

# ALL ABOUT **PLASTICS** in one place

●●●● **FTPO**  
Faculty of  
Polymer Technology



Mechanical/thermal and chemical characterization | Processing tests and preparation of blends/composites and recycled materials | Providing help for companies experiencing problems during processing | Tests of environmental impact and biodegradation  
Product development in all stages of developmental process | Trainings/conferences/seminars/B2Bs | Bachelor's and Master's degree in Polymer technology

## THERMAL AND CHEMICAL CHARACTERIZATION OF POLYMERS



Determination of the:

- + type of polymer
- + type of inorganic filler in the polymer
- + amount of inorganic filler in the polymer
- + glass transition temperature (T<sub>g</sub>) of the polymer
- + melting points of the polymer
- + degree of crystallinity of the polymer
- + thermal history-processing of polymers
- + maximum residence time of thermoplastics in the screw
- + crosslinking of the thermosets in relation to temperature of polymer degradation
- + rheological properties of thermoplasts

## MECHANICAL PROPERTIES OF POLYMERS/PRODUCTS



Universal testing machine, charpy impact tester and mechanical analyser perform the following:

- + tensile tests
- + bending tests
- + pressure tests
- + creep tests
- + cyclic tests – fatigue
- + temperature dependence test of mechanical properties (-100 °C to 350 °C)
- + frequency dependence test of mechanical properties
- + amplitude dependence test of mechanical properties
- + shear dependence test of mechanical properties
- + toughness test

## PROCESSING TESTS AND PREPARATION OF BLENDS AND COMPOSITES



Injection-moulding machine and twin-screw extruder enable:

- + start-test of new tools
- + optimization of processing parameters
- + definition of technological frame for processing of new polymers production of restricted series of product
- + granulation of filaments of various materials
- + production and granulation of new blends of materials
- + colourful production as per companies demands
- + production and characterization of recycled materials
- + definition of shrinkages of different materials
- + comparison of different flowpath for various materials
- + multiple recycling test with grinding of injection-moulded pieces

**The state of the art equipment enables testing and determination of various properties of the processed material/product.**

## ENVIRONMENTAL IMPACT AND BIO-DEGRADABILITY



Our laboratory equipment and advanced knowledge in the field of characterization and processing of polymer materials enables us to:

- + define the importance of environmental impact on materials degradation
- + define the impact of processing conditions on materials degradation
- + develop the adequate incoming control of raw material
- + define the adequate additive to minimise the environmental impact on the final product
- + test biodegradability of biodegradable materials

## PRODUCT DEVELOPMENT

We offer holistically designed service comprising all development stages of the product – from idea to the final products.

### IDEA

Market and state of the art analysis  
Search for additional financial resources  
Technological solutions for product ideas

### MATERIAL

Material synthesis  
Compounding (composites and blends)  
Measurements /material characterization

### TECHNOLOGY

Processing tests  
Characterization  
Optimization (technological window)

### PRODUCT

Thermal and mechanical properties measurements  
Ageing tests  
Biodegradability tests

## TRAININGS, SEMINARS AND CONFERENCES



Trainings are tailor-made to meet the needs of customers in order to follow the latest trends in the field of polymer materials and their processing.

### Who are the trainings for?

- + companies who want to upgrade knowledge and skills of employees
- + individuals from the industry and research institutes who want to keep up with the latest trends and novelties

**Trainings are carried out by experienced professionals from research and industry who are able to adapt trainings to target groups.**

### The following types of trainings are available:

- + in company tailor-made trainings for different target groups (technical profiles, purchase & sales services employees)
- + one-day seminars dealing with various topics related to polymer materials and their processing
- + conferences and seminars to present the latest technological achievements in the world

**Equipment for  
thermal/mechanical  
and chemical  
characterization of  
materials:**

- + Differential scanning calorimeter (Mettler Toledo, DSC 2)
- + Flash DSC (Mettler Toledo, Flash DSC 1)
- + Dynamic mechanical analyzer (Perkin Elmer, DMA 8000)
- + Universal testing machine (Shimadzu, AG-X plus)
- + FTIR spectrometer (Perkin Elmer, Spectrum 65)
- + Thermogravimetric analyzer with DSC signal (Mettler Toledo, TGA/DSC 3+)
- + Thermogravimetric analyzer (Perkin Elmer, TGA 4000)
- + Pyris Software for Model Free Kinetics and TTS DMA/TGA (Perkin Elmer)
- + Transferline TGA and FTIR (Perkin Elmer, TG-IR-GCMS INTERFACE TL8000)
- + Thermal conductivity instrument (Hot Disk, TPS 1500)
- + Melt flow index instrument (LIYI, MFI LY-RR)
- + Impact strength instrument (CHARPY LY -XJDS)
- + Moisture Analyzer (Mettler Toledo, HX204 Moisture Analyzer)

**Processing  
equipment:**

- + Grinding mills for thermoplastics (Wanner)
- + Injection moulding machine (ARBURG, ALLROUNDER 320 C 500-100 Golden Edition)
- + Injection moulding machine (KRAUSS MAFFEI, CX 50-180 blue power)
- + Single screw extruder (BAOPIN BP-8176-ZB)
- + Laboratory press (BAOPIN BP-8170-B)
- + Twin-screw extruder (LABTECH - LTE 20-44)
- + Injection moulding tools (size in compliance with ISO 527, ISO 178 in ISO 179)
- + Granulator (SCHEER)
- + 3D FDM Printer (Makerbot Replicator 2)
- + 3D DLP Printer
- + Pellet Line (PT 50)

**Equipment for  
environment  
impact testing and  
biodegradability,  
LCA analysis:**

- + UV chamber (Intelli-ray 600)
- + Accelerated aging test (Atlas, SUNTEST XXL+)
- + Respirometer for biodegradability analysis (ECHO, RESEP 02)
- + Composters (NATUREMILL)
- + Software for LCA analysis (GaBi)

**Equipment for  
the synthesis of  
polymers:**

- + Laboratory mixing reactor
- + Glass reactors
- + Digestor (Wesemann, ENAS 1500)
- + Ultrasonic bath (Iskra PIO, SONIS 3 GT)
- + Lyophilizer (Christ Alpha 1-4)

**CONTACT and  
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