UNIVERSITEIT GENT

FACULTY OF ENGINEERING AND ARCHITECTURE

Processing of polymers and microprocessing @ UGent

Prof. Dr. Ludwig Cardon

03/12/2014

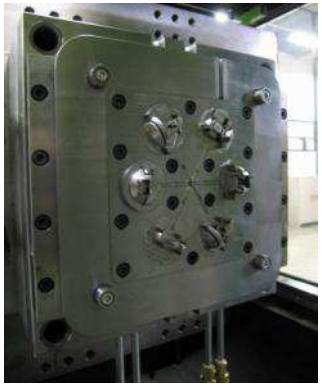
Opening P3 Lab

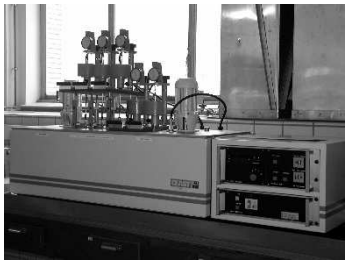
PMT

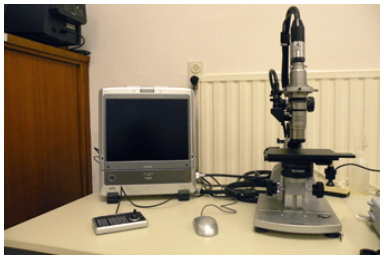
P3Lab

Education

- Engineering Chemistry & ElectroMechanics
- BSc & MSc courses
- Specialization polymers (1955)

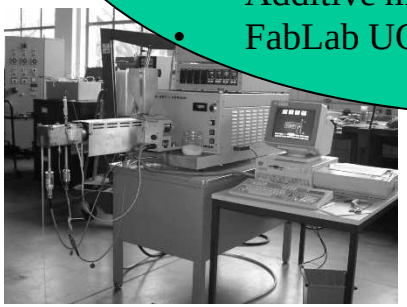


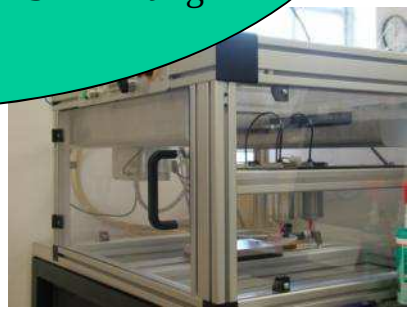




Research (1970)

- Physical and physical-chemical analyses of polymers-textiles-materials/metals
- Polymer processing - composites
- Mould making – hybrid moulds
- Flow simulation (Moldex3D)
- Biobased polymers & biomedical applications
- Re-processing of polymers & composites
- Additive manufacturing – 3D Printing
- FabLab UGent





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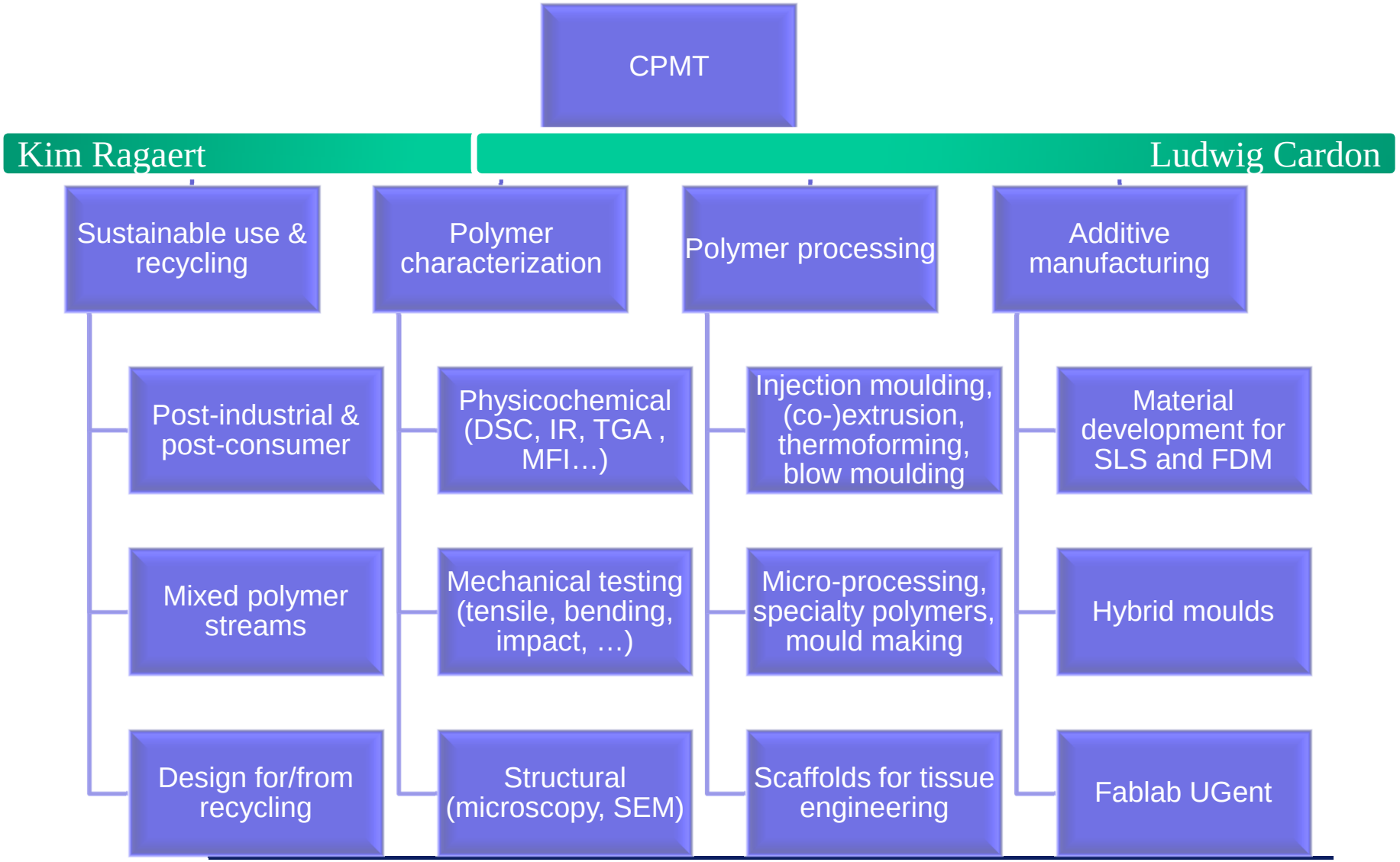
Research @ CPMT



