

## **Thermal Processing/ Heat Technology**

Environmental engineering and energy process engineering , safety and security

The students calculate the heating and cooling processes of solids such as metals ceramics and fuels. They know the mechanism of heat transfer by radiation. They know how to influence heat transfer by radiation shields and secondary radiation. You can apply the methods of intensive cooling with liquids. They calculate coupled heat and mass transport processes using equilibrium equations. They are able to interpret thermal processes of high temperature process engineering and energy technology .

- ▶ Heat treatment processes of solids , application examples , the production of ceramics and metals , temperature gradients , Fourier's differential equation . with boundary conditions
- ▶ Simplified analytical solution for one-dimensional heat conduction , dimensionless description , examples , multi-dimensional heat conduction , heat transfer in semi-infinite bodies and in short times , contact temperature
- ▶ Heat transfer by radiation , mechanism , intensity , emission levels for solid, liquid and gaseous substances , dust and soot radiation
- ▶ Irradiating numbers , radiation exchange , radiation shield , greenhouse effect , secondary radiation (G)
- ▶ Freezing and melting processes
- ▶ Intensive cooling operations , diving cooling, film cooling and spray cooling , influence of liquids , critical heat flux , Leidenfrost problem (G)
- ▶ Coupled heat and mass transfer processes , equilibrium conditions at phase boundaries , as carbon combustion , limestone decomposition

Lecture with exercises and experiments

Thermodynamics, heat and mass transfer, fluid mechanics, physical chemistry

- ▶ 3 SWS / 4 SWS
- ▶ Attendance: 42 hours
- ▶ Self-study: 100 hours

orally, 5 CP

Prof. Dr.-Ing. E. Specht

- ▶ E. Specht: Wärme- und Stoffübertragung in der Thermoprozesstechnik, Vulkan-Verlag.
- ▶ Stefan; Baehr: Wärmeübertragung

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