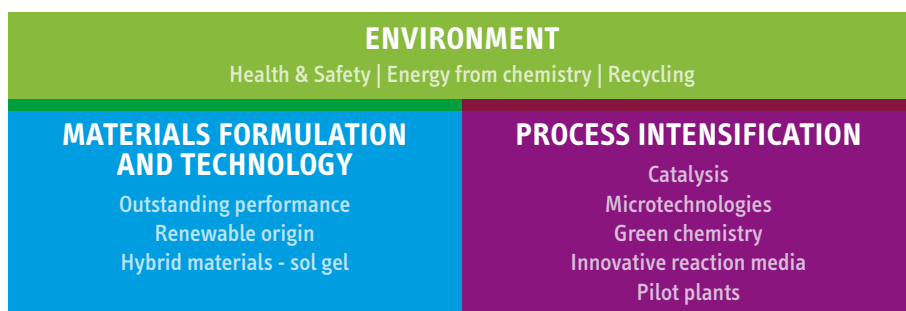
## 1.1 Presentation

The Centre of Technological Resources in Chemistry (**Certech**) is a contract research organisation offering a wide range of services to industries directly or indirectly involved with chemical technology, such as automobile, construction, packaging, food, agriculture, personal care, pharmaceutical, medical, energy, environment, etc.

**Certech's** mission is to provide help, support and services to small and large industrial enterprises, by offering ad hoc analysis and measurements, problem-solving, contract research, product and process development capabilities.

Our vision is to become a recognized expert in product and process improvement or development, by exploiting sustainable chemistry, to meet future societal and industrial needs.

Strategic research and expertises include now three axis: environment, materials formulation & technology and process intensification.



### ENVIRONMENT

This horizontal issue includes health & safety, energy from chemistry and recycling.

#### *Health & Safety*

**Certech** offers for a long time industrial support in the field of air quality, risk assessment and environmental impact. Research relates to diagnosis and treatment of atmospheric pollution, workplace exposure, ambient air analysis, as well as emissions from materials.

In the field of outdoor environment, **Certech** offers sampling, on-line measurements and analysis (noise, odour and gaseous effluents). Environmental impact is evaluated via simulations of atmospheric dispersion and neighbourhood direct assessment. Performance evaluation of air purification units is also offered.

Key expertises in workplace air assessment include sampling and analysis of dusts, aerosols and chemical components, measurement of nanoparticles and biological agents, determination



of organic vapours, cartridge service for exposure assessment, probability assessments of workplace exposure and characterization of ATEX (ATmosphere EXplosive) atmosphere.

**Certech** deals with research, development, testing and consulting in all aspects of materials interaction with their environment. New requirements from end-users (low odour and emission products), new directives & regulations (for example new OEM standards or construction products directives and essential requirements about hygiene, health and the environment) have distinct influences on product acceptability by the market. They have generated a need for reliable laboratory testing conditions. Combining skills in sampling and analysis of air with expertise in materials technology, CERTECH has developed leading edge know how in assessing and managing gaseous emissions produced by materials. It includes indoor air quality (IAQ), emissions from building or transport 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 felt acceptable by the scientific community.



**Certech** has been selected as the Belgian expert concerning the elaboration of the European Standard EN13725 "Air quality - Determination of odour concentration by dynamic olfactometry" and ISO 16000 standards "Indoor air". It is currently involved in different committees (see 1.5).

### *Energy from chemistry*

Decentralised production of energy presents a major challenge. **Certech** is currently involved in a project concerning production of energy via chemical reactions in a fuel cells (see 2.1).

### *Recycling*

Recycling of materials is one of the most challenging issues from a sustainability point of view. **Certech** is involved in sorting and separating processes as well as the conversion of solid wastes into new materials and/or energy. For the mechanical recycling of plastic materials, it provides assistance in materials identification, processing, formulation and evaluation of recycled materials performance. **Certech** displays also expertise in the field of pyrolysis for fuel transformation and energy valorisation. Different projects focus on these topics (see 2.1).

## **MATERIALS FORMULATION AND TECHNOLOGY**

**Certech** aims at developing materials with tailored properties, fine tuned performance and processing conditions, challenging sharpest cost/benefits. Intrinsic properties, the cost of carefully selected additives, their origin, their processing and mode of fabrication, health and environmental impact, recyclability and so many other parameters are being considered for materials development. Services include development of analytical techniques, measurements, reverse engineering, problem solving and contract research.

### Services include:

- Preparation of hybrid materials (sol gel, specialty and multifunctional coatings, zeolites chemistry, cellular materials, ...)
- Synthesis, modification, formulation and recycling of thermosets, thermoplastics of petrochemical and biological origin. Specific examples include wood plastic composites, nanocomposites, barrier additives for packaging and storage, functional additives, biopolymer formulations, ...
- Analysis and reverse engineering: nature of resins, chemical architecture, process additives, identification of fillers.w.. **Certech** has over ten years experience in such services. The expertise rests on a thorough knowledge of materials and analytical sciences, on the ability to plan and exploit sophisticated investigation techniques, with a constant regard to optimal cost/benefit.
- Determination of physical properties: mechanical, rheological, thermal, dynamic mechanical, morphological, barrier and sensorial properties, combined with statistical tools leading to faster experimentation and better interpretation.
- Pilot operations: drying, mixing, pelletizing, extrusion, coextrusion, injection moulding, ... Highly flexible equipments are designed for the simulation of industrial transformation processes: compounding, coextrusion of multilayered films or tubes, cable insulation, injection moulding, preparation of nanocomposites. Output capabilities range from 5g to a few hundred kg of transformed materials.