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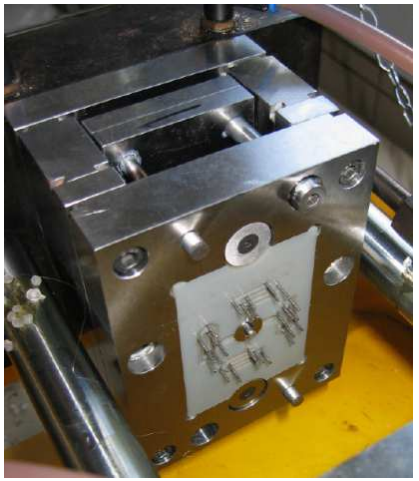
Equipment @ CPMT: processing

4 injection machines

(Engel 80T, Engel 28T, Boy 22T, Klockner 70T)



Equipment @ CPMT: processing

3 single screw extruders (2 Brabender lab extruders, 1 axson compounder)

2 twin screw extruders (Coperion 18D & 1 reactive extruder)

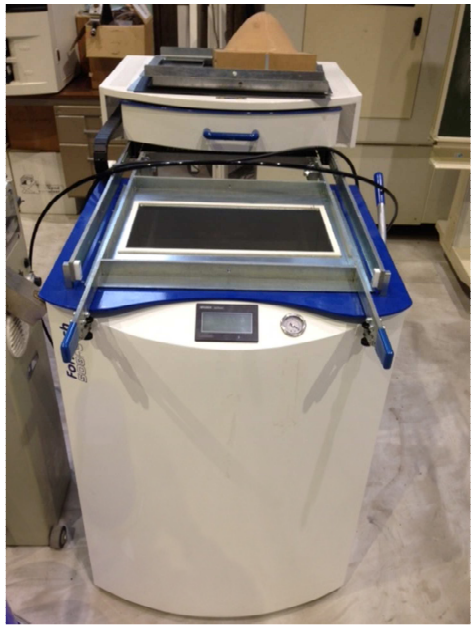
- extrusion plate die 150mm
- extrusion slit die 2*20mm
- extrusion blow film die diameter 150mm
- co-extrusion 2 layer plate die 120 mm

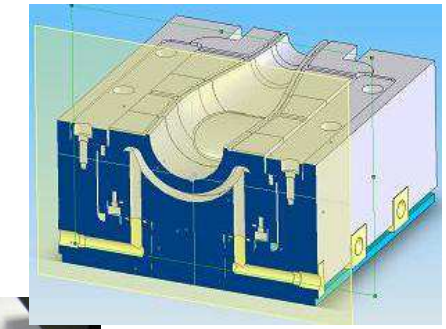
Equipment @ CPMT: processing

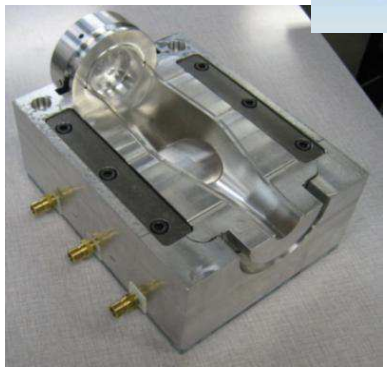
extrusion blow moulder Bekum

co-injection/intrusion Main

Thermoforming





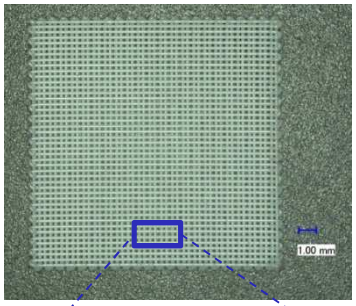


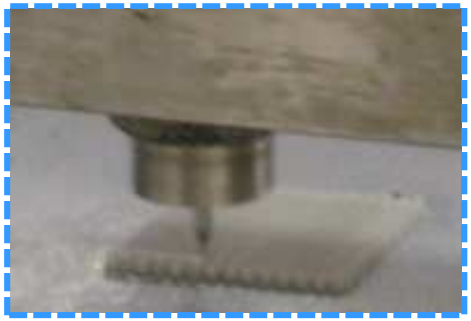
extrusion blow moulding bottle 1L

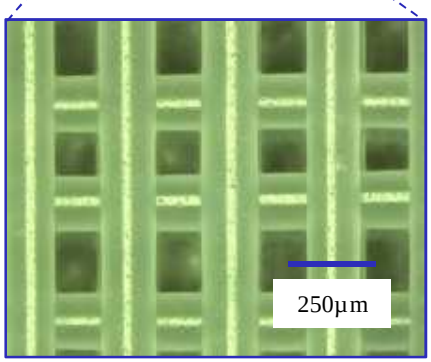
thermoforming mould for packaging applications

