Everything starts with **chemistry**

We make it more **innovative**

Certech

R&D partner in chemistry

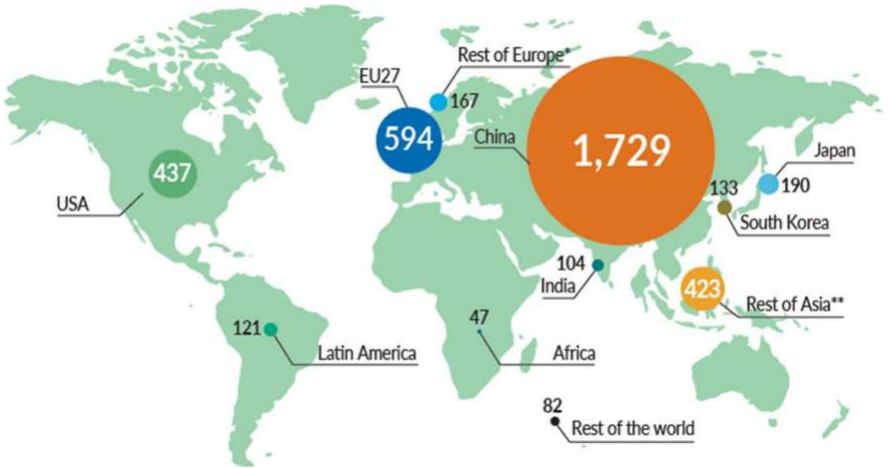
R&D partner and supplier of analytical and technological services for companies involved in activities related to chemicals, plastics, life science

Belgium (2021)
73,8 billion € turnover
97.500 direct jobs
and 224.000 indirect jobs
5,5 billion € in R&D investments

Wallonia (2021)
10,8 billion € turnover (26%)
25% industrial employment
30.000 direct jobs
and 68.000 indirect jobs
2 billion € in R&D investments