### PROCESS INTENSIFICATION

Process Intensification (PI) is a relatively new approach in the chemical industry. The use of extreme conditions is the key to this new technology (very high temperature and pressures, short reaction times, continuous processes). It leads to a substantially smaller, faster, cleaner and more energy-efficient technology. It is a multidisciplinary opportunity to improve process technology and underlying chemistry at the same time. **Certech** ambition is to help and convince its partners to choose and adopt such efficient technologies in their chemical operations, present or future.

**Certech** continues to offer its expertise in the field of catalysis and synthesis. **Certech** services include custom organic and inorganic synthesis (from grams to kilograms), improvement of synthetic pathways and process development for chemicals and rare active ingredients, through high throughput experimentation with automated synthesis workstations. **Certech** scientists practice also polymer and copolymer synthesis.



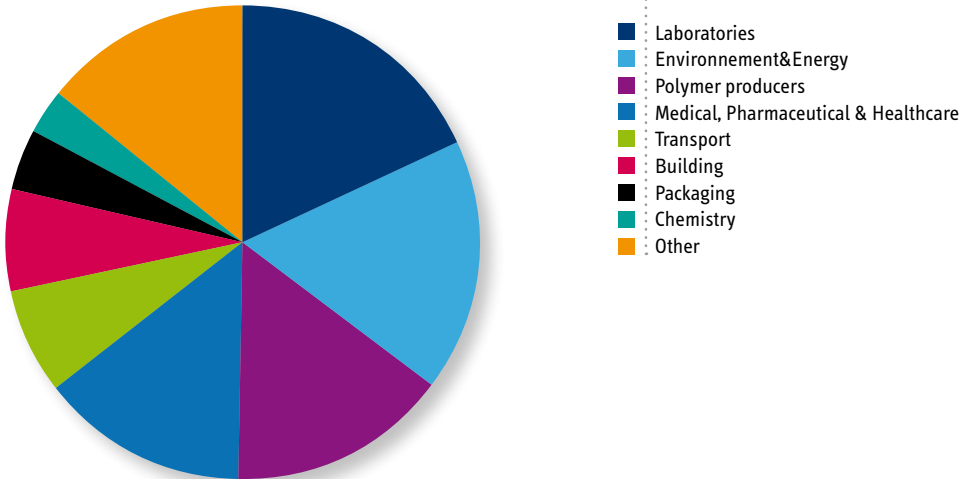




## 1.2 Markets

As shown in Figure 1, **Certech** serves a wide range of industries. In 2010, **Certech** provided more specialised services to other laboratories (19%) than to any other market. Environment and energy (16%), medical, pharmaceutical and healthcare industries (14%) and polymer producers (13%) are the other leading markets. Such customers call upon the different fields of expertise of the centre.

Figure 1: Distribution of income of industrial origin in 2010



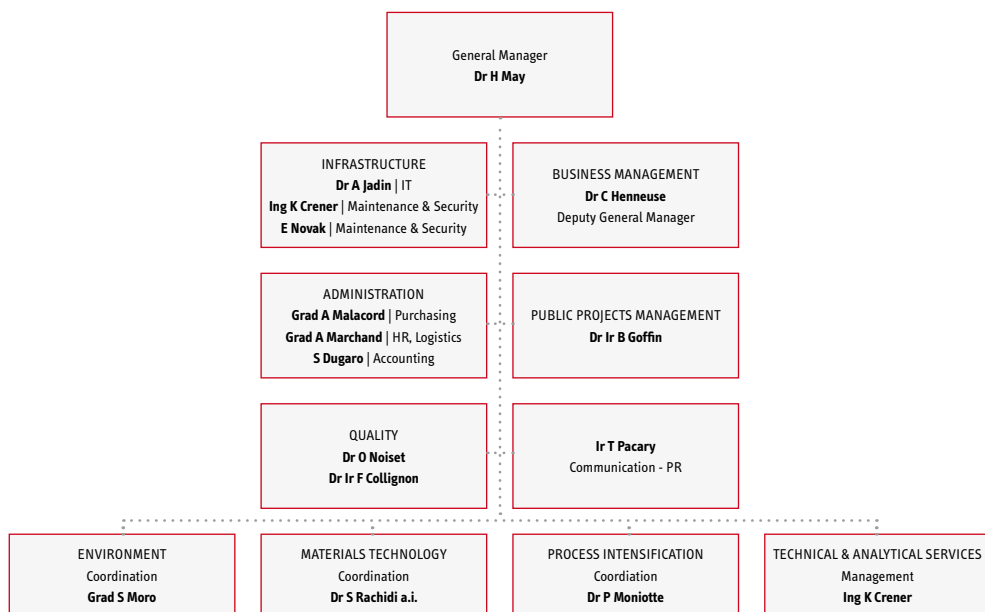
### 1.3 People and Organisation

**Certech** enjoys a highly qualified and dedicated workforce. By the end of 2010, the Centre employed 37 scientists and administrative staff.