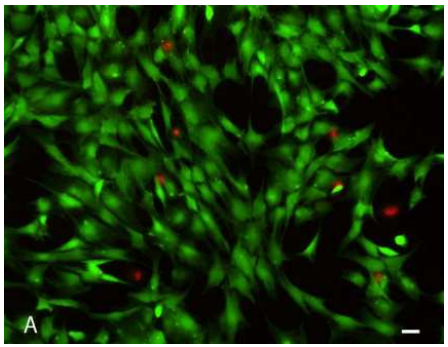
Equipment @ CPMT: AM processing

BioScaffolder: 3D plotting of scaffolds for tissue engineering





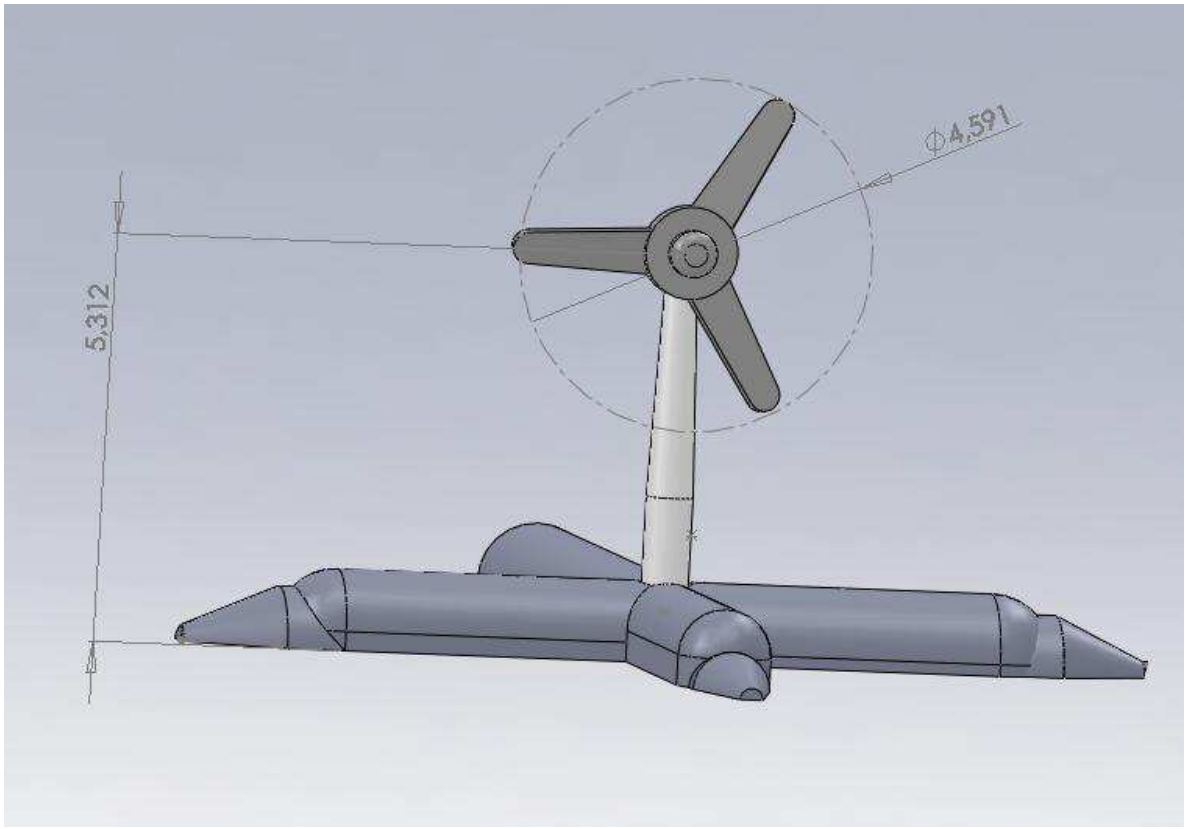


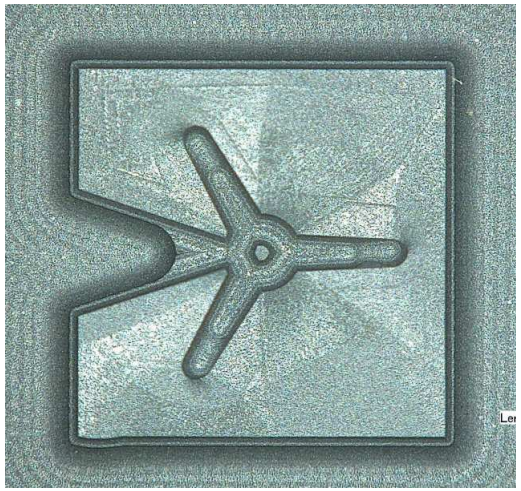


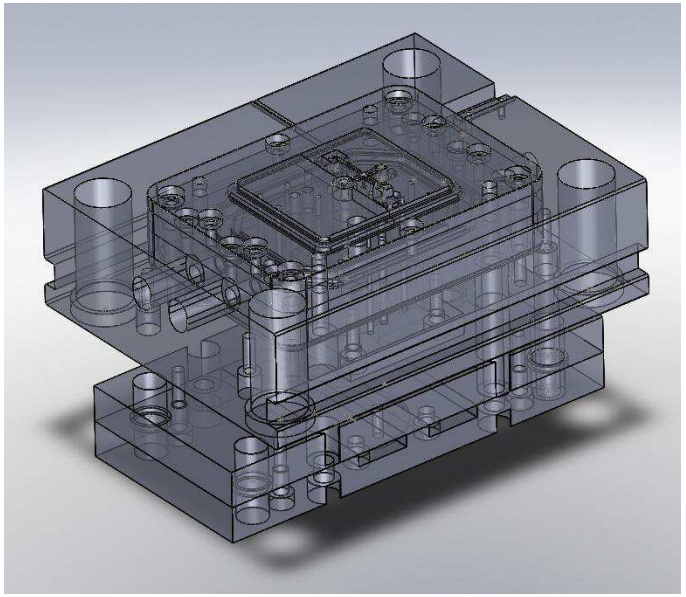
Material & machine development for