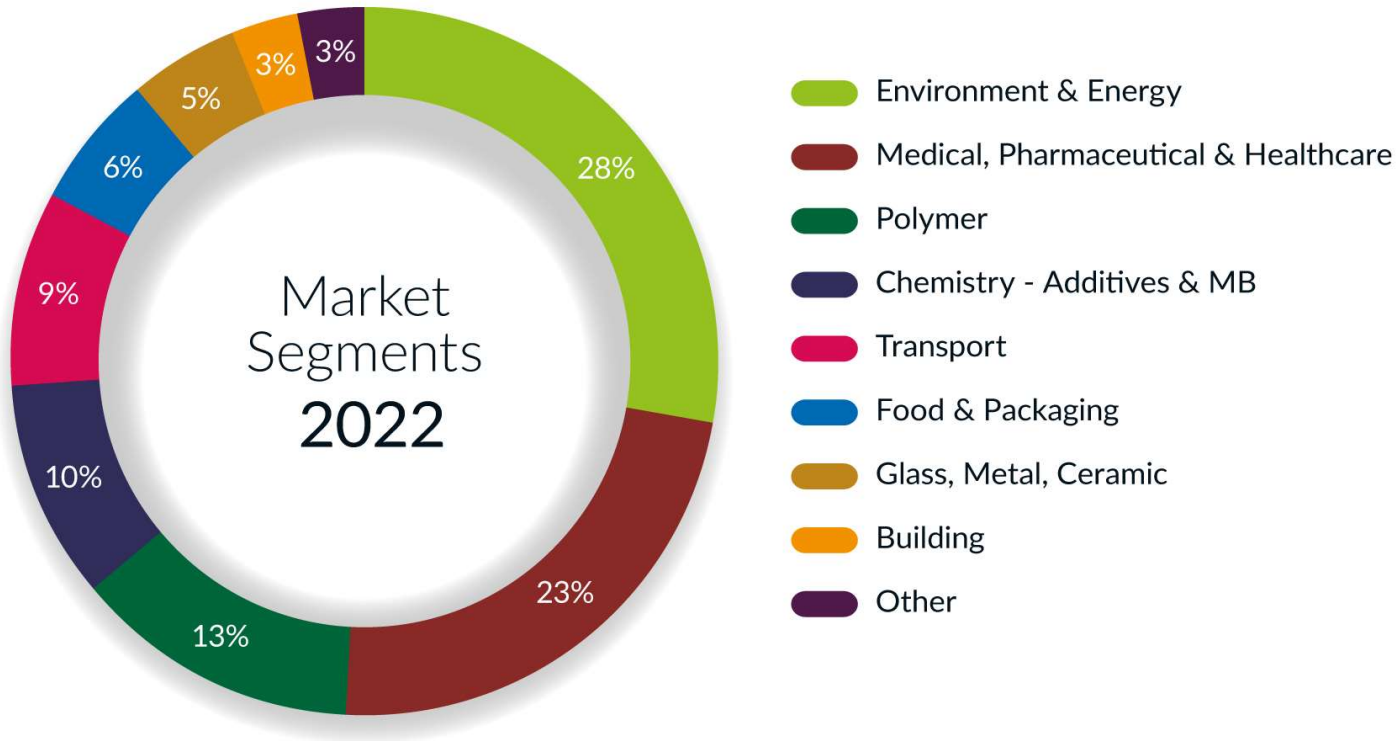
Source: essenscia

Europe (2021)
594 billion € turnover
2nd largest chemicals producer



Source: Cefic

Breakdown of income from industrial contracts



R&D Partner for Industries

Certech
R&D partner in chemistry

Sustainable innovative solutions to improve or develop products and processes

Services

Analytical support
Problem solving
Out of Spec analysis
Regulatory assessment

Industrial projects

Product/process development
Product/process improvement

Collaborative projects

Competence development
Product development
Process development

ENVIRONMENT

Air quality
Health & safety
Energy
Circular Economy

MATERIALS

(Bio-based) polymers & composites
Emissions and odours from materials
Lightweight materials
Mechanical Recycling

CHEMISTRY & INDUSTRIAL PROCESSES

Factory of the future / Intensification
Micro / Meso fluidic technologies
Catalysis and synthesis
Chemical Recycling

ANALYTICAL & TECHNOLOGICAL SERVICES

Extended characterization platform / reverse engineering
Pilot equipment
Products and processes improvement

Certech
R&D partner in chemistry

465 industrial contracts in 2022

33 employees

1680 industrial collaborations since 2000

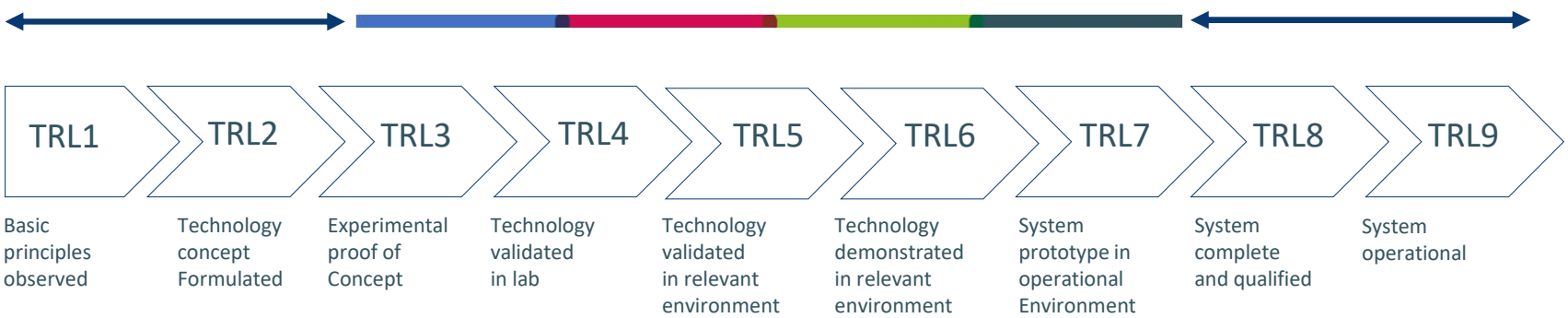
Technology Readiness Level : from 3 to 7

Certech
R&D partner in chemistry

Academic partners
Joint Research Unit
with UCLouvain

Certech

1650 industrial collaborations since 2000



Market Readiness (Technology Readiness Level)

We make it more **efficient**

Certech
R&D partner in chemistry

Materials

- Bio-based Polymers & Composites
- Emissions & Odours from Materials
- Lightweight Materials
- Mechanical Recycling

Formulation / Compatibilization / Characterization / Processing / HSE Management

Market oriented development

Polymers – Medical – Healthcare – Packaging – Automotive & Transportation…

(Bio-based) polymers & composites

Thermoplastic compounding
Compatibilisation/dispersion
Biocomposite and biobased formulations
Polymerisable formulations
High performance materials for 3D printing
Regulatory compliant materials

Emissions and odours from materials

Objective measurements and diagnostic
Odour-chemistry correlation
Remediation
Validation of materials and devices for indoor air purification

Lightweight materials

Physical and chemical foaming
Development and optimisation of formulations
Development and optimisation of foaming processes

Mechanical Recycling (P to P)

Thermoplastic compounding/processing
Shredded composites valorisation
Characterisation / technical data sheet
Odour management of recyclates