**Certech** activities are organized around three thematic units: environment, materials technology and process intensification. A central technical and analytical services department supports those units (figure 2). Within each unit, project managers have a thematic expertises (polymers, catalysis, etc) and address medium to long-term projects negotiated with private or public parties. They assemble virtual temporary teams involving internal and external skills. The analytical services department manages large human and instrumental support resources. Scientists in this department develop instrumental skills and operate the equipments that are needed to support and guide project managers efforts.

Maintenance, safety, information technology, quality and communication are provided part time by appropriately trained scientists who generally coordinate the support of contracted external organisations. Thematic project managers are backed up in their efforts by a dedicated manager specialised in the handling of either private or public affairs. Administration provides critical services such as accounting, purchasing and management of human resources. In 2010, implementation of electronic invoicing has been successfully implemented. More than 80% customers are now invoiced electronically, with advanced electronic signatures, as per EU Directive 1999/93/EC. This cuts time, cost and is better for the environment.

Figure 2. Organisation (April 2011)



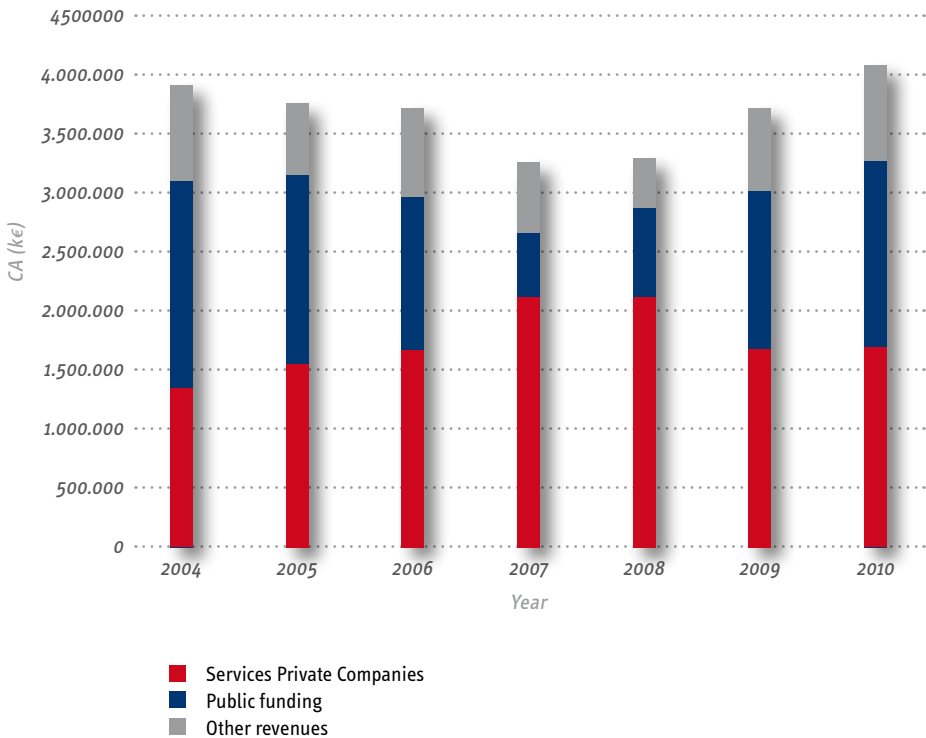


### 1.4 Key Figures

In 2010, **Certech** billed € 1.684.912 to private enterprises and managed € 1.596.380 worth of public research projects grants. Other incomes (€ 794.258) arose from tax reductions, depreciation subsidy allowances and other exceptional revenues. Figure 3 shows the evolution of incomes since 2004.

Private income has been disappointingly low over 2009 and 2010. Main factors relate to a difficult economic environment, but perhaps also the intensity the centre physical and organisational changes in 2010, with a doubling of laboratory space, the rearrangement of nearly all facilities across the location and practically all employees being affected by the organisational changes.

Figure 3: Turnover distribution from 2004 to 2010.



## 1.5 Recognition & Communication

### Recognition

**Certech** is recognized as a reference expert by AFNOR, ISO and CEN committees. Participation enables scientific exchanges and elaboration of new standards. Covered topics include:

- Determination of VOC's in indoor air
- Emissions into indoor air
- Emissions from constructions products into indoor air
- Sensory testing
- Measurement of odour impact by field inspection
- Photocatalysis
- Workplace air
- Ambient air - diffusive samplers

**Certech** is accredited by the Walloon Region for the sampling, analysis and research in the field of air quality (including odour aspects). **Certech** is eligible for technological consulting and contracting via the so-called "chèques services technologiques" for Wallonia (see [www.ct.innovons.be](http://www.ct.innovons.be)) or "KMO-portefeuille" for Flanders (see [kmo-portefeuille.be](http://kmo-portefeuille.be)). These grants are dedicated to SMEs, to support and promote innovation. **Certech** has been an approved service provider for the years 2009, 2010 and 2011 under the French General Code of Taxation allowing a Research Tax Credit (CIR). **Certech** is also mentioned by ADEME (The French Agency for the Environment and Energy Management) as a qualified laboratory for the assessment of air quality.

