

ANALYTICAL PLATFORM

AIR QUALITY PLATFORM

- Sampling
  - Direct monitoring on stack or remote from a mobile laboratory
  - Lung-principle sampler for bags sampling
  - Isolation flux chamber
  - Specific filters and adsorbants
  - Emission cells and emission chambers (from 44 cm^3 to 1,5m^3)
  - On-line measurements

- Analysis
  - Online measurement (O_2, COx, NOx, SOx, TVOC, VOCs by Soft Ionization – Mass Spectrometry, sulfur compounds, ozone, temperature, humidity, portable weather station ….)
  - Chemical analysis by chromatography (TDS-GC-MS, GC-DFPD, GC-FID, GC-PID, HPLC-UV-MS)
  - GCxGC-HRTOFMS
  - Odour analysis (detectability, intensity, quality and hedonic character): dynamic olfactometry, different panels (representative of the population, calibrated, trained expert panels), 2 sensory rooms, Gas chromatography-olfactometry (GC-O or GC-Sniffing)
  - Nanoparticles and dust analysis (nanoparticles counter, size distribution, evaluation of dust deposit)
  - Noise measurement (sound level meter and dosimeter)
  - Airborne and/or deposited bacteria and fungi sampling and analysis
  - Laboratory gas generator (controlled atmosphere, efficiency testing of safety filters cartridges)

- Pilot devices
  - VOCs wet scrubber
  - VOCs catalytic oxydation
  - Photocatalysis
  - Efficiency testing of materials and devices developed for air purifying

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MATERIALS PLATFORM

- Materials characterisation
    - Spectroscopy: FTIR, NIR, Raman, UV/Vis, NMR (access)
    - Chromatography (preparative GPC/HPLC, HPLC-PDA-MS, GPC-UV-DRI-Visco-LS, GPC High Temperature and triple detection, GPC-MS, TREF- Temperature Rising Elution Fractionation, GEF - Gradient Elution Fractionation, GC-PID, GC-MS, pyrolysis GC-MS)
    - Mechanical and thermomechanical analysis (bending, compression and tensile test, modulus of elasticity, abrasion and scratch test , hardness, creep test, Charpy and Izod impact test, HDT/VICAT, DMA)
    - Thermal analysis: TGA, muffle furnace, DSC, moisture analysis, TMA (access), Flash DSC (access)
    - Structural and surface characterisation (particle size, porosimetry BET, XRD, roughness, permeability, surface wettability, optical microscopy, FEG-SEM-EDX, EELS-TEM, cryo-ultramicrotomy)
    - Rheological analysis (rotational and capillary rheometer, viscometers, Melt Flow Index)
    - Optical analysis (transmission, reflection, refractive index)
    - Characterisation of barrier properties against odours and VOC
    - Odour characterisation (sensory room, dynamic olfactometry at detection threshold with human assessors, expert panel, GC-MS Sniffing)
    - Simulation of aging in climatic chambers (UV, temperature, humidity, air renewal rate)

- Surfaces characterisation
    - Microscopy (optical microscopy, Variable Pressure FEG-SEM, EDX)
    - Roughness (optical and mechanical profilometer)
    - Wear resistance (nanoscratch, abrasimeter)
    - Wettability (surface tension, contact angle, potentiel zeta)
    - Electrochemistry (potentiostat/galvanostat , electrochemical cell)
- Coating deposition
    - Spin-dip-roller coating

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- Polymer processes
    - Air dryers, mixers, single-screw and twin screw extrusion, co-extrusion (films and pipes)
    - Pellet Compactor
    - Film: flat dye extrusion and blow extrusion
    - Thermoforming
    - Injection molding
    - Foaming line
    - Micro twin screw extruder and microinjection molding (5 g)
    - LRI and RTM

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PROCESS INTENSIFICATION PLATFORM

- Autoclaves and Equipments for Chemical Synthesis
    - Autoclaves in parallel with mechanical stirring (8 x 20 mL, up to 34 bar and 200°C)
    - Steel autoclaves (75 to 600 mL) for high-pressure and high temperatures chemical treatments (up to 500 °C and 600 bar)
    - Micro autoclaves in glass (0.5 mL to 20 mL) stirred and heated by microwave irradiation (up to 250°C) and resistant to an autogenous pressure of 20 bar.
    - Glass reactors (0.6 to 6L) heated by double jacket (200 °C) with semi-automated injection systems and continuous temperature and pH control.

- Pilot reactors
    - Pilot reactor (5 liters) with solid addition unit (1 kg/h) and pilot distillation unit (pyrolysis, catalytic cracking, waste treatments, biomass conversion, …)
    - Intensified reactor for continuous meso-fluid tests (-10 to 200 °C, 2 to 10 ml /min)
    - Intensified reactors for gas phase catalytic tests (25 to 450 °C, 100 ml /min)
    - Intensified reactors for continuous catalytic oxidation of VOCs (250 °C, 30 m^3/h)
    - Reactors for continuous treatment of fluids loaded with solid particles (design and adaptation according to project needs).
    - Ultrasonic reactors (design and adaptation according to project needs)
- Purification
    - Preparative chromatography, distillation columns
- Characterisation
    - NMR (access), GC-FID, GC-MS, HPLC, IR, Raman, UV, DRX, BET, DLS, TGA / DSC, micro-GC coupled to mass spectrometer, zeta potential analyzer

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