(Bio-based) polymers & composites

Expertise & developments (1) - biobased and sustainable materials

- Formulation of polymerisable resins based on commercial biobased products free of styrene, formaldehyde, bisphenol A or other CMR products
- Production of natural fibers reinforced composites by liquid resin infusion or by resin transfer moulding (RTM)
- Modification of biobased polymers to improve specific properties
- Production of lightened materials by foaming extrusion

Biobased sandwich panel development

(Bio-based) polymers & composites

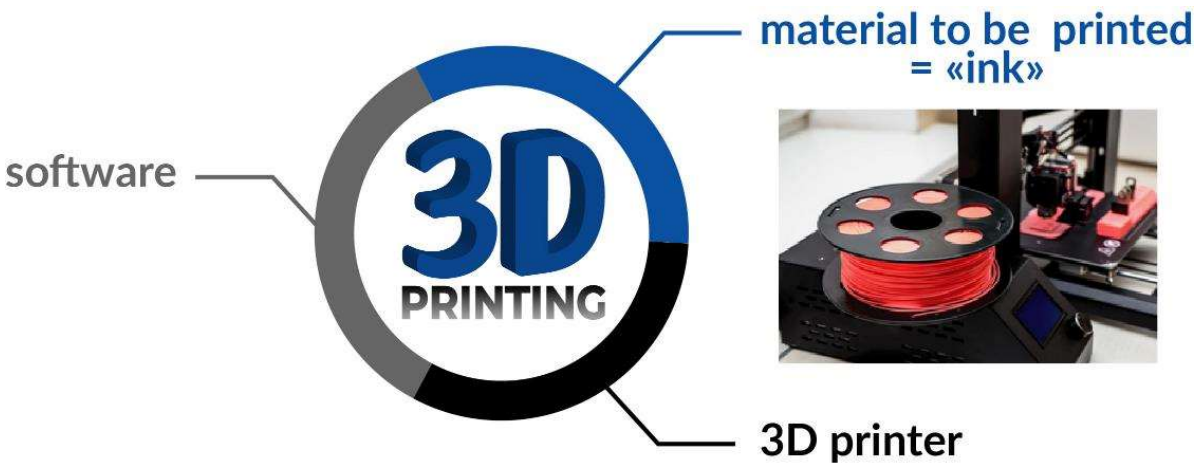
Certech
R&D partner in chemistry

Expertise & developments (2) – low odour & low emission biocomposites

- Development of high performance biocomposites with low environmental impact
- Improvement of mechanical properties
- Formulation of materials, remediation of odours and VOCs
- Impregnation of natural fibres with thermoplastics
- Formulation and production of granules or filaments for 3D printing
- Sensory characterization of finished materials.

(Bio-based) polymers & composites

Expertise & developments (3) – high performance materials for 3D printing



Fused filament fabrication (***FFF***)
= **fused deposition modeling®** (***FDM***)
= "extrusion-based" process

- FDM materials comprising (biobased) polymers and fillers
- FDM materials comprising post-industrial and/or post-consumer recycled materials