### Interlaboratory tests

In 2010, **Certech** has successfully participated to well known international Round-robin tests dealing with organic substances analysed by thermodesorption. Those tests involved the analysis of volatile organic compounds absorbed by the organisers on Tenax tubes. A highest permissible deviation of  $\pm 15\%$  was used for z-score calculation.

**Certech** has also successfully participated to an interlaboratory comparison test in the field of workplace assessment.

### OEM accreditation

**Certech** is proud to announce its accreditation by RENAULT, SAMSUNG, DACIA and PSA. The crosscheck involved analysis of odour, aldehydes and ketones, as well as VOC measurements on materials and large complete parts. Toyota also recommends **Certech** as a reference laboratory.





### Communication

The new logo notifies Certech upwards ambitions: with the removal of the top bar, the centre is more clearly open to opportunities. At the same time, it modernises through more dynamic font and a more lively three colours bar reminding the three domains of activity of the center. The heritage of the Catholic University of Louvain remains highlighted by use of the same blue shade.



The company **Precis Select in Manage** made a press conference on 29th January on a process allowing ultra-fines (from 1 to 50 µm) powders calibration while preserving their intrinsic properties. During the first phase of the development and installation of the pre-production, **Precis Select** called upon **Certech** support. This has been reported in:

*“Procédé saupoudré d'excellence” La Libre Belgique, 8 février 2010, page 39*

*“Les plus fines poudres du monde”, 5 février 2010, Sudpresse - La nouvelle gazette, page 5*  
*Antenne centre 29/01/2010*

### Symposia

The 8<sup>th</sup> edition of **“Emissions and odours from materials”** took place in Brussels, on the 8<sup>th</sup> and 9<sup>th</sup> October. Over 75 people from all-over Europe attended the two-days conference, confirming once again the interest of the industry and of regulatory bodies. Delegates came mainly from the plastic industry (raw material producers) but also from the automotive, packaging and building industries. European laboratories & research centers were broadly represented. A summary of the conference was reported in *Mobiletex*, page 3, December 2010 and in *International Dyer*, MAR, pages 33-34, 2010.



### **Publications**

#### **Papers:**

Le Sol-Gel: la chimie douce au service de l'innovation, F.Collignon, VOM info N°10/10, pages 22-25, décembre 2010.

Characterization of VOC and formaldehyde emissions from a wood based panel: results from an interlaboratory comparison, C. Yrieix, A. Dulaurent, C. Laffargue, F. Maupetit, T. Pacary, E. Uhde, Chemosphere, vol 79, 2010, pages 414-419.

Photocatalytic degradation of gaseous acetaldehyde on nitrogen - TiO<sub>2</sub> modified under visible light; J. Choina, K. Bubacz, A.W. Morawski, B. Kartheuser, F. Collignon, Submitted in Applied Catalysis.

#### **Conférences:**

Optimisation de la conservation des aliments: un emballage micro-nanostructuré barrière à l'oxygène", H.Damsir, Micro et nanotechnologies, un max d'opportunités pour votre entreprise, Gembloux, Belgique, 30 novembre 2010.

Biocolonisation et biodétérioration du bâti en pierre dans le Nord de la France et le sud de la Wallonie - une collaboration transfrontalière: Hybriprotech; S.Eyssautier, G.Michaud. X<sup>ième</sup> forum Biodétérioration des matériaux, 8-9 Novembre 2010, Douai, France.

Le sol-gel: la chimie douce au service de l'innovation, F.Collignon - Journée d'étude "Sol-gel: une très vieille technologie pour les applications du futur!", Strépy-Bracquegnies, Belgique, 19 octobre 2010.

Indoor air quality at workplace: risk assessment in regard to materials emissions, S. Moro, S.; **Certech** conference "emissions from materials", Bruxelles, Belgique, 13<sup>th</sup> of October 2010.

Developing of a technology for rehabilitation of old landfills - Application to Tenneville landfill (Belgium); G. Chantry, É. Koller, P. Hubaux, C. Lucion, D. Lalande, Annual conference of the SIM (Societe de l'Industrie Minérale), Nantes, France, 5-8 October 2010.

Nuisances du quotidien - Evaluation objective de la gêne et risque pour la santé, O.Noiset, Journées de l'environnement, GSK, 16 juin 2010, Wavre, Belgique.

Hybriprotech: Projet de recherche transfrontalier pour le développement durable, G. Michaud; Environord 2010, 8 Juin 2010, Lille, France.

Recypolymer: Projet de recherche transfrontalier pour le développement durable; B. Goffin Environord 2010, 8 Juin 2010, Lille, France.





Développement d'additifs pour l'amélioration des propriétés barrière des polymères, S.Rachidi, Journée technologique Mise en œuvre des polymères et composites, Ghislenghien, Belgique, 18 mai 2010.

Overview of the Afnor standard for air purifiers device, B.Kartheuser, COST Symposium "Recent achievements in photocatalysis: fundamentals, applications and standardised test methods", La Plateforme, Grenoble, France 18-19 January 2010.

**Stand presence at trade fairs or participation to conferences:**

24<sup>th</sup> International exhibition of environmental equipment, technologies and services (Pollutec), 30 November-03 December 2010, Lyon, France.



Identiplast 2010 "Identifying the value from end-of-life plastics", 10 November 2010, London, United Kingdom.

