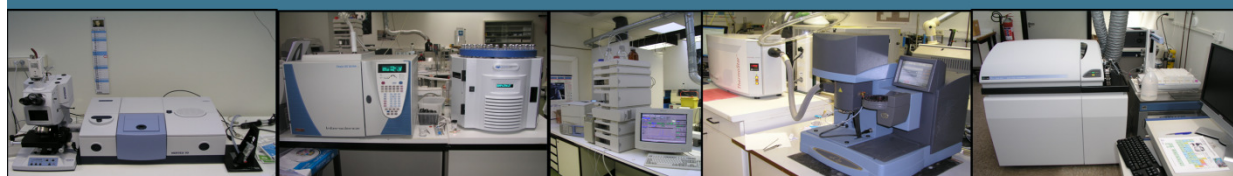


Research group
Applied and Analytical Chemistry
UHasselt



Applied chemistry





Applied and Analytical Chemistry

Research activities in coöperation with industrial companies:

- Scientific services
- Development, application and implementation of specific analytical strategies on advanced material systems.
- Environmental related research (waste disposal, environmental analysis, pyrolysis,...)
- Study of thermal features and properties of polymers (VOC, cure behaviour, degradation, fogging,...)
- Development of new product applications
- Material failure (die and mould contamination, adhesion problems)
- Analysis of additives
- Troubleshooting (processing, application, contamination,...)



Our ambition is a synergy between fundamental, applied research and scientific servicing.

Type of collaboration

- Generic Industrial Research (project- and contractresearch), studies co-financed by IWT and European Funding (INTERREG), bilateral contracts
- Scientific servicing and short-term-research
- Non-disclosure agreements
- Quick response problems



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Case studies:

- Development of a doublesided tape with recycling abilities
- Development of a wastefree degreasing proces with guaranteed high degreasing speed and -quality
- Low formaldehyde emitting glues for the woodmaking industry
- Study of de delamination of PVC on MDF board
- Research on the additive composition as a function of the emission of volatile components
- Characterisation of phenolic resins, UF resins, foams
- Study of adhesion problems coating defects
- Analysis of the composition of a polymer material
- Study of structure-property relationships for new material applications

Features of the scientific service:

- Permanent personnel of academics and qualified technicians
- State-of-the-art analytical equipment
- Multidisciplinary approach in close collaboration with the industrial partner
- Expertise on a wide range of material systems applied in different domains
- Quick response opportunities and high flexibility
- Bilateral agreements and NDA's

Analytical Instrumentation and applications

Element analysis:

-*Atomic Absorption Spectrofotometer (AAS)*

Perkin Elmer 1100B flame-AAS

Perkin Elmer Zeeman 5100 flame-AAS, graphite oven, hydride system

-*Inductive coupled plasma - emission spectrometer (ICP-OES)*

Perkin Elmer Optima 2000 dv simultane spectrometer



-*Inductive coupled plasma - mass spectrometer (ICP-MS)*

Perkin Elmer Elan-DRC-e ICP MS spectrometer

-*X ray fluorescence spectrometer (XRF)*

Bruker S4 Explorer

-*Ion chromatograph (IC)*

Dionex DX-120 equipped with UV- and conductivity detector

-Flash EA 1112 series: CHNS-O Analyzer (Interscience)



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Chromatography:

- Ion Chromatograph (IC)*
Dionex DX-120 equipped with UV- and conductivity detector

- Gas Chromatograph (GC)*
Trace with FID detector
Trace with FID/ECD detector +headspace

- Gaschromatograph/ Mass spectrometer (GC/MS)*
Finnigan TSQ70 quadrupool mass spectrometer
Perkin Elmer quadrupool mass spectrometer
Voyager quadrupool mass spectrometer
DSQ quadrupool mass spectrometer

- High Pressure Liquid Chromatography (HPLC)*
Agilent 100 Series with diode array, fluorescence, UV-Vis and refractometer detection

- Gelpermeation Chromatograph (GPC)*
TSP GPC (2)
Triple GPC (Optilab DSP, Wyatt, Viscotek)

- Dynamic en static headspace - gaschromatograph*
Tekmar HT3

- Thermal desorption - GC/MS*
Markes Unity

- Thermal desorption en pyrolysis-gas chromatograph - GC/MS*
Frontier Lab Dual Injection

Spectroscopy:

-NMR spectroscopy (solid state, liquid, MRI, relaxometry,
1H,13C,19F,31P,...)
400, 300 and 200 MHz Varian spectrometers

-FT-IR spectroscopy

Bruker Vertex 70 with Hyperion FT-IR microscope

Accessories: - horizontal ATR
- GATR
- micro-ATR
- specular reflection
- diamond anvil cell (DAC)



-FT IR microscopy

in transmission and reflection
micro-ATR microscopy

-FT Raman spectroscopy

Bruker IFS66: FT IR spectrometer extended with a FRA 106 Raman
module

-UV-VIS-NIR spectroscopy

Varian Cary 500 Scan spectrometer

-Photometry (UV-VIS)

Ultrapec 200

-Massa spectrometry (MS)

Finnigan TSQ 70 quadrupole mass spectrometer (EI, CI, DIP-MS, FAB-MS)

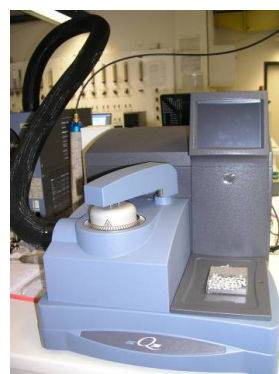
Interscience Voyager quadrupole mass spectrometer (EI, CI)

Interscience DSQ quadrupole mass spectrometer equipped with headspace
and thermal desorption

Perkin Elmer (EI) quadrupole mass spectrometer equipped with pyrolysis
unit

Thermal analysis:

- Differential scanning calorimetry (DSC)
TA DSC 2920 Modulated DSC (-100°C +600°C)
TA DSC Q200 (-90°C +700°C) Differential
thermal analysis



- Mettler Thermogravimetric Analyser coupled with FT-IR spectrometer
- High resolution TGA Hi-Res TGA 2950 Thermogravimetric Analyser
- High resolution TGA Hi-Res Q5000 Thermogravimetric Analyser coupled with
a Mass Spectrometer

- SDT Q600 (simultaneous TGA/DSC)
- Thermomechanical analysis(TMA)
- Dynamic mechanical analysis (DMA 983)
- Rheology CSL 500



Particle size distribution:

- Malvern Master Sizer S (laser diffraction)

Potentiometry

Coupled techniques:

- Gas chromatograph-mass spectroscopy (GC-MS)
- Liquid chromatography (Dionex)- Mass spectrometry (IT-Thermo)
- Headspace-GC-MS
- Thermal desorption and pyrolysis GC-MS
- UV-VIS-NIR spectroscopy
- FT IR microscopy and micro ATR microscopy
- Direct inlet GC-MS (DIP-MS)
- IC-ICP-MS
- TGA-FT IR
- TGA-MS
- TGA-thermal desorption (TD)-GC-MS
- Atmospheric Pressure Temperature Programmed Reduction (AP-TPR)
 - AP TPR-potentiometry
 - AP TPR-MS
 - AP TPR-FPD
 - AP TD-GC-MS





Applied and Analytical Chemistry

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