Fusion and Extrusion Based 3DPrinting

Equipment @ CPMT: Micro processing



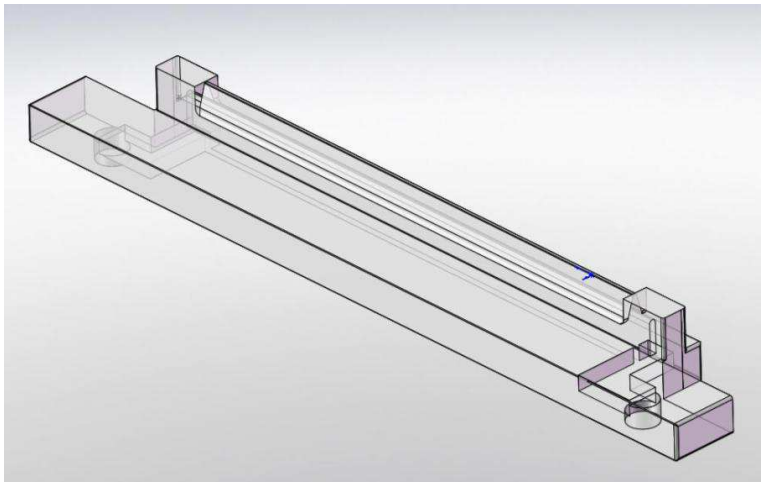


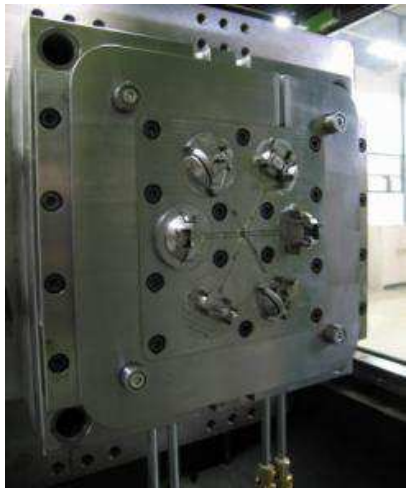


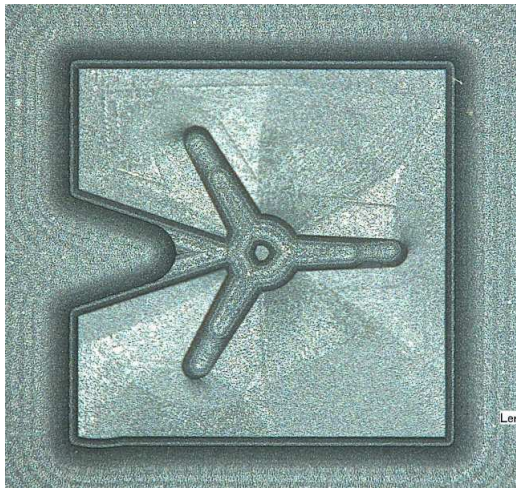
Equipment:

- Battenfeld micro injection @ clean room @ CMST
- Engel 28T injection screw 15mm