X<sup>ème</sup> Forum biodétérioration des matériaux, 08-09 November 2010, Douai, France.

Journée Scientifique Annuelle de la SRC - Chimie Verte, 14 October 2010, Gembloux, Belgique.

10<sup>ème</sup> journée scientifique GFP GRAND-EST "Les polymères et la chimie du végétal", 9 September, Reims, France.

Environord 2010, Exhibition for environment solutions, 08 -10 June 2010, Lille, France.

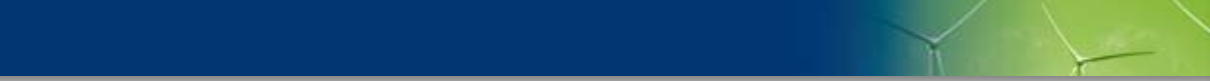
7<sup>th</sup> International Conference of the European Industrial Hemp Association (EIHA), 26-27 May 2010, Wessling (Cologne), Germany.

2<sup>ème</sup> Congrès wallon sur les déchets, 25 March 2010, Upignac (Eghezée), Belgique.

12<sup>th</sup> workshop odour and emission of plastic materials, 15-16 March 2010, Kassel, Germany.

4<sup>ème</sup> Table Ronde Biocarburant, 10 March 2010, Namur, Belgique.

Journées Sol-Gel Edition 2010, 1-3/02/2010, Tours, France.





■ **2010 HIGHLIGHTS** ■

**Certech** mission is to speed up the R&D efforts of its industrial partners. Typical developments include:

- **Collective or public research:** the Centre executes a research that has often generic characteristics and that is financed by a public body (Region, Nation, Europe, etc). The results of the research are usually accessible to all enterprises.
- **Product and process development:** The Centre executes a program driven by an organisation or an enterprise. Results belong typically to the parties who have financed the work.
- **Research & Development projects** initiated by the Centre, at its own cost, typically on the basis of an identified market need. Results belong to the Centre.

## 2.1 Public R&D projects

Greenwin (6th Walloon Pole of Competitivity Greenwin) projects must be initiated by private enterprises, in partnership with universities and research centers to promote sustainable developments. 5 Walloon SMES proposed in association with **Certech** and Louvain University a project aiming at developing materials from vegetable oils as alternatives to petrochemical polyester composite materials (COMPONAT). The target of the project is to develop a “drop in” product avoiding the production of volatile organic compounds such as styrene. The project should start in 2011. Another project is dealing with the production of second generation bio-ethanol from renewable or recycled materials by an innovative technology based on the use of phosphoric acid (Phosbiol2). **Certech** contribution relates to the validation of produced ethanol for conversion into ethylene.

Two new collective research projects have been approved by the Walloon authorities:

- **Humibati:** research led by CSTC and Certech from September 2010, with a view to develop methodologies to assess products used for the treatment of ascensional humidity in buildings. The environmental impact of these new formulations (solvent free) will be also investigated.
- **Revadec II** in collaboration with CTP and CERISIC which aims at the valorization and recovery of major components of landfills.

At the federal level, a pre-normative research on photocatalysis has been accepted in collaboration with BRRC and CENTEXBEL.

Projects in progress are listed below:

- A First-DOCA called “INTERMES” is led by Certech since 2008 with the help of Prof P Dubois of Mons University. It equates to public partial financing of an employee as a PhD student. This research aims at developing interpenetrating polymer networks (IPN), with a view to generate mesoporous materials with a controlled morphology. After two years, the first interpenetrated hydrogels could be prepared. The compatibility of polymers has been fine tuned in order to obtain homogeneous systems susceptible to produce the expected mesoporous materials





■ Four Interreg IV transborder co-operation programs:

- RECY-POLYMER (FranceWalloniaFlanders programme) focuses on innovative and value-added applications for plastic wastes in order to minimise landfill or disposal. The purpose of this project is the development of recycled products based on PVC, automotive plastics waste and waste of electrical and electronic equipments (WEEE). RECY-POLYMER involves collaborations between CERTECH (Wallonia), CREPIM (France) and VKC (Flanders).

More details on [www.recypolymer-interreg.org](http://www.recypolymer-interreg.org)



- HYBRIPROTECH (Wallonia-France programme), involves CERTECH, CRITT-MDTS (Charleville-Mézières) and GEGENA<sup>2</sup> (University of Reims). The aim of the project is the development of better surface protections for steel and natural stone monuments, through the exploitation of sol gel hybrid materials.

More details are available on [www.hybriprotech.eu](http://www.hybriprotech.eu)



- SENSOPLAST (Wallonia-France programme) deals with sensory properties of plastics. It has started in 2009 in collaboration with Armines-Ecole des Mines de Douai. The project attempts to develop knowledge and methodologies for the control of odours generated by polymeric materials. Targeted applications are transportation and building industries (air quality in confined spaces) as well as packaging (impact on content quality, content/container interaction). This program will seek the identification and characterisation of odorous compounds emitted by polymeric materials, the impact of different parameters on these emissions and their eventual remediation. The project has been certified by MAUD (Sustainable materials) and COSMETIC Valley (cosmetic-perfumery) French competitiveness clusters.

