

## **Process Engineering of Metals and Ceramics**

Summer semester

- ▶ Lecture: Prof. Dr.-Ing. E. Specht
- ▶ Seminar
- ▶ LSF Entry of this lecture
  
- ▶ Chemical and Energy Engineering CEE
- ▶ Environmental and Energy Process Technology UEPT
- ▶ Industrial Engineering for Process and Energy Engineering WVET

## **Process Engineering of Metals and Ceramics**

The students understand coupled processes of simultaneous heat transfer, mass transfer and chemical reactions. They know the mechanism to identify the rate determining steps. They can assess processes applying energy and molecular balances for the thermal engineering of the production of inorganic materials. They are able to connect different fields of chemical and energy engineering for the total production chain starting from raw materials until the wanted product of high quality.

- ▶ Manufacturing process of steel, basic reactions, handling of raw material
- ▶ Thermal and chemical treatment of raw materials in shaft kilns and cupola furnaces (reaction kinetics, heat and mass transfer, fluid dynamics)
- ▶ Modeling of lime calcination as example
- ▶ Thermal and chemical treatment of materials in rotary kilns
- ▶ Manufacturing process of ceramics, shaping, drying, sintering
- ▶ Thermal and chemical treatment of shaped material in roller kilns and tunnel kilns
- ▶ Casting and shaping processes of metals (steel, copper, aluminium)
- ▶ Freezing and melting processes

Lectures with experiments and excursions

Thermodynamics, Heat Transfer, Physical Chemistry, Combustion Engineering

- ▶ 3 SWS
- ▶ Time of attendance: 42 hours
- ▶ Autonomous work: 78 hours

Exam: Engineering of a given process for a group of four members

Prof. Dr.-Ing. E. Specht

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