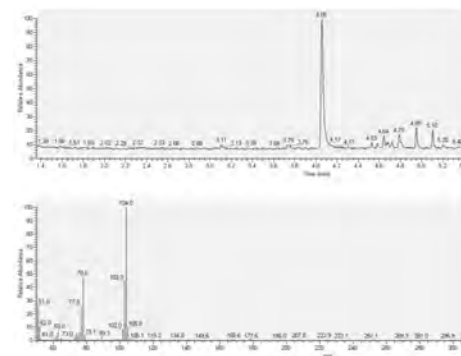


## GC / MS

The Fraunhofer PYCO is specialized on the targeted development of sustainable processes and materials based on natural and synthetic polymers. They are the basis for the development of new, efficient and sustainable materials, functional materials and additives.

A broad spectrum of analytical methods guarantees process control, material testing and routine analytics. But it also allows the investigation of chemical and physical structures and the examination of polymer properties, respectively. Therefore we possess extensive modern equipment. Methods can be newly developed and adapted on this basis. The expertise of our specialists of synthesis and processing technology contributes considerably to the solution of analytical problems.



13 Headspace GC Analysis

## Method

- Split, splitless fluid injection
- Headspace, MHE
- Thermodesorption
- Pyrolyse GC
- SPME
- EI, PCI, NCI
- DCI solid rod



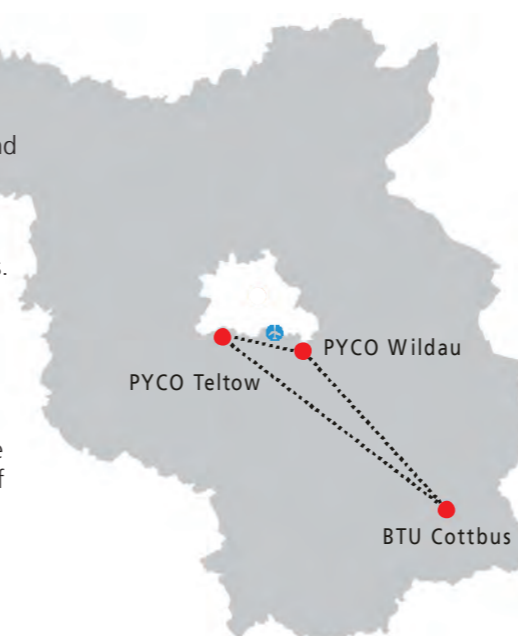
14 GS / MS-system

## Services

- Analytical HPLC
- Preparative HPLC
- GPC / SEC
- Continuous HPLC
- Coupling of HPLC / FTIR
- GS / MS
- MALDI-TOF
- Application retrieval
- Method optimization

## Location Berlin-Brandenburg

New solutions require new approaches: The location of the research institute in Teltow, where the metropolis of Berlin and the federal state of Brandenburg meet, offers optimal conditions for innovative scientific research. Here, the products of tomorrow emerge from ideas and visions. Therefore, the institute's scientists have formed a creative research network with renowned universities, well-known large-scale enterprises, and various innovative medium-sized companies. Additionally, new synergy arises from the integration in the third largest location of aerospace industry in Germany.