More information available at [www.sensoplast-interreg.eu](http://www.sensoplast-interreg.eu)



- POLYCHANVRE has started in 2010 (Wallonia-France programme). This project involves a collaboration of CERTECH with the University of Liège - Gembloux Agro-Bio Tech (Gembloux), INRA - UMR FARE (Reims) and CRITT MDTS (Charleville-Mézières). The objective of the project is the crossborder development of polymer-hemp composite materials.

■ **Certech** has been granted two projects under the Operational Programmes of the European Structural Funds for the 2007-2013 period (European Fund for Regional Development):

- TECHONOPOLY (polymer technology) started in 2008 for a period of 6 years. **Certech** is the coordinator of this project involving CTP and MATERIA NOVA. The project aims at the valorisation of municipal plastic waste in order to minimise disposal to landfill. A range of technological options shall be considered for the best possible environmental and economic outcome: material recycling and catalytic cracking.
- MICROPACK was started on July 1st 2009, for a period of 6 years. It aims at developing a new concept for the protection and preservation of food in plastic packaging, at a more

attractive cost performance ratio than known technologies. MICROPACK will approach the barrier properties of multilayer products through novel additives that could be applied to existing monolayer processing equipment. **Certech** is the coordinator of the project. Partners are CELABOR who have developed a broad expertise in food packaging and CARAH who have expertise in chemical, physical and microbiological analysis of food.

- Within the frame of the regional competitiveness action, the Walloon “Plan Marshall” granted four projects to Certech:
  - PHOENIX, which deals with the energetic valorisation of complex ultimate wastes composed of foams, textiles, rubbers and wood. They arise from the recycling of complex finished goods such as automobiles or “white goods”. This project is conducted for 3 years by a consortium of 3 research centres, 3 private companies and one “Competencies centre” specialised in training in automotive mechanics. It has achieved several breakthroughs and the construction of a large pilot plant has been decided lately. Important advances related to the cleaning of the pyrolysis products by Certech. A patent application has been filed.
  - PICOM, an open innovation project addressing novel fuel cells, has been pursued in 2010. This has been conducted in partnership with ULg - CIOR and LASSC (University of Liège), UCL – EMIC (University of Louvain), NANOCYL S.A. and IT4IP S.A., who are coordinating the work. It is concerned with the development of new electrodes and new MEA (Membrane Electrode Assembly), through original materials developed by the two companies involved in the project. **Certech** has been focusing on the fine tuning of the electrolyte, the membrane and on the electrodes catalyst developments.
  - HOPE4PD has been pursued in 2010 (BIOWIN cluster of competitiveness). The project attempts to identify new treatments for Parkinson’s disease. The strategy of the project rests on validating the pertinence of receptors as novel drug targets and to identify compounds that can modulate these receptors. The project involves Euroscreen, UCB pharma, as well as laboratories from Namur and Brussels Universities. If the first phase reaches promising results, **Certech** will be involved in the second part of the project through the synthesis of target compounds.
  - **Certech** participated to the NANOCOMP project and developed expertise on carbon nanotubes. **Certech** contribution was principally linked to characterisation and measurement of physical properties of materials.
- Finally, four collective research projects initiated in 2009 have been continued:
  - MODICELL involves a collaboration of **Certech** with MATERIA NOVA and CELABOR. Modicell aims at developing packaging materials combining a structural cellulose matrix with a biodegradable polymer coating to improve water and oxygen barrier properties. Food packaging is the target market.
  - PARAGGLO deals with the reduction of industrial dust pollution by helping electrostatic agglomeration through the addition of appropriate chemicals. It involves three research centres: CRM, CENAERO and **Certech**.
  - PHASEMAT involved collaborations between **Certech**, CRR and CSTC. It aimed at the evaluation of phase change materials in construction materials. These products can store and





release comparatively large amounts of heat through their phase change at critical temperatures. They should be evaluated in concrete to prevent overnight freezing of roads or critical areas such as bridges. A PCM can possibly reduce the number and the intensity of freeze/thaw cycles experienced by a bridge deck or other concrete structures exposed to weathering, reducing thereby fatigue and attrition.

- RETERMAT involved CSTC, CENTEXBEL, CRM and **Certech**. This project aimed at evaluating phase change material (PCM) for thermal regulation of buildings.

### *Technological guidances*

The Walloon Region grants financial aid to approved research centers for the creation of technological guidance services. This activity is dedicated to technical consultancy and stimulation of innovation, particularly in SMEs. It requires technological and normative watch at an international level. For the period covering 2009 to 2011, **Certech** was active in 5 guidance services:

WALREACH: 6 research centres join forces to support Walloon companies in the framework of REACH.

SOLERO: technological guidance for an integrated management of the environmental impacts of industrial activities in the Region (soil, air, water). 8 research centers are involved.

BARRIERE: 2 research centres offer a common guidance for the development of “barrier” products and processes mainly for packaging and medical applications.

AIRPOLMA: identification and treatment of pollutants emitted by materials in confined spaces.

POLYMERE: formulation and development of speciality polymeric materials.

## 2.2 Technological Developments

**Certech** commitment is to offer its clients state-of-the-art facilities, innovative products, processes and methods, through R&D and partnerships with other relevant sources of knowledge, which could include companies, research centres and/or academic partners.

