MH2041 Applied Thermodynamics and Kinetics, Part 2 6.0 credits

Tillämpad termodynamik och kinetik, del 2

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

This course syllabus valid from Autumn term 2020, registration numberM-2020-0777

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Materials Science, Materials Science and Engineering

Specific prerequisites

Basic knowledge of chemical thermodynamics and phase equilibria in binary systems, corresponding to the courses MH2029 Process Metallurgy or MH2039 Process Engineering.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course the student will be able to:

- Read and interpret ternary, quaternary, and quinary phase diagrams of alloys and oxide systems
- Apply ternary lever rule, liquidus projections, and iso-activity diagrams
- Apply phase diagrams in selection of refractories for liquid slags
- Perform equilibrium calculations in reduction of metal oxides and sulfides, gas solubility in metallic melts, solute distributions in slag-metal systems, and in modification of non-metallic inclusions

Course contents

Fundamentals

- Solution thermodynamics
- Multicomponent phase diagrams, kinetics for materials processes
- Applications in materials engineering, e.g.
- Ironmaking, sulfide roasting and smelting, iron and steel refining, silicon refining
- Solid phase transformations and equilibria in metals and alloys

Examination

- TEN1 - Written examination, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- INL1 - Hand in assignment, 1.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.

- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.