Seminar directors

ao. Univ.-Prof. Mag. Dr.
Ulrich Griesser
Institute of Pharmacy

Mag. Dr. Doris Braun
Institute of Pharmacy

Duration

2 ½ days

Location

University of Innsbruck
Institute of Pharmacy, Pharmaceutical Technology
Josef-Moeller Haus, Innrain 52c (2nd floor)
6020 Innsbruck, Austria

Period

23rd - 25th September 2020

Seminar Fee

Industry, business: € 950,-
Academia: € 720,-
External students: € 380,-
The fee includes the costs for seminar documents, official seminar dinner and coffee breaks.
Registration fees must be paid in advance.

Contact

Ing. Elisabeth Gstrein
Tel.: +43 512 507-58403
Elisabeth.Gstrein@uibk.ac.at

Enrolment

http://bit.ly/thermo_pol
Division of Continuing Education
Innrain 52f
6020 Innsbruck
Tel.: +43 512 507-39402
weiterbildung@uibk.ac.at

universität innsbruck

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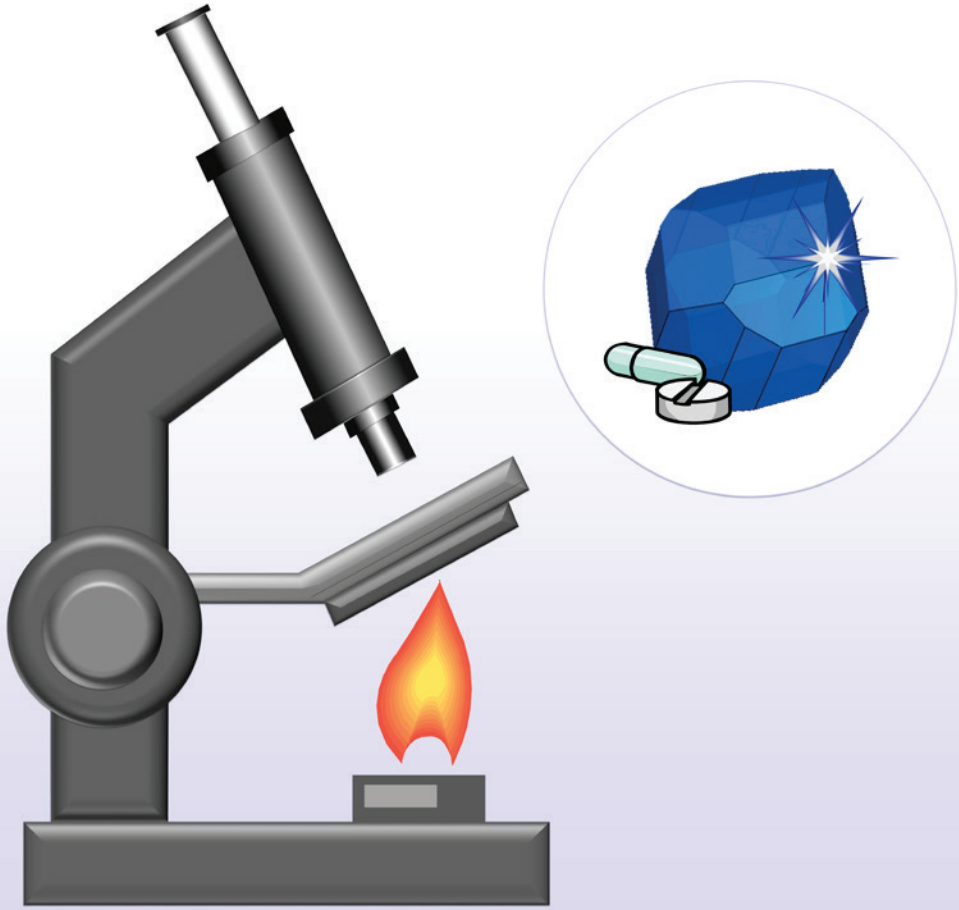
universitäre Weiterbildung

HOT STAGE MICROSCOPY AND POLYMORPHISM

IN THEORY AND PRACTICE

UNIVERSITY SEMINAR 2020



Target audience

The seminar imparts practical skills and expertise for analysing solid-state properties of small organic molecules with the aid of a hot stage microscope and is designed for students, lab technicians and advanced scientists dealing with material properties of pharmaceuticals, agrochemicals or other fine chemicals. The training will particularly benefit those who deal with preformulation studies, polymorph screening, crystal engineering, co-crystallization and other materials science aspects of small organic molecules.

Content and targets

The seminar offers a balanced mix of theory and practice. To better understand the practical seminar contents, basic information about the instrumentation, optical properties of crystals, relevant crystallization and solid-state phenomena etc. is conveyed in lectures supported with extensive video and picture material. The practical training includes the use of a hot stage microscope and the hot bench, different preparation techniques, precise determination of fusion data, generation of polymorphs and co-crystals, growth of single crystals from the melt and much more. Based on well chosen practical examples the participants can study different polymorphic phase transitions as well as desolvation reactions and will learn how to effectively combine thermomicroscopic investigations with complementary techniques, such as Differential scanning calorimetry (DSC), and how to interpret data obtained from different analytical methods. Moreover, the participants learn how to recognize and characterize mesophases (liquid- and plastic crystals) and amorphous solids. Besides the acquisition of experimental skills in hot stage microscopy, participants will gain a deeper understanding of crystallization processes (nucleation, crystal growth), the nature phase transformations as well as the thermodynamic and kinetic aspects of crystal forms.

A hot-stage microscope and the required tools are provided to each participant during the seminar and experienced teachers guide through a programme of well-selected training examples.

Topics

- Theory, principle, importance, applications of thermomicroscopic techniques
- Become acquainted with the most important types of hot stages
- State of the art operation - hot stage microscope (HSM) and hot bench
- Basics of optical microscopy and optical phenomena in crystals
- Precise melting point determination and concomitant phenomena during melting point determinations (realization, understanding)
- Crystallization from the melt and the vapour phase (sublimation)
- Determination of mixed melting point and eutectic temperature
- Polymorphism and solvates/hydrates: theory, analytical aspects, practical aspects, generation, screens
- Identify, observe and evaluate phase transitions and desolvation reactions of polymorphs and solvates/hydrates
- Analysis of binary systems (eutectics, molecular compounds – co-crystals, solid solutions, chiral compounds) with the HSM (contact method according to Kofler, χ-T phase diagrams)
- Mesophases (Liquid crystalline compounds, plastic crystals) and their thermal behaviour
- Identification of organic (drug-) substances using HSM methods
- HSM and complementary technique in solid-state analysis of organic substances (DSC, TGA, PXRD, spectroscopy etc.)

Outside the official programme, discussions and short instructions about more specific topics are possible:

- Strategies in finding and characterizing polymorphic forms, hydrates, solvates, co-crystals
- Construction of energy-temperature diagrams of polymorphs based on thermochemical data
- Analytical techniques in polymorphism research such as: thermal analytical techniques (DSC/TGA), isothermal calorimetry, powder X-ray diffraction, infrared-(micro)spectroscopy, Raman-spectroscopy, moisture sorption analysis (hydrates) and more.

Confirmation

Confirmation of Participation from the University of Innsbruck