(Bio-based) polymers & composites

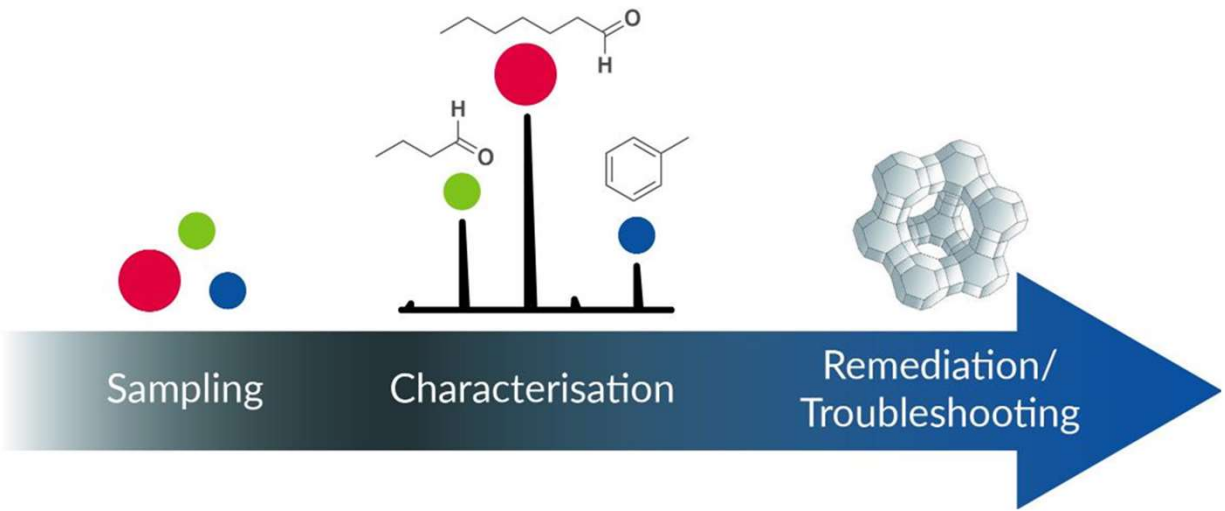
Certech
R&D partner in chemistry

Expertise & developments (3) – high performance materials for 3D printing

3D printer filament extrusion line

3D printer with heated platform for 3D printing of PMMA, PC …

Emissions and odours from materials

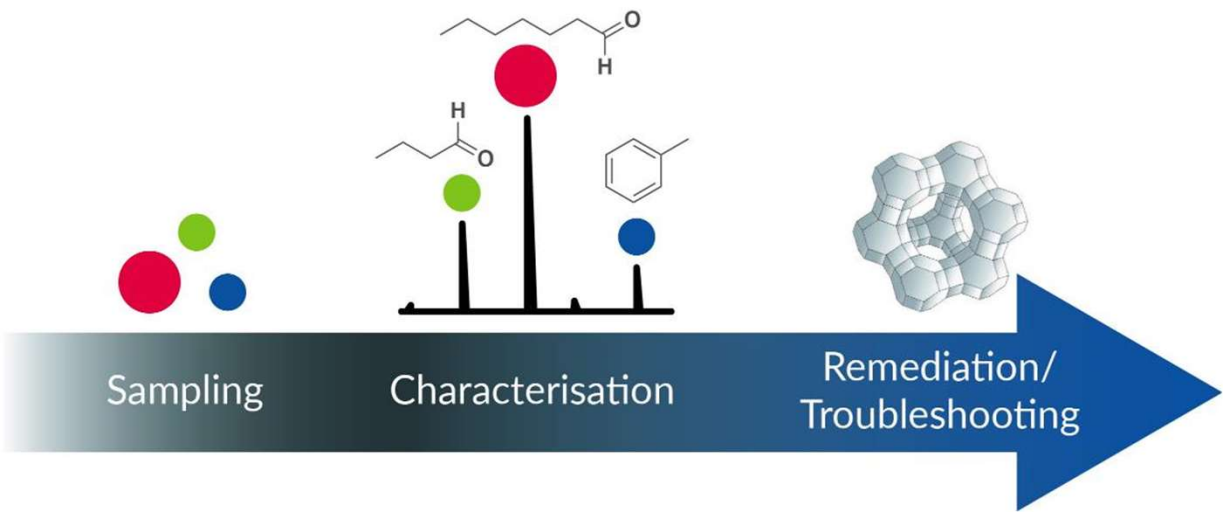


- Sampling: various emission cells and emission chambers
- Characterisation - Expertise in VOCs and traces analyses (including NIAS)

  GC×GC-HRTOFMS

  Liq/MHE-GC-HES-MS/FID

Emissions and odours from materials

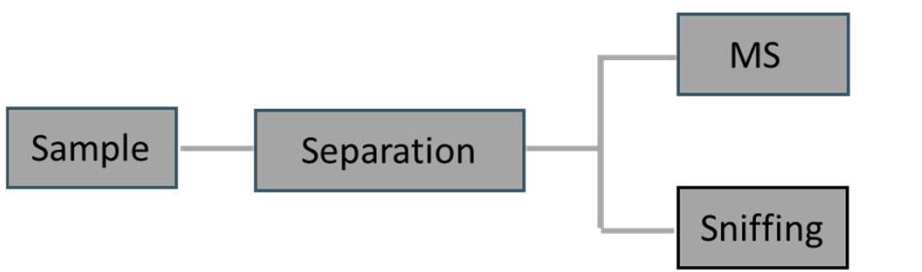


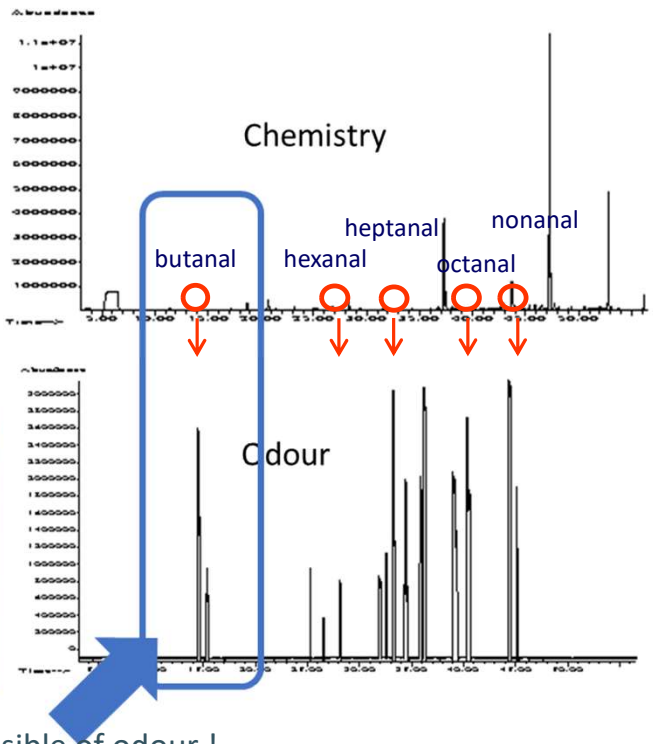
Expertise in the 4 components of the odour:

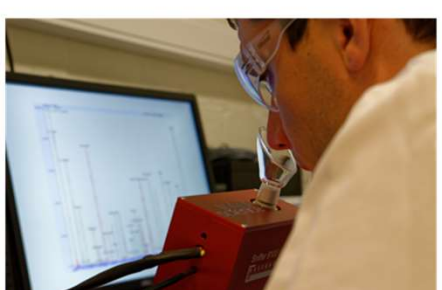
- Detectability = detection threshold, odour quantification by dynamic olfatometer according to EN 13725
- Intensity, quantification based on a scale
- Quality = decomposition into fundamental notes using the “Field of odours®” approach
- Hedonic tone (acceptability), subjective and global (annoyance, approach – pleasantness/unpleasantness)

Emissions and odours from materials

Chemistry/odour correlation by TD-GC-(TOF)MS/Sniffing:







Experts panel Certech
(weekly training)

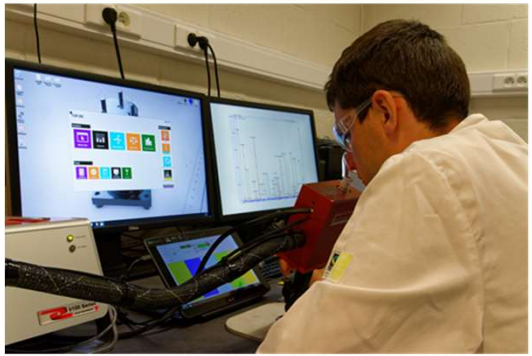
Minor compounds could be responsible of odour !

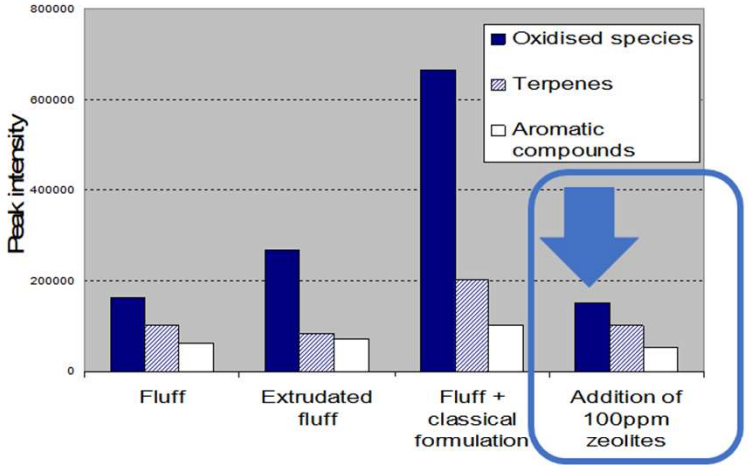
Emissions and odours from materials

Certech
R&D partner in chemistry

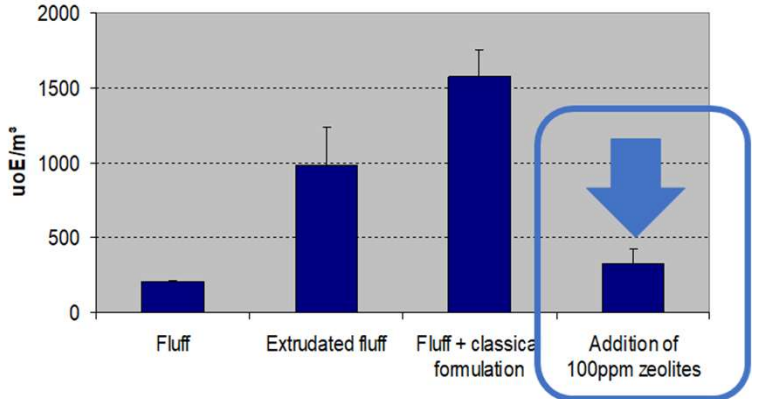
Case study: remediation of HDPE for packaging application by formulation with adsorbents

TD-GC-MS/Sniffing





Dynamic olfactometry



Lightweight materials

Foaming activities

- Physical and chemical foaming
- Development and optimisation of formulations
- Development and optimisation of foaming processes