Equipment @ CPMT: Mould making

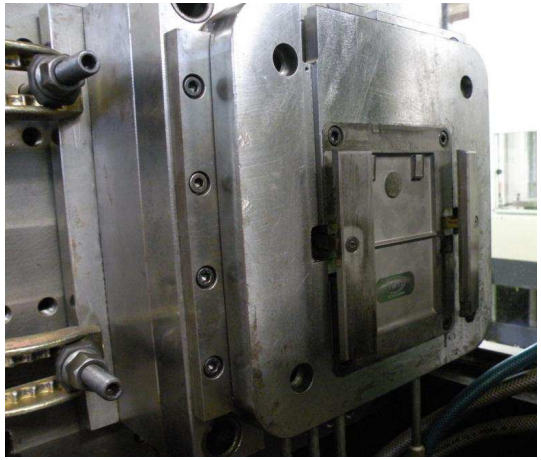


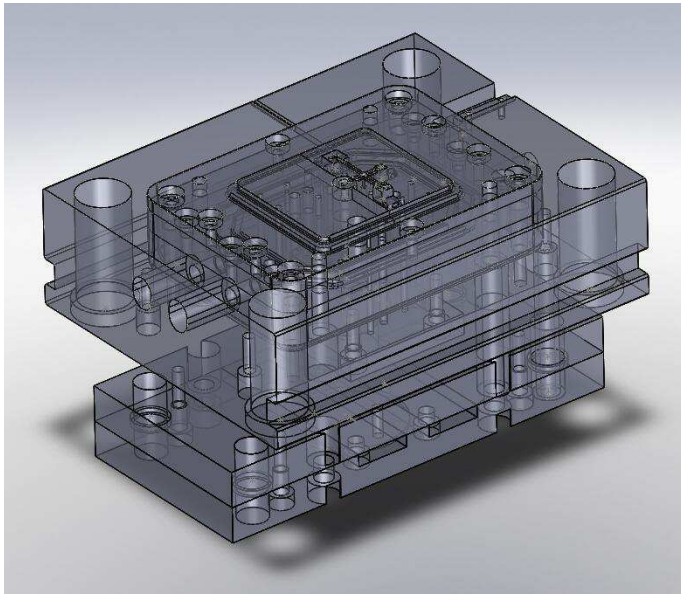




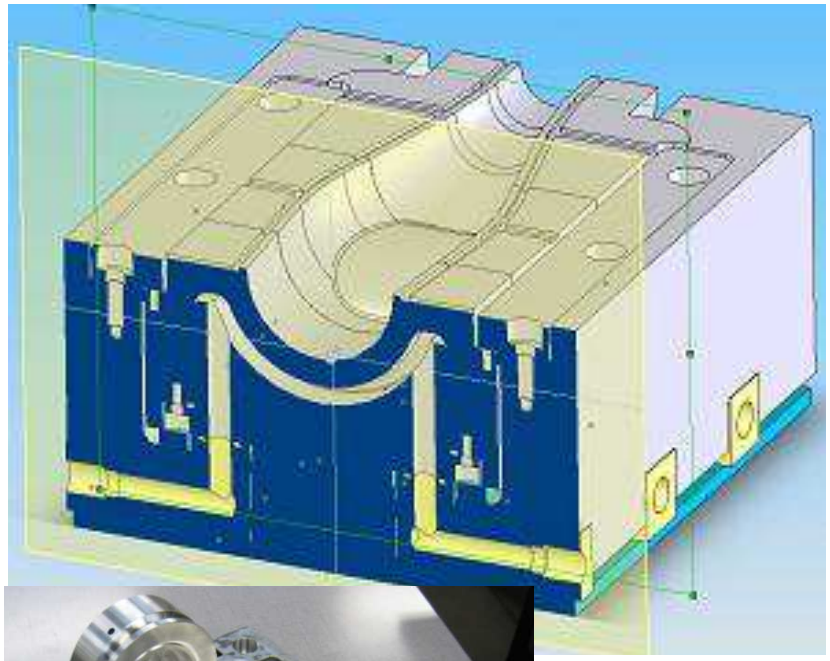
Available moulds:

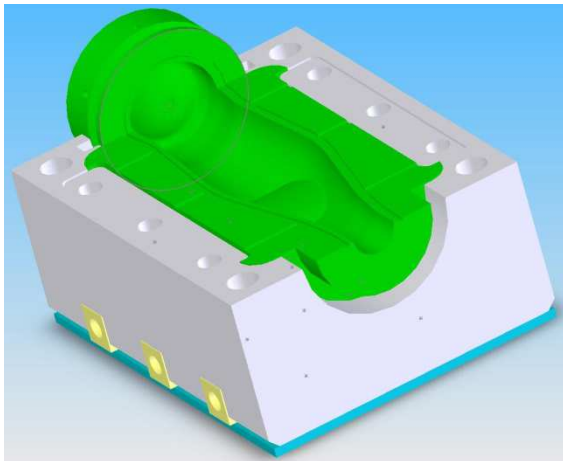
- ISO & ASTM
- Hybrid moulds
- Several test moulds