### ENVIRONMENT

**Certech** is a widely recognized expert laboratory in the assessment of air quality. For the last years, **Certech** has been offering a large span of capabilities and know-how with respect to the



chemical, sensorial (odour) and toxicological aspects of air quality. Its expertise in chemical and sensorial evaluations of air quality helps customers to select the most relevant methodology for every product situation. **Certech** operates multi-component gas analyzers, for real time analysis of poorly detectable volatile organic and inorganic compounds. Services are offered to the automotive industry, development

of catalysts, fuel cell R&D, waste burners and power plants, the food industry, pharmaceutical R&D, medical diagnostics... Analytical skills include identification and quantification of aliphatics, aromatics, PAHs, alcohols, aldehydes, ketones, carboxylic acids, thiols, amines, inorganic acids and bases. In order to face the most exacting demands, **Cerotech** has acquired sophisticated softwares to accelerate product identification.. Specialised equipment has been acquired and developed for the screening and selection of barrier materials and for rapid screening of emissive materials. It has been applied in transport, building materials, furniture and household products. Equipment to generate controlled atmospheres containing VOC has also been acquired and commissioned. It facilitates the measurement of the performance of abatement of VOC by photocatalytic devices, respiratory cartridges, passive sampler behaviour, ...

Sensory testing is one the core expertises of **Cerotech**. New approaches have been developed for the assessment of low odour levels in ambient air, for outdoor and indoor applications. Specific devices have been validated to boost sensitivity. These methods would also apply to the new ISO16000 standard for the assessment of odour from building materials.

In the field of photocatalysis, **Cerotech** was involved in a French project called "Normacat" certified by AXELERA cluster. It deals with the development of new photocatalytic material for air treatment as well as the methodology to assess activity on the basis of AFNOR XP B44-13.

## MATERIAL TECHNOLOGY

Construction of a new industrial hall has been completed in 2010. It houses various pilot equipments such as polymer processing machinery, basic chemical and catalytic operations.

**Cerotech** has significantly expanded its historical involvement in pilot processing tools for the production of industrial trial quantities. In the field of polymer materials, capabilities include coextrusion of cast multilayered films or tubes,

cables insulation, blown extrusion, injection moulding, preparation of complex masterbatches... Output production ranges from 5g to several hundred kg volumes.

For many years, **Cerotech** has been developing additives to improve the barrier properties of polyolefin food packaging films or containers. The technology could reduce oxygen permeability by an order of magnitude, which is significant as the limiting date of conservation of packaged food is inversely proportional to the rate of penetration of oxygen. One of the main advantages of this example of development is of environmental nature: cuttings and wastes could be recycled through the packaging production process, whereas multilayered materials can only be disposed of or reprocessed into lower value products as their architecture would be destroyed in the course of melting. Further developments are under way to try and optimise the quantity of additives required in the process.





The field of surface protection was also deeply investigated, through synthesis of hybrid organic-inorganic materials as sustainable solutions. It concerns the development of technologies more specifically devoted to the protection of surfaces via easily applicable processes such as sol gel, which could be sprayed, painted, dipped...

In the field of analytical science, **Certech** acquired a gas chromatograph equipped with pyrolysis and solid/liquid probe interfaces. This instrument will help determining the chemical composition of most resilient plastic matrices (engineering plastics, thermoset resins, molecular architecture, additives ...).

### PROCESS INTENSIFICATION



**Certech** has acquired equipment reaching extreme pressures and temperatures as first steps towards the development of Process Intensification technologies. In the field of recycling, **Certech** is involved in several projects for the catalytic valorisation of wastes, which could be considered as other aspects of process intensification. Those projects sit at the intersection of **Certech** environmental and process activities.

■ 2010 HIGHLIGHTS ■

### 2.3 Quality



n°400-TEST

Obtaining the first BELAC certificate was clearly a major achievement in 2010. Certech is the first laboratory in Belgium to obtain an accreditation for a sensory method. It relates to the assessment of odour concentration by dynamic olfactometry (certificate nr 400-TEST). **Certech** quality management system is now merging the requirements of both reference standards ISO9001 and ISO17025.

#### *Customer satisfaction*

Good returns and ratings were observed for customer satisfaction enquiries. They highlighted the importance of the technical support expected by most of our customers in term of equipment and interpretation of results.

#### *Employees satisfaction*

Employee's satisfaction enquiries revealed that flexibility and autonomy are highly appreciated and represent important aspects of the job. Numerous competencies have to be displayed to perform the work, but direct involvement to final project achievement is felt motivating.

## 2.4 Future Plans

They shall involve Implementation of strategies aiming at matching **Certech** 2020 vision. This shall include specialist recruitments and investments into pilot and demonstration equipment. Major promotional efforts should be launched over the next few years in order to promote investment of resources into better products and processes.

An important element of the strategy shall call on networking and collaborations with other centres of expertise, in applied but also basic research.

Sustainable development principles shall remain a priority at **Certech**, with several new projects addressing aspects such as development of renewable origin synthetic materials.