R&D tools

- Batch foaming / high pressure vessel
- Continuous foaming / melt processing

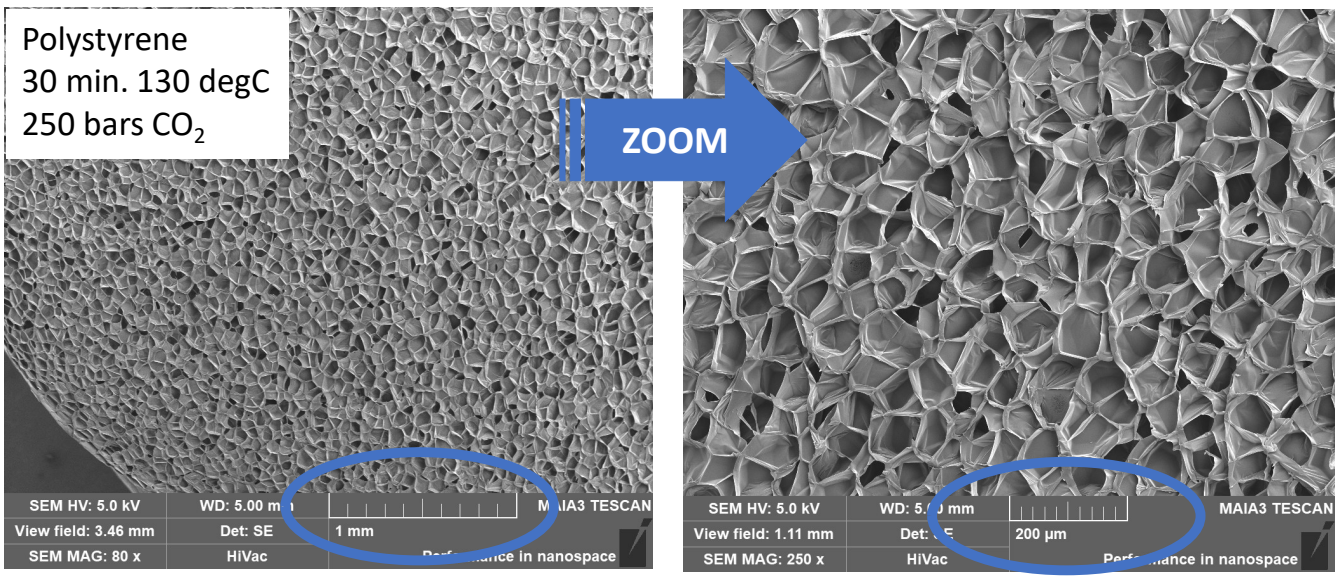
Lightweight materials

Batch foaming / high pressure vessel

- Pre-R&D investigation
- (1) gas diffusion below or above Tg under gas pressure
  (2) expansion below or above Tg

➔ Polymer/blowing agent validation

➔ Foam cells structure



Lightweight materials

Continuous foaming / melt processing (1)

- Validation of operational parameters (rpm, flow …)
- Validation of formulation
- Validation of foam structure

Two steps set-up

- preliminary compounding required
- single-screw extruder + static mixer (+ rod die)

Lightweight materials

Continuous foaming / melt processing (2)

- Validation of operational parameters (rpm, flow …)
- Validation of formulation
- Validation of foam structure

One step set-up

- twin-screw extruder + static mixer (+ rod die)

Lightweight materials

Continuous foaming / melt processing (2)

- Validation of formulation

  PS/CO2

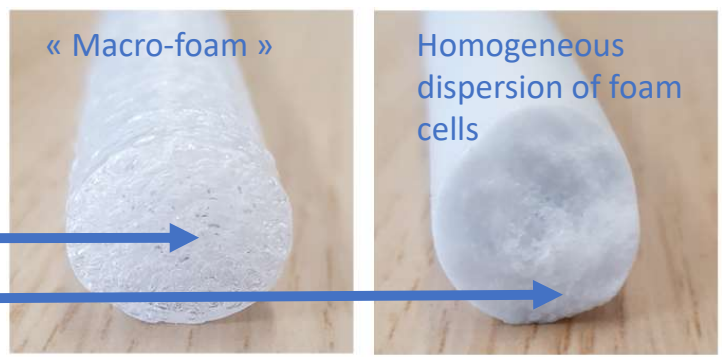
  Single screw-static mixer-rod die

  Density = approx. 0,35

  Expansion : 3 to 3,5

  Unformulated

  Formulated



- Validation of process

  PS/CO2

  Twin screw-static mixer-rod die

  Single screw-static mixer-rod die

Mechanical recycling (P to P)

Certech
R&D partner in chemistry

Converting Plastic to Plastic

- R&D Research partnership to:

  Improve the economics, quality and uptake of recycling plastics

  Understand the potential impact of substances of concerns and accelerate the development and application of safe alternatives

- Independent laboratory for:

  Polymer processing at pilot scale

  Analyses and expertise for material characterisation (mechanical, chemical and sensory properties)

  Management of health, safety and environmental aspects

Mechanical recycling (P to P)

Converting Plastic to Plastic / Key achievements (1)

- Materials valorisation, characterisation and technical data sheet drafting

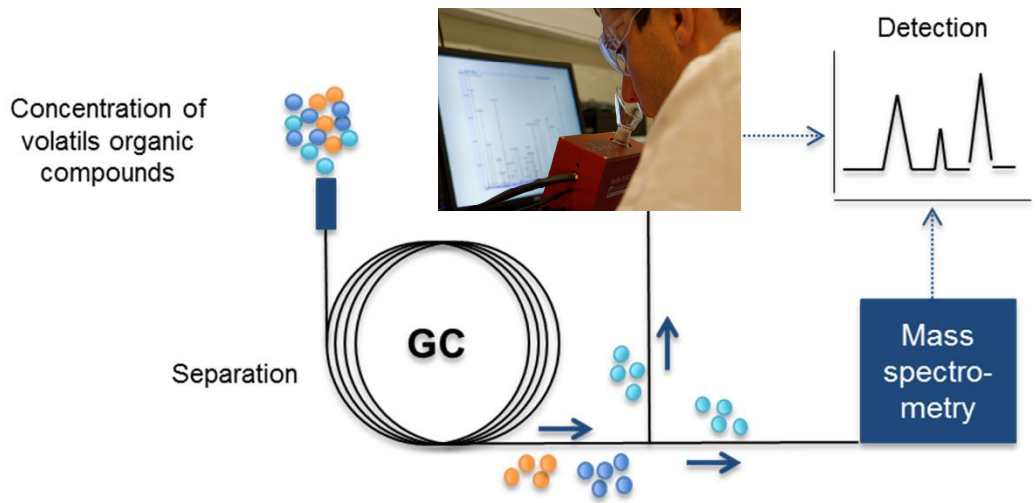
  Example: recycled filled PP / FPP COMET Regrind (originating from car shredding)

https://www.cometgroup.be/nos-activites/plastiques-issus-de-residus-de-broyage/

Mechanical recycling (P to P)

Converting Plastic to Plastic / Key achievements (2)

- Process/formulation optimization including odour and VOCs remediation to meet industry specifications (ex: automotive application)



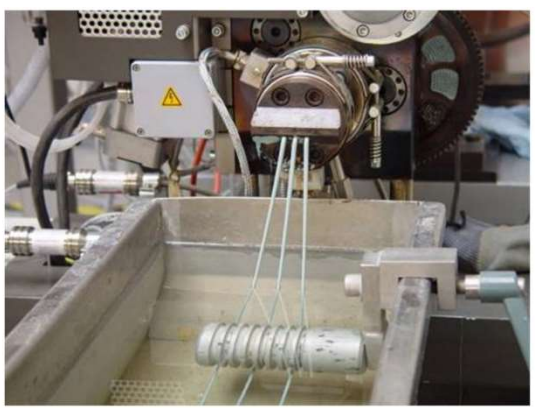
➔ *Identification of the nature of odorous compounds for remediation*

Mechanical recycling (P to P)

Converting Plastic to Plastic / Key achievements (3)

- Valorisation of plastic waste selectively collected in the Walloon waste collection centers: development of a complete flow sheet for mechanical recycling (treatment and grinding, extrusion, filtration and injection)

Plastic waste collection and grinding



Extrusion

Pelletizing

Injection molding

Mechanical recycling (P to P)

Converting Plastic to Plastic / Key achievements (5)