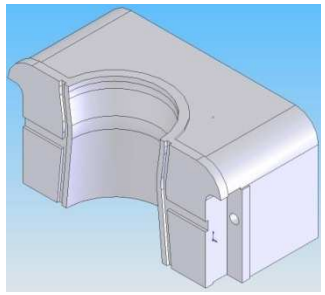


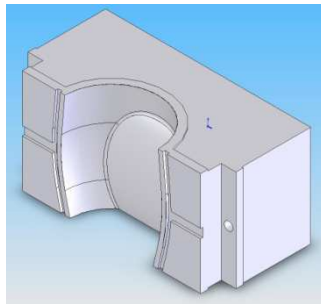


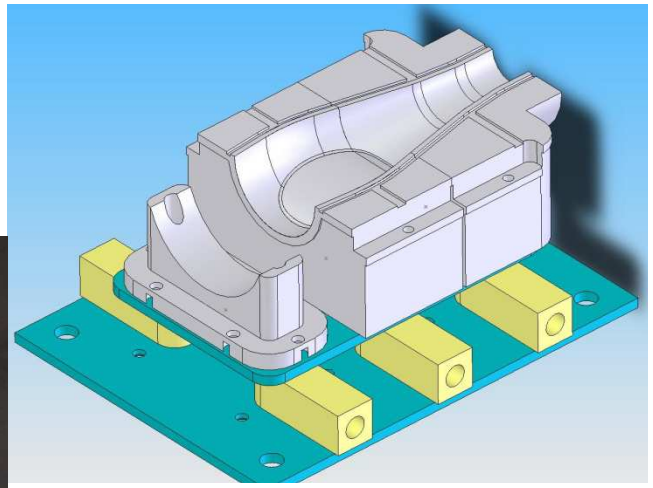
Equipment @ CPMT: Mould making

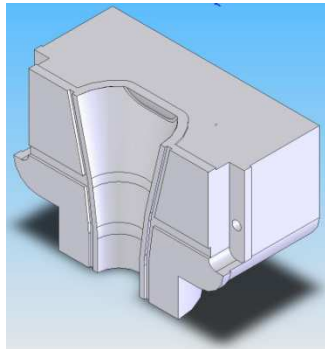


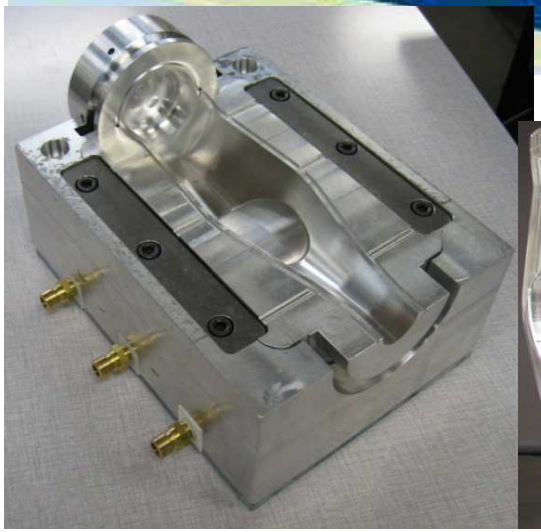




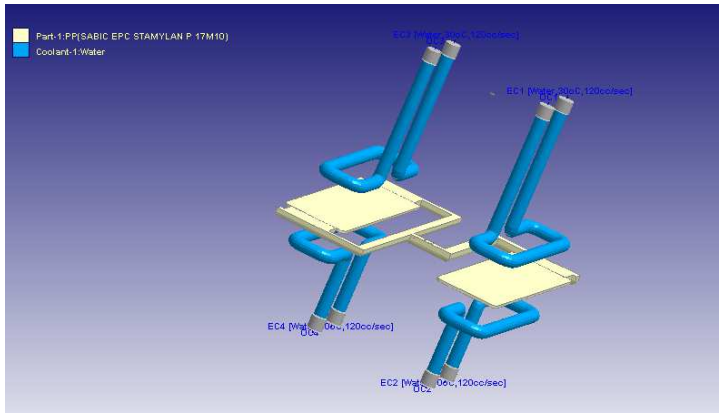


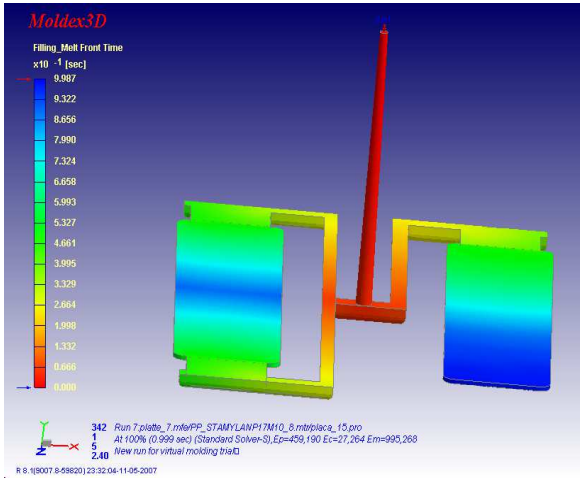


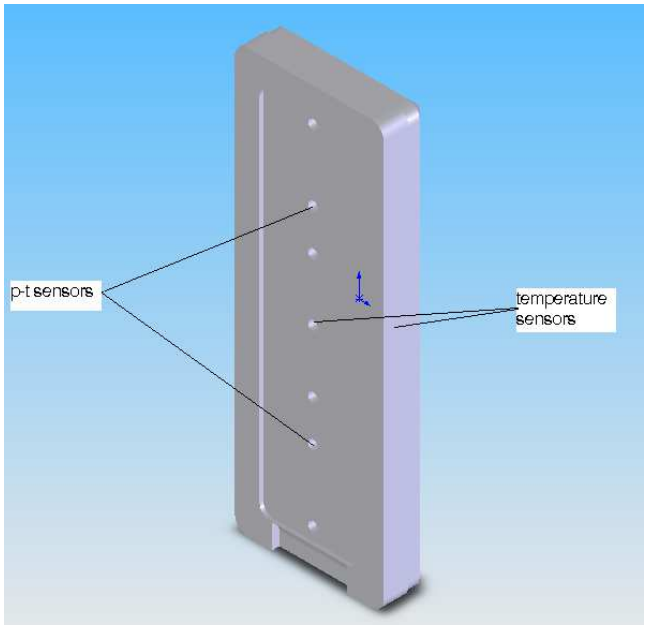


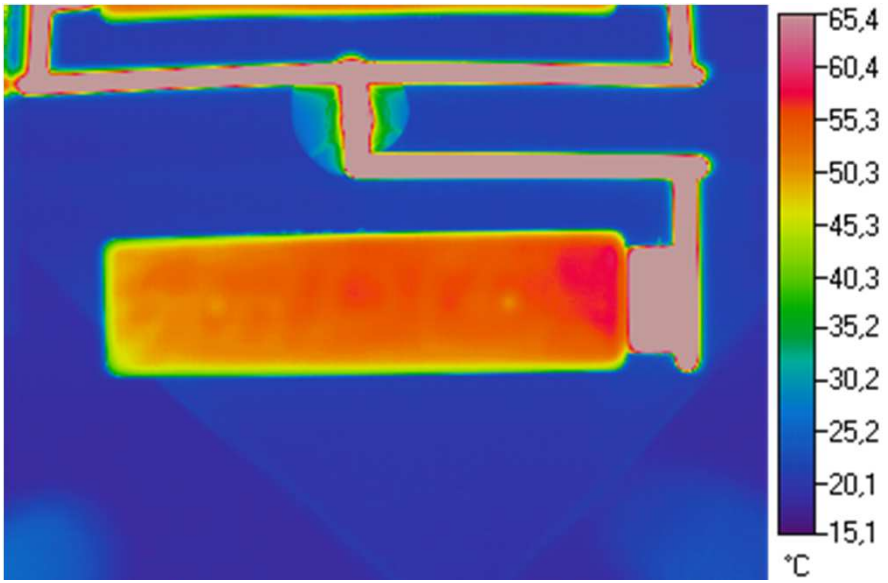