## 2.5 Accounts

### BALANCE SHEET 2010

<b>Assets</b>	<b>2010</b>	<b>2009</b>
<b>Fixed assets</b>	<b>1.581.168</b>	<b>990.126</b>
Scientific equipment and installations	1.553.620	990.126
Intangible assets	27.548	
<b>Current assets</b>	<b>5.339.809</b>	<b>4.994.108</b>
Accounts due within one year	2.513.580	2.050.618
Investments	0	1.000.000
Cash	2.012.790	1.018.320
Adjustments (accrued income)	813.440	925.169
<b>Total assets</b>	<b>6.920.977</b>	<b>5.984.233</b>







BALANCE SHEET 2010

<b>Liabilities</b>	<b>2010</b>	<b>2009</b>
<b>Reserves</b>	<b>4.797.720</b>	<b>4.579.059</b>
Permanent resources	1.466.935	1.466.935
Accumulated reserves	2.483.441	2.471.301
Investment subsidies	847.344	640.823
<b>Provisions for contingencies and losses</b>	<b>208.082</b>	<b>181.743</b>
<b>Debt</b>	<b>1.915.176</b>	<b>1.223.432</b>
Accounts payable within one year	518.233	402.777
Cash advances	1.396.943	820.655
<b>Total liabilities</b>	<b>6.920.977</b>	<b>5.984.233</b>

## INCOME STATEMENT 2010

### Income statement

	2010	2009
<b>Turnover</b>	<b>3.693.085</b>	<b>3.428.069</b>
Services provided to private companies	1.684.912	1.685.938
Research financed by public funding	1.596.380	1.350.170
Other revenues	411.793	391.961
<b>Expenses</b>	<b>3.517.674</b>	<b>3.215.570</b>
Supplies and services	854.476	782.283
Subcontracting	137.882	111.393
Salaries	2.510.155	2.319.081
Depreciation, provisions and loss of value	539.768	363.049
Exceptional expenses	15.162	926
<b>Financial revenues</b>	<b>376.853</b>	<b>303.060</b>
<b>Financial expenses</b>	<b>2.847</b>	<b>8.076</b>
<b>Extraordinary revenues</b>	<b>5.612</b>	<b>1.992</b>
<b>Taxes</b>	<b>3.120</b>	<b>11.312</b>
<b>Profit</b>	<b>12.140</b>	<b>134.190</b>



■ ORGANISATION ■

## Certech Management

### THE BOARD OF DIRECTORS

- **Mr F. Blondel**, Chairman of the Board
- **Prof. C. Bailly**, UCL
- **Mr. M. Beguin**, R&D Manager, ArcelorMittal
- **Mr D. Benanou**, Expert, Veolia
- **Dr N. Burtreau**, Administration of Research, UCL
- **Mr P. Busquin**, Mayor of Seneffe
- **Dr Y. Charlier**, Product & Development Manager, Grando
- **Dr G. Debras**, R&D Director, Total Petrochemicals
- **Prof. E. Gaigneaux**, UCL
- **Dr C. Lefevre**, R&D Manager, MacTac
- **Dr. E. Lox**, Senior Vice-President, Group Research and Development, Umicore
- **Prof. B. Macq**, Prorector, UCL
- **Mr F. Massin**, CEO, Nanocyl
- **Prof. T. Pardoën**, UCL
- **Prof J.-Y. Schneider**, UCL

### DAILY MANAGEMENT

- **Dr B.H. May**, General Manager since 1999
- **Dr. C.Henneuse**, Deputy General Manager since 2010

### THE SCIENTIFIC ADVISORY BOARD OF CERTECH

The scientific advisory board composed of leading academics is providing scientific validation of projects.

- **Prof. P. Bertrand**, Surface chemistry characterization (UCL)
- **Prof. J. Devaux**, Polymer physics and chemistry (UCL)
- **Prof. M. Devillers**, Inorganic chemistry and Catalysis (UCL)
- **Prof. J. De Wilde**, Materials and Process Engineering (UCL)
- **Prof. J.-F. Gohy**, Macromolecular Chemistry (UCL)
- **Prof. J. Marchand-Brynaert**, Organic Chemistry (UCL)
- **Prof. I. Marko**, Organic Chemistry (UCL)
- **Prof. O. Riant**, Organic Chemistry (UCL)





## INDUSTRIAL STEERING COMMITTEE

The Industrial Steering Committee is made up of a cross section of **Certech** customer base. It helps the Centre to better address Industrial needs.

- **Mr. B. Broze**, Managing Director, Essenscia
- **Dr G. Debras**, R&D Director, Total Petrochemicals
- **Dr G. Fryns**, Director, Sirris
- **Mr D. Geuning**, Manager, Sonaca SA
- **Dr N. Hautcourt**, Group Issue Manager, Recticel
- **Dr Y. Jongen**, Founder and Director, IBA SA
- **Dr. A. Kamprath**, Secretary General, Europur
- **Dr A. Momtaz**, Senior Departmental Manager, Solvay S.A.
- **Dr J. Salmon**, Regional Operations Manager, Sirris

## INDEPENDENT ACCOUNTANT

- **Deloitte fiduciaire**

## AUDITOR

- **BDO Atrio DFSA**



**Certech**

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centre  
de ressources

# certech

technologiques

en chimie

## materials formulation & technology

outstanding performance

renewable origin

hybrid materials

sol gel

## environment

health

& safety

recycling

Energy from chemistry

## process intensification

Innovative reaction media

Green chemistry

Catalysis

Microtechnologies

Pilot plants



**Certech**

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Wallonie