

Registration of GVT professional course

GVT-Member Yes No

BILLING ADDRESS

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I have been informed about my right to object to the use of my data at any time.

Date / Sign _____

General Information

PARTICIPATION FEE

Non-members € 1.600,-
GVT-Members € 1.525,-

The participation fee includes comprehensive course materials (lecture slides, videos and notes on laboratory demonstrations and tutorials). Please do not remit the course fee before receiving confirmation of attendance and the invoice. Upon cancellation before **March 7, 2021**, we remit the fee less 50 Euro handling costs. Upon later cancellations no remittance is possible, however, the course documents will be sent. Furthermore you may nominate a substitute participant. Course fees are sales tax free.

REGISTRATION

Please register online at www.gvt.org/hochschulkurse not later than **March 7, 2021**. The number of participants is limited.

REQUIREMENTS

- Google Chrome or Firefox as browser.
- Close other services such as Skype or similar messengers before each meeting. So your hardware is not blocked.
- Do not use VPN's.
- USB Headset.

PRIVACY POLICY

You have the right to withdraw a given consent at any time. Details about our privacy policy can be found at www.gvt.org/Datenschutz.

INFORMATION

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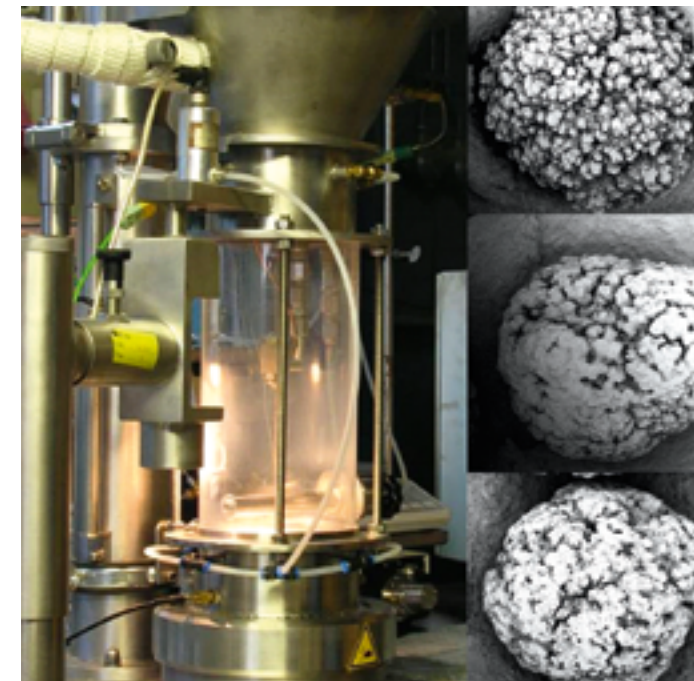
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GVT

PROFESSIONAL COURSE

ONLINE



March 29th - April 1st, 2021
Online

Drying

Fundamentals and Applications

Directed by:

Prof. Evangelos Tsotsas

Otto von Guericke University Magdeburg

Prof. Stefan Heinrich

Hamburg University of Technology

Organizer

In cooperation with

GVT Forschungs-Gesellschaft
Verfahrens-Technik e.V.

TVT
THERMISCHE VERFAHRENSTECHNIK
OTTO-VON GUERICKE UNIVERSITY OF MAGDEBURG

Fundamentals of drying technology

- Goals of drying: product quality and process efficiency
- Relevant material properties (sorption, water activity, glass transition etc.)
- Particle / product formulation by drying
- Drying methods, types of dryers, dryer selection

Properties of wet air, capacity of convective dryers

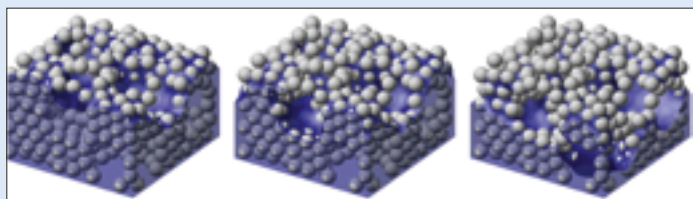
- States and processes on psychrometric charts
- Adiabatic saturation temperature
- Air conditions in and capacity of convective dryers

Moisture measurement

- Gas moisture, particle / solids moisture

Drying kinetics of single particles or droplets

- Wet bulb temperature, drying curve, drying periods
- Methods of measurement or of indirect determination
- Normalization, second drying period models
- Understanding drying with the help of pore networks

**TARGET AUDIENCE**

The course is designed for people from various backgrounds (engineers, chemists, food and pharmaceutical technologists) and with different levels of experience, who need to understand the fundamentals of modern drying technology and apply them to produce better solid / particulate products with more efficient drying processes. The course language is English.