Equipment @ CPMT: Mould making





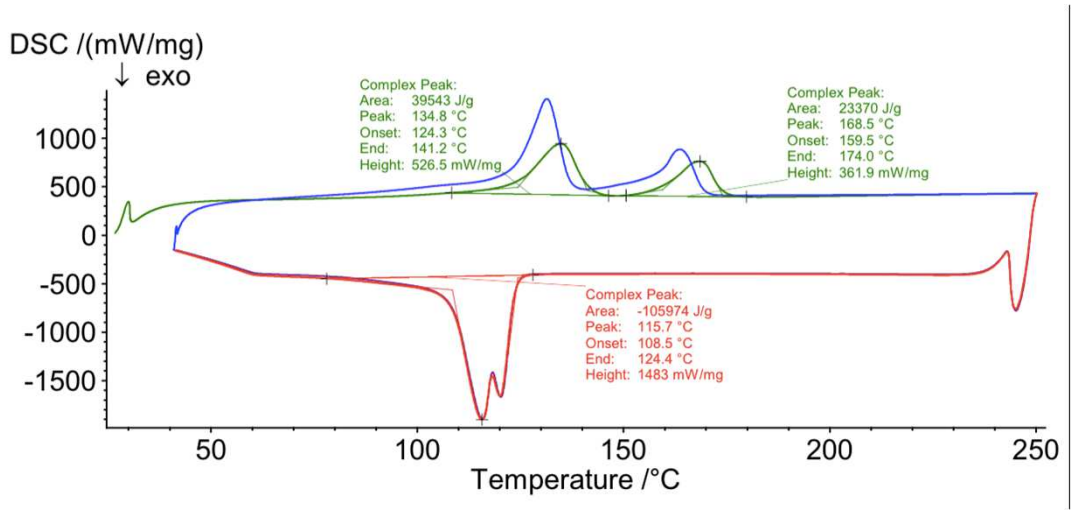


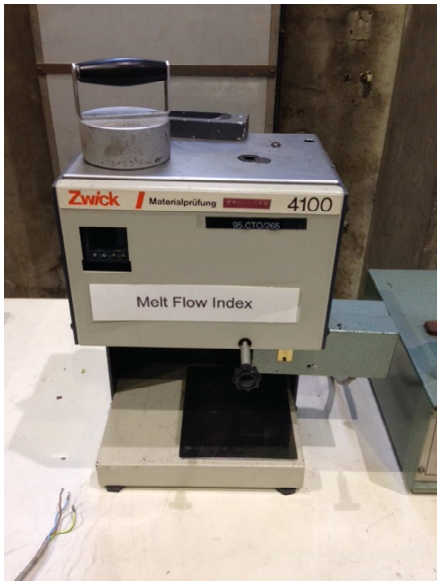


Equipment @ CPMT: characterization

Physico-chemical:

- DSC, TGA, FTIR
- MFI
- density

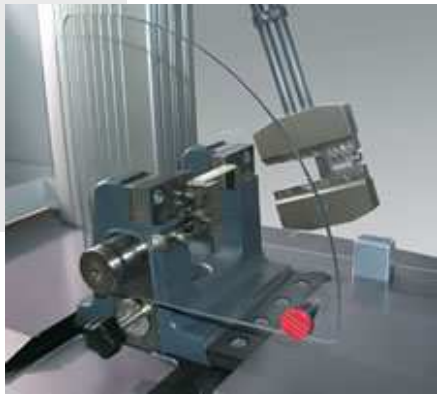


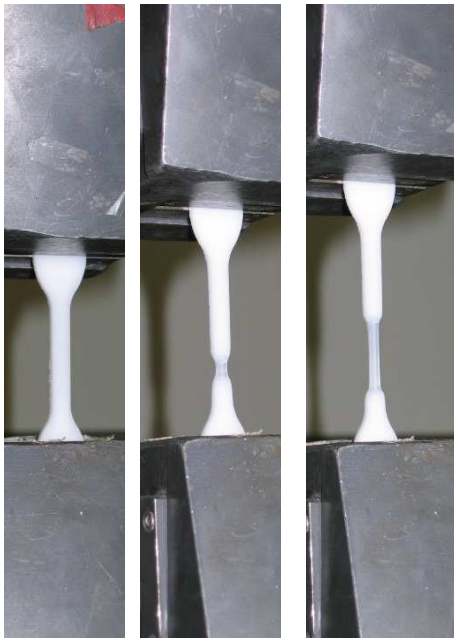


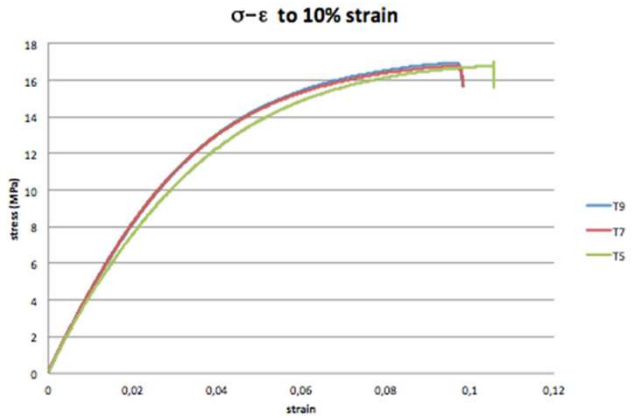
Equipment @ CPMT: characterization

Mechanical:

- tensile/bending
- Impact (Charpy/Izod)



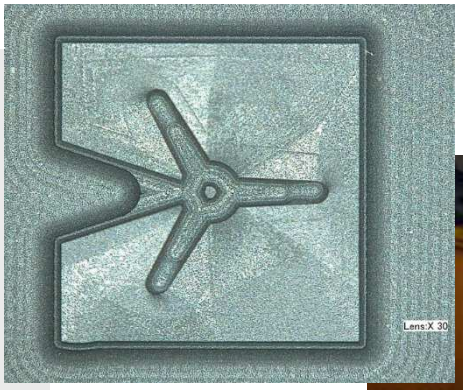


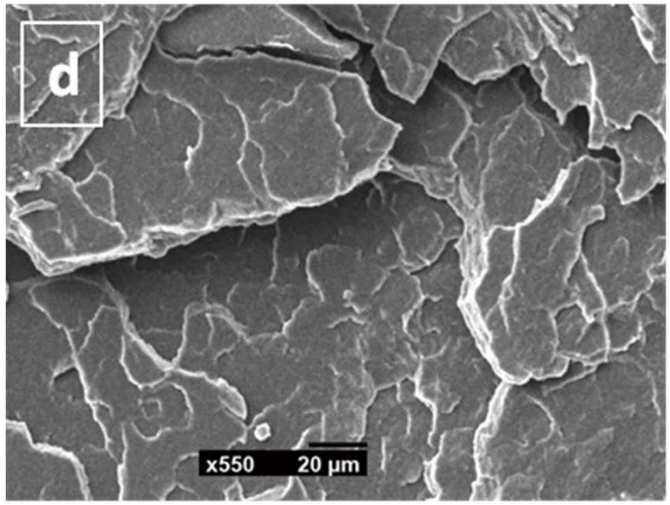


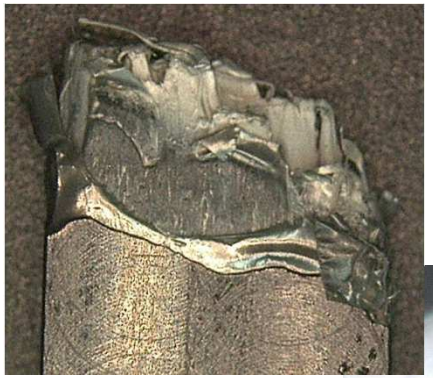
Equipment @ CPMT: characterization

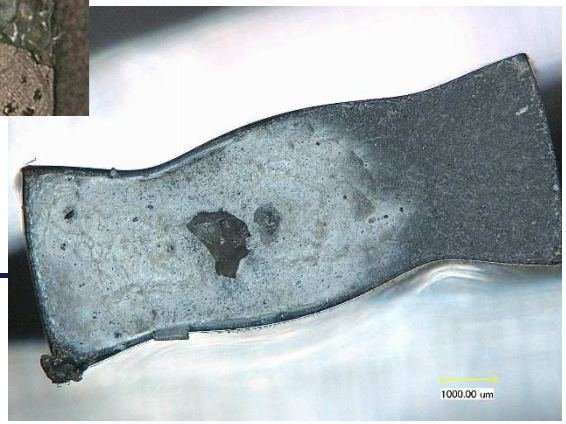
Microscopy:

- Dimensional control
- Inspection of fracture surfaces
- Keyence 3D microscope
  - Up to 1000x
- SEM (associated)









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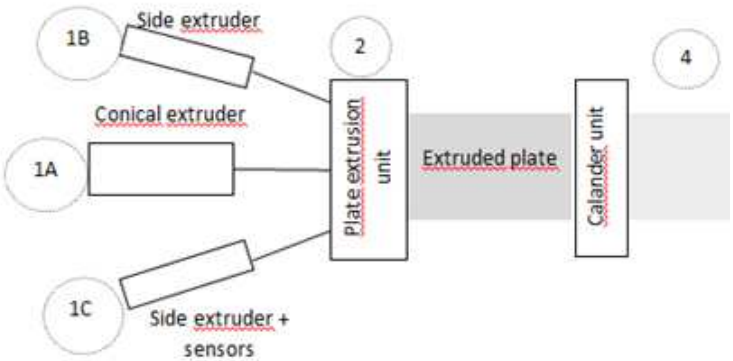
Equipment @ CPMT: near future

- Filament extrusion caliper for 3DPrinting
- Micro-extrusion for material testing
- FLAMINCO co-extrusion modular unit

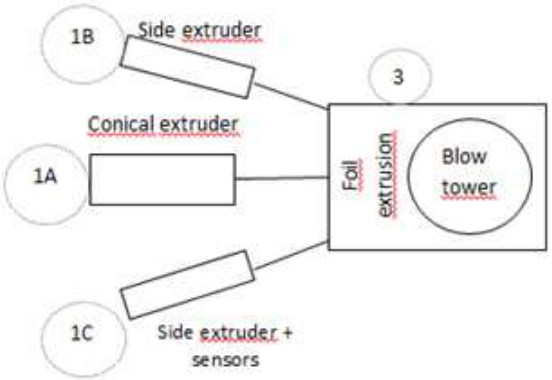
Coming up @CPMT: FLAMINCO

Co-extrusion and lamination equipment for integration of functional components in advanced multilayer materials

Configuration for plate production



Configuration for foil production



Hercules type 1 AUGE/13/015 FLAMINCO

1. **Co-extruder unit**, consisting of one conical double screw extruder and two single screw side extruders
2. **Plate extrusion unit**, comprising of a 5-layer co-extrusion collector and related die with a maximum plate width of 500mm
3. **Foil extrusion unit**, comprising of a 3 layer co-extrusion collector and related film blow installation
4. **Calander unit + stretch unit**, comprising of three cylinders for sheets of max. 500mm width, integrated with an automated lamination unit and a stretch unit

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PMT

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