- HSE Management

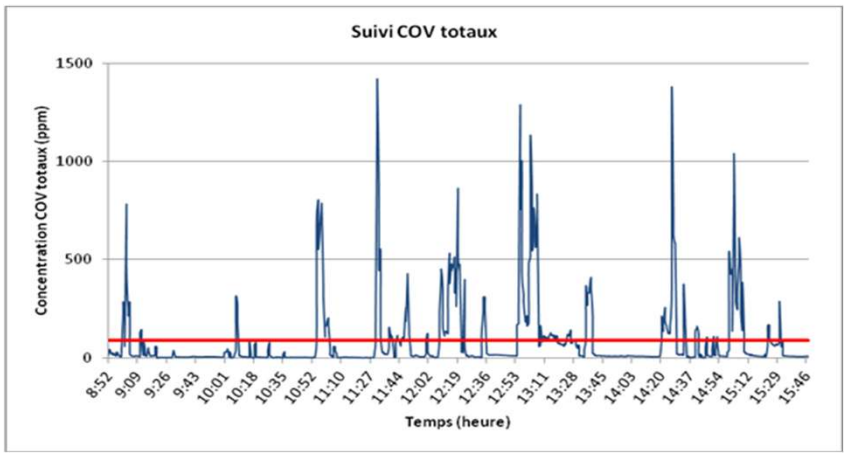
  Analysis of risks

  Samplings and analysis

  -Chemicals, dust, nanoparticles, microbial contaminants, noise

  -Evaluation of personal protective equipment

  Assessment of workplace exposure levels with toxicological advices



On-line analyses and various tools for workplace exposure monitoring

We make it more **intelligible**

Certech
R&D partner in chemistry

Analytical & Technological Services

- Extended Characterization Platform
- Reverse Engineering
- Pilot Equipments
- Products & Processes Development

Structure-properties relationship / physical, chemical & odour characterization / traces analysis

Polymers – Medical – Healthcare – Food & Packaging – Chemistry – Environment & Energy – Transport – Building…

Extended Characterization Platform

Air quality

Online measurement
VOC analysis
Odour analysis: dynamic olfactometry, trained expert panels, GC-MS-Sniffing, 2 sensory rooms
Nanoparticles, dust, noise, microorganisms, laboratory gas generator

Mechanical properties

Bending, compression and tensile test, Young modulus, abrasion, scratch test , hardness, creep test, Charpy and Izod impact, HDT/VICAT, DMA

Spectrocopy / Thermal analysis

FTIR, FT-µIR, NIR, Raman, UV/Vis, NMR (access)
TGA, muffle furnace, DSC, Flash DSC (access), TMA (access), moisture analysis

Chromatography

GCxGC-HRTOFMS
HPLC-PDA-MS, (TDS)-GC-MS/FID, GC-FPD
GPC-MS, GPC RT and HT multidetectors (UV-DRI-Visco-LS-EELS)
TREF, GEF
Preparative GPC and HPLC
Pyrolysis GC-MS, Direct Injection Probe

Microscopy

Optical
FEG-SEM-EDX, EELS-TEM

Rheology

Rotational and capillary rheometer
Viscometers, Melt Flow

Structural and textural analysis

Permeability, DRX, BET, DLS, Profilometer, Laser Granulometer, Ageing, zeta potential analyser

Pilot equipments

- **Pre-treatment**
  - Air dryers
  - Pellet Compactor
  - Shredder

- **Mixing and compounding (thermoplastics)**
  - Single-screw extrusion
  - Twin screw extrusion

- **Shaping (thermoplastics)**
  - Film : flat die extrusion and blow extrusion
  - 3D printer filament extrusion line
  - Thermoforming
  - Injection molding
  - Fiber impregnation
  - Foaming extrusion: single screw or twin screw + static mixer, tandem line
  - Micro twin screw extruder and microinjection molding (5 g)

- **Polymerisable liquid formulations processing**
  - Liquid resin infusion (LRI)
  - 2 component resin transfer moulding (2K RTM)

Recognition

Certech
R&D partner in chemistry

ISO 9001

Automotive collaborations and accreditations

Belgian expert for standards elaboration (ISO16000, EN 13725)

Belgian expert in 11 CEN, ISO and Afnor standardisation committees

Belgian expert for IAQ labels harmonisation in Europe

Walloon Region, Flanders, BXL, CIR agreements

ADEME recognition

Wallonie

AGENTSCHAP INNOVEREN & ONDERNEMEN

Vlaanderen is ondernemen

ADEME

Agence de l'Environnement et de la Maîtrise de l'Energie

Participations and collaborations

Certech
R&D partner in chemistry

Professional bodies

www.essenscia.be

www.wal-tech.be

www.gn-meba.org

www.gfsv.net

www.src.be

www.valbiom.be

www.idea.com

www.4spe.org

www.ccih.be

Clusters

www.greenwin.be

www.polemecatech.be

www.wagralim.be

www.clusterswallonie.be

www.clusters.wallonie.be

www.bioeconomyforchange.eu/

Recognition and collaborations

Agilent Technologies

Authorized Partner Laboratory

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).

Certech is member of the Editorial Board of the International Journal of Polymer Analysis and Characterization (IJPAC)

Certech is also referee for the following journals: ACS Applied Polymer Materials, Catalysis, Catalysis Communications, Catalysts, ChemCatChem, Chemistry - A European Journal, Macromolecules, Molecules, Nanomaterials, Organic Letters, Polymer Chemistry, RSC Advances, Synthesis

Certech
R&D partner in chemistry

Customer-focused employees

Meet industrial needs

From raw materials suppliers to end-users