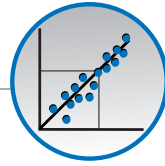




Training Courses

- Bruker Optics Course Offer



FTIR/NIR- and Raman-Spectroscopy

The fast progress in the fields of analytics and R&D requires the knowledge of the current methods of the IR spectroscopy and its latest developments.

Next to on-site individual customer trainings Bruker Optics performs for almost 30 years international customer training courses.

You learn the functionality of the Mid-IR, Near-IR and Raman spectroscopy under expert guidance as well as how to use it with different and optimized measurement techniques.



Bruker Optics headquarter in Ettlingen, Germany.

• Our Course Offer

The courses are divided and treated in two weeks.
The major subject areas NIR, R&D, Raman and CML applications.

	NIR Training
15.11.2021	OPUS Basics for Near-IR User
16.11.2021	OPUS/QUANT Quantitative Analysis with PLS
17.11.2021	OPUS/IDENT and related qualitative Methods
18.11.2021	Qualification and Validation Topics

	R&D and Raman
15.11.2021	Rapid/Step Scan
16.11.2021	Sample Preparation & Surface Techniques
17.11.2021	Coupling Techniques
18.11.2021	FT-Raman Spectroscopy & BRAVO

	CML
22.11.2021	Introduction into IR Spectroscopy
23.11.2021	OPUS Basics for IR User
24.11.2021	IR Microscopy & HYPERION
25.11.2021	IR Microscopy & LUMOS II
26.11.2021	Raman Microscopy & SENTERRA II

Get more detailed information about our courses on the next pages.

- Introduction into IR Spectroscopy
- OPUS Basics for Mid-IR User
- Sample Preparation and Surface Analysis
- Coupling Techniques
- Rapid Scan/Step Scan
- IR-Microscopy
- FT- & dispersive Raman Spectroscopy
- OPUS Basics for Near-IR User
- OPUS/QUANT Quantitative Analysis with PLS
- OPUS/IDENT and related qualitative Methods
- Qualification and Validation Topics

■ OPUS Basics for Near-IR User

The course OPUS for NIR Applications addresses to all users who do not have much experience with the spectroscopy software OPUS. Special attention will be paid to the requirements of those users who work in the field of NIR applications, i. e. only functions being relevant for the NIR spectroscopy are taken into consideration.

- ◆ NIR spectroscopy
 - Measurement techniques, accessories
 - Applications
- ◆ Introduction into OPUS and OPUS/LAB
 - General operations
- ◆ Simple functions for spectra processing (e. g. normalization, derivatives)
- ◆ User administration
 - Setting up users
 - Customizing the user interface
 - Working according to GMP
- ◆ Overview of the OPUS packages

■ OPUS/QUANT Quantitative Analysis with PLS

The practical course for the OPUS/QUANT software package offers a short introduction into the theory of multivariate calibration. The attendees learn the use of the OPUS/QUANT software with the help of many practical NIR examples.

- ◆ Quantitative Analysis
 - Basic theory of PLS
 - Sample selection
 - Impacts of reference methods
- ◆ OPUS/QUANT
 - Setting up a QUANT method
 - Calibration and optimization
 - Method Validation
 - Displaying and plotting the calibration results
 - Quantitative analysis
- ◆ QUANT examples with exercises on the PC data stations

■ OPUS/IDENT and related qualitative Methods

The basics of NIR spectra identification are explained with the help of practical examples and the possibilities of the IDENT software are shown. The attendees learn to build up multilevel IDENT libraries and to validate them.

- ◆ Basics
 - Pre-treatment of data
 - Comparison of spectra
 - IDENT algorithms
 - Factorization
- ◆ IDENT software
 - Library structure
 - Validation
- ◆ Practical applications of the IDENT software
 - Raw material control

■ Qualification and Validation Topics

- ◆ Qualification of NIR spectrometer
- ◆ Software validation
- ◆ Compliance to 21 CFR part 11
- ◆ Use of OPUS in a GMP compliant environment

● R&D and Raman Users Training

■ Rapid Scan/Step Scan

- ◆ Time-resolved FTIR spectroscopy:
Rapid Scan and Step Scan
Based on examples, criteria are derived which help the user to choose the suitable technique for his application.
 - Technical preconditions
 - Step Scan: Reproducible kinetics
 - Step Scan: Trigger schemes, parameters and data acquisition
 - Rapid Scan: Time-resolved single event reactions
 - Rapid Scan: Method editor
 - Limits of time resolved spectroscopy
 - Practical sessions including OPUS/3D