TOPIC

Almost every material used in solid form (from foods to pharmaceuticals, from minerals to detergents, from polymers to paper, from raw materials and commodities to highly formulated specialties) is dried during production. Drying technology is, therefore, a continuously developing field with various challenges referring to process design, development, operation and automation, to equipment selection, development and use, as well as to the

Major drying processes: Equipment, dryer design, scale up

- Generic examples of convective dryer design
- Fluidized bed drying
- Spray drying
- Vacuum contact drying, freeze drying

Special drying processes and their application

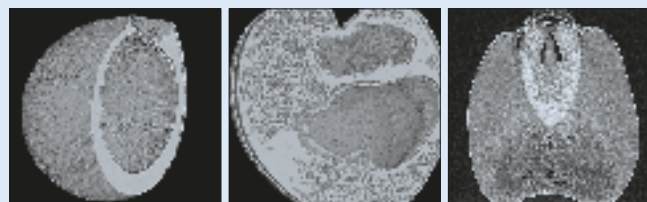
- Atmospheric freeze drying, microwave and high-frequency drying, microwave vacuum / freeze drying, superheated steam drying, impingement drying, supercritical drying

Laboratory work (exercises and demonstrations on video)

- Various equipment for moisture measurement, particle characterization, drying
- Drying kinetics of droplets in the acoustic levitator
- Drying kinetics of particles in the magnetic suspension balance
- Batch and continuous fluidized bed drying

Online tutorials (guided practical computations and simulations)

- Exercises on material properties, wet air, dryer capacity
- Evaluation of drying kinetics for single droplets and particles
- Fluidized bed dryer design and scale-up (batch, continuous)
- CFD simulation of spray dryers



preservation or even creation of desired product properties. The purpose of the course is to provide the essentials of modern drying technology to the participants in a broad but compact way, at a high but understandable level close to practice.

The course starts at the very beginning (why shall materials be dried and how can this be done?), and then discusses: elementary approaches and methods (how does the drying medium used relate to the capacity of the process and to the achievable product moisture?); drying kinetics (why are certain materials more difficult to dry than other ones?); dryer design and scale up methods (how long will drying of a specific product take, how big will the dryer need to be?); instrumentation (how can gas moisture or even product moisture be measured and monitored in my equipment?); options and alternatives (why shall I use a certain drying method and the respecti-

ONLINE COURSE

hosted from

Otto von Guericke University Magdeburg

LECTURERS

Prof. Evangelos Tsotsas Otto von Guericke University Magdeburg

Dr.-Ing. Abdolreza Kharaghani Otto von Guericke University Magdeburg

Prof. Stefan Heinrich Hamburg University of Technology

External speakers

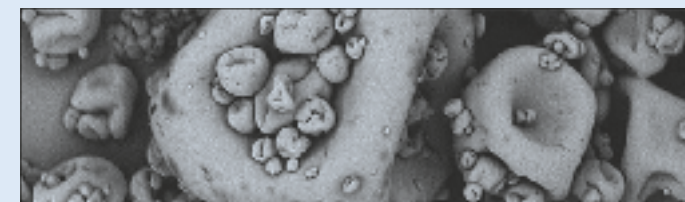
Prof. Andreas Bück FAU Erlangen-Nuremberg

Dr.-Ing. Michael Jacob Glatt Ingenieurtechnik GmbH, Weimar

Prof. Mirko Peglow IPT-Pergande GmbH, Weißandt-Göolzau

Dr. Roland Wernecke Dr. Wernecke Feuchtemesstechnik GmbH, Potsdam

Dr. Maciej Jaskulski Lodz University of Technology



ve equipment, instead of another one?); and opportunities (how can I use drying for particle formulation, how can I reduce the energy demand of my process?). This is done in three complementary ways: Lectures, video demonstrations of experimental methods and equipment in one of the leading laboratories in drying technology and tutorials (ranging from simple exercises to solidify the understanding of principles, and the guided evaluation of experimental data, to the application of modern computational tools for dryer design).

Beginners in drying will take with them from the course the broad overview and the sound basis of skills that they need for their every-day work; experienced people will refresh their knowledge and renew their point of view up to the cutting-edge of drying technology in experimentation and modelling.