## Fraunhofer Research Institution for Polymeric Materials and Composites PYCO

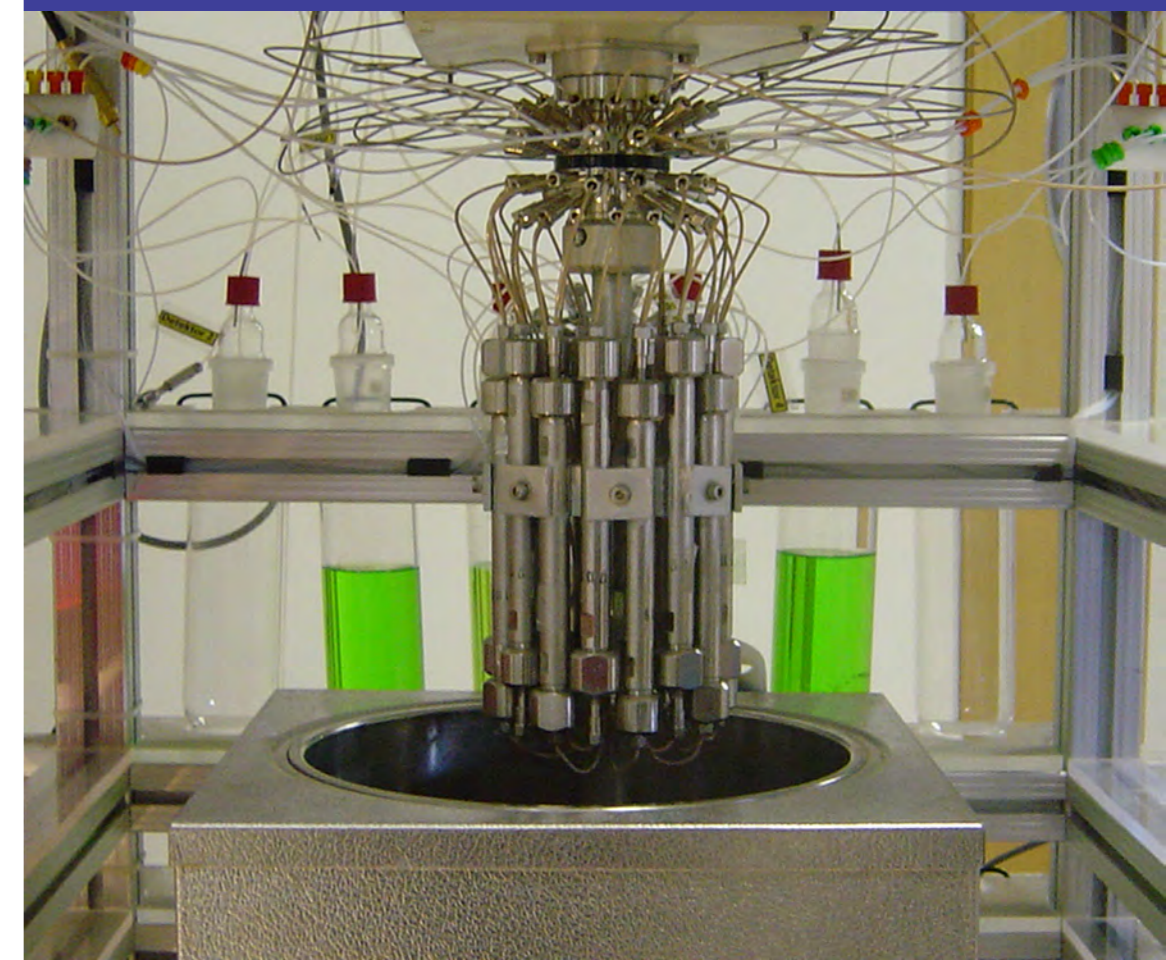
Application Lab for Chromatography  
 Matthias Kay  
 Kantstrasse 55  
 14513 Teltow, Germany  
 Phone +49 3328 330-275  
 Fax +49 3328 330-282  
 matthias.kay@pyco.fraunhofer.de  
 www.pyco.fraunhofer.de

Prices and processing time on request.



15 Main building

# Application Lab for Chromatography



## Application Lab for Chromatography

The application lab for Chromatography offers qualified scientific support in particular to small and medium-sized companies. It provides a wide range of services for the characterization of organic monomers, oligomers, intermediates and polymers which are distinguished by the effective and problem oriented combination of chromatography with other characterization methods.

## HPLC - High Performance Liquid Chromatography

### Method

Liquid chromatographic separation of multicomponent systems works due to different interactions of the solved molecules with the stationary phase. Mobile and stationary phase can be optimally-adjusted according to the properties of the multicomponent system which is to be separated.



1 HPLC-system



2 Chromatogram

## GPC - Gel Permeation Chromatography SEC - Size Exclusion Chromatography

### Method

Liquid chromatographic separation of oligomeric or polymeric multicomponent systems by size exclusion using macroporous gels. The molecules are separated according to their hydrodynamic volumes. The retention times (elution volumes) can be converted into molar masses by the use of calibration standards or molar mass-sensitive detectors.

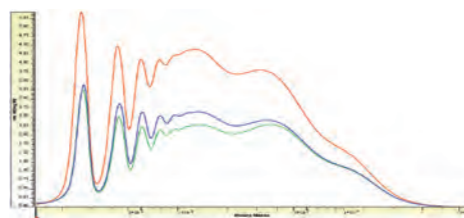
### Applications

Measurement of:

- Molecular weight distribution
- Mean molecular weight
- $[\eta]$ -M-relationship of soluble oligomers and polymers



3 GPC-system



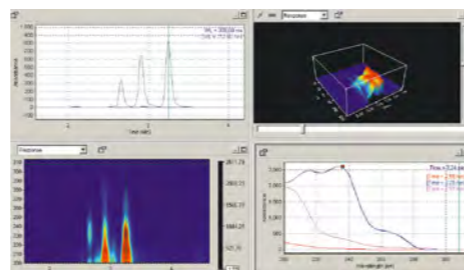
4 Molecular weight distribution of a thermoset

## Structure Determination of a Multicomponent System

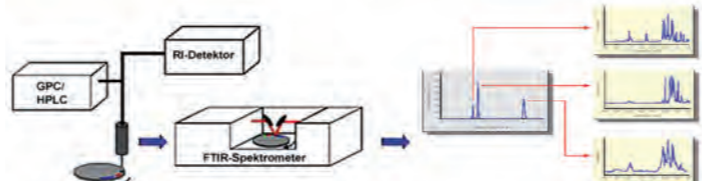
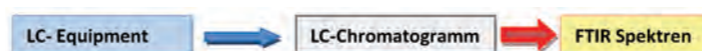
The Fraunhofer PYCO offers a method which effectively combines chromatography and spectroscopy:

- Chromatographic separation of the product into its constituent components by means of HPLC or GPC
- Separation of the solvents and FTIR-spectroscopic determination of the system's separated components

The determination methods can be carried out independently from one another.



5 DAD peak identification, purity and recovery



6 Method coupling HPLC-FTIR

## Applications

- Purity control
- Kinetic analysis of synthesis processes
- Method development for preparative separation processes
- Preparative separation on gramscale



7 Coupling LC with FTIR

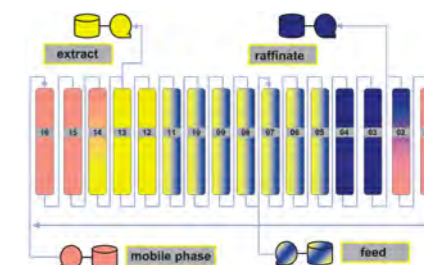


8 FTIR spectrometer

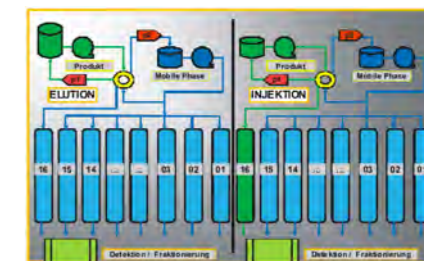
## CHPLC - Continuous HPLC

### Method

Continuous liquid chromatographic separation of multicomponent systems on an analytical and preparative scale according to the principle of a rotating stationary phase. Column switchings can be optimally-adjusted according to the properties of the multicomponent system which is to be separated (Simulated Moving Bed, fractionation with recycling etc.). Measurements are conducted using GLP-compatible HPLC software for MS Windows.



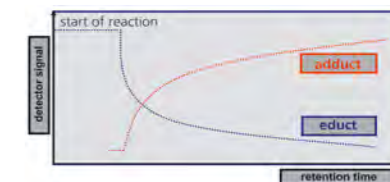
10 Continuous LC process - simulated moving bed



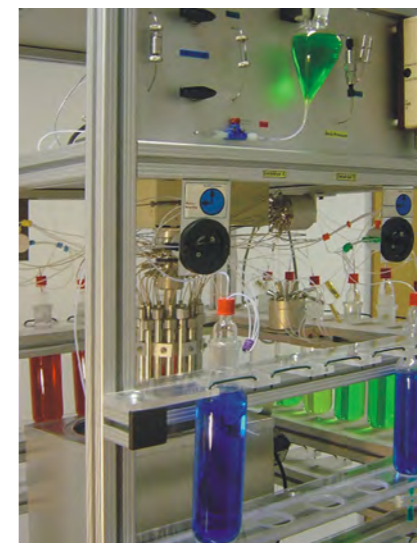
11 Product oriented processing control

### Application

- Kinetic analysis of synthesis processes
- Process control
- Preparative separation on gramscale



12 Continuous chromatography of an addition reaction



9 Preparative HPLC