■ Sample Preparation and Surface Techniques

- ◆ Basic sample preparation
 - KBr/PE-pellets
 - Nujol suspensions
 - Liquid cells
- ◆ Attenuated total reflection (ATR)
 - Micro-ATR units
 - ATR materials
- ◆ Specular reflection and IRRAS
 - Kramers-Kronig-transformation
 - Polarisation modulation technique (PMA 50: PM-IRRAS and Vibrational Circular Dichroism (VCD))
- ◆ Diffuse reflection (DRIFT)
 - Measurement accessories
 - Effects of dilution and morphology
- ◆ Photoacoustic spectroscopy (PAS)
- ◆ Practical exercises

■ Coupling Techniques

- ◆ Coupling Techniques
 - Thermogravimetric FTIR coupling TGA-/DSC-IR
 - Chromatographic FTIR coupling, GC-, GPC-, HPLC-IR
 - OPUS/CHROM and OPUS/3D
 - Digital library search

■ FT-Raman Spectroscopy & BRAVO

- ◆ Introduction to the basics of Raman spectroscopy
- ◆ Setup of FT-Raman and dispersive spectrometers
 - Components and accessories for FT-Raman spectrometers
 - Methods for suppression of fluorescence
 - Applications and examples of FT-Raman spectroscopy
 - Measurements with OPUS/MAP, OPUS/VIDEO and OPUS 3/D
 - Data evaluation in FT-Raman spectroscopy

■ Introduction into IR Spectroscopy

The training mediates the basics of the Infrared spectroscopy.

Next to theoretical introduction into the principles of the FTIR spectroscopy, the training covers the typical MIR sampling techniques.

- ◆ Principles of the FTIR spectroscopy
- ◆ Basic construction of an FTIR spectrometer
- ◆ Sample preparation and basic measurement techniques (Transmittance, ATR, Reflectance)
- ◆ Practical exercises

■ OPUS Basics for IR User

The basic knowledge of the OPUS spectroscopic software will be trained. MIR example spectra (from quality control applications) will be used for the exercises in data processing and data evaluation.

- ◆ Main functions of spectra treatment
- ◆ Identification by use of correlation functions
- ◆ Identification with spectra libraries
- ◆ Quantification by use of Lambert-Beer

■ IR Microscopy

Note: the IR microscopy courses for LUMOS and HYPERION take place on two consecutive days, separately from each other.

- ◆ IR microscopy with LUMOS and HYPERION:
 - Practical aspects of IR microscopy
 - IR microscopy measurements
- ◆ Sample preparation and handling
 - Measurements in ATR, Reflectance, Transmittance
- ◆ Properties and handling
- ◆ System test and OVP
- ◆ Two-dimensional measurements with OPUS Wizard
- ◆ Data collection, selection of parameters
 - Evaluation and display of spectral data of Microscopy Measurements
 - Chemical Imaging
- ◆ Properties and display options of the Chemical Imaging window
- ◆ Display of spatially resolved measurements
 - Evaluation functions of spatially resolved measurements
- ◆ Integration
- ◆ Examples of 3D manipulation functions
- ◆ Trace ratio and spectra calculator
- ◆ Component regression, chemical mapping and multi-component subtraction
- ◆ Cluster analysis, factorization, RGB and WTA
- ◆ Library search
 - Export of data

■ Raman Microscopy (SENTERRA II)

Introduction to Raman spectroscopy and technique of Raman microscopy

- ◆ Raman Effect
- ◆ Side effects in Raman spectroscopy
- ◆ Raman microscope SENTERRA II setup and technique
- ◆ Applications of Raman spectroscopy
 - Practical exercises SENTERRA II
- ◆ Raman measurements and Raman imaging with the Video Wizard
- ◆ Confocal depth profile
- ◆ Measurement parameters
- ◆ Data evaluation with OPUS/ 3D
- ◆ Optical components and accessories

General Hints

to the Bruker Optics Training Courses

Venue:

Online Training Courses (PC with Webbrowser is necessary only)

Time:

Lectures starting at 09.00 AM MEZ

Lectures and Trainers:

Bruker Optics application specialists

Course Documentation:

The corresponding documentation will be handed over to the attendee before as pdf files.

Course Fees: (for 2021)

Per day:

€ 355,- Industry

€ 195,- University and non-commercial institutes

Registration and Confirmation:

For your course registration please get in contact with your local Bruker representative. He will send you the Bruker Optics Registration Form.

Force majeure or illness of several trainers allows the cancellation at any time.

Certificate of attendance:

For each performed course the attendees will get a certificate of attendance that can be used as training certificate.

www.bruker.com/optics



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