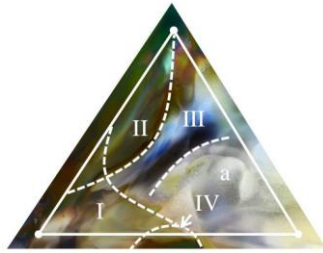




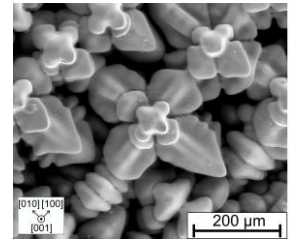
LECTURE ANNOUNCEMENT Summer Term 2019

Fundamental Aspects of Materials Science and Engineering (FAMSE)



Prof. Dr.-Ing. Gunther Eggeler
Prof. Dr.-Ing. Alfred Ludwig

Tuesdays, 12:00 – 14:45 h
Room IC 04/408



The course “Fundamental Aspects of Materials Science and Engineering” builds up on basic materials science knowledge and introduces a few advanced topics. We discuss why an atomistic and thermodynamic understanding is important in materials engineering. We learn about ternary phase diagrams, intermetallic phases and how combinatorial materials research works. These topics are of general importance in materials science and engineering. We then acquire specific knowledge about two material classes, which are in the focus of materials research in Bochum: Superalloy single crystals and shape memory materials. Superalloys have to withstand mechanical loads at high temperature where creep is an important deformation mechanism which governs high temperature strength. In the case of shape memory alloys, fracture mechanics concepts need to be reconsidered and structural and functional fatigue are equally important. Shape memory polymers also show the shape memory effect but we will see that the elementary processes which govern shape recovery are different from what we have learned in metallic shape memory alloys.

I. Thermodynamic aspects of materials (Prof. Dr.-Ing. Gunther Eggeler)

- (1) 02. April 2019: Thermodynamics in materials science & high entropy alloys

II. Phase diagrams, intermetallic phases and combinatorial materials research (Prof. Dr.-Ing. Alfred Ludwig)

- (2) 09. April 2019: Binary and ternary phase diagrams
(3) 16. April 2019: Intermetallic compounds
(4) 23. April 2019: Combinatorial materials research
(5) 30. April 2019: [Class room exercise & Lab-tour \(Dennis Naujoks\)](#)

III. Superalloy Single Crystals & Shape Memory Alloys (Prof. Dr.-Ing. Gunther Eggeler)

- (6) 07. May 2019: Basic aspects of high temperature strength
(7) 14. May 2019: [Lab-tour \(Julian Hunfeld\)](#)
(8) 21. May 2019: Superalloys: processing, microstructure and properties
(9) 28. May 2019: [Class room exercise \(Julian Hunfeld\)](#)
(10) 04. June 2019: Martensitic transformations and shape memory effects
11. June: No Lecture Pfingsten
(11) 18. June 2019: Mechanics of shape memory alloys
(12) 25. June 2019: Fatigue of shape memory alloys
(13) 02. Juli 2019: [Class room exercise \(David Piorunek\)](#)

LV-Nr.: 138520

Coordination will be provided by Julian Hunfeld (ICFO 04-305, Julian.Hunfeld@rub.de).