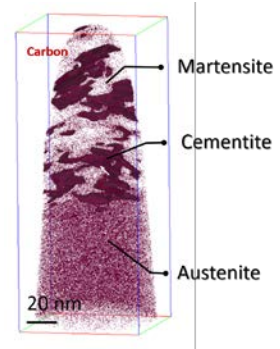
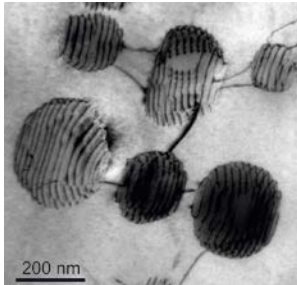


LECTURE ANNOUNCEMENT SS 2021

Scanning and Transmission Electron Microscopy / Advanced Characterisation Methods (STEM - ACM)

Fridays, 15.00 – 18.00 h

Prof. Dr. Tong Li
Prof. Dr.-Ing. Gunther Eggeler
Apl. Prof. Dr.-Ing. Jan Frenzel
Dr. rer. nat. Christoph Somsen



The lecture course *STEM - ACM* will be given in the English language. It is aimed at students of the Master's programmes of **Mechanical Engineering** (special subjects: Materials Engineering and Micro-Engineering) and of the Master's programme **Materials Science and Simulation (MSS)**. The lecture course teaches the fundamentals that are essential for correct interpretation of microstructural results from electron-microscopic investigations. Gunther Eggeler will cover, in the **first part** of the course, the structure of matter, important crystallographic methods and the interaction between electrons and solids. In the **second part** of the course, Tong Li will give an introduction to atom probe tomography (APT) and demonstrate how APT can be correlated with (t-)EBSD and TEM to provide complementary information on microstructure. In the **third part** of the course, Jan Frenzel will present the fundamentals and applications of scanning electron microscopy (SEM). Special emphasis will here be placed on orientation imaging microscopy (EBSD). In the **fourth part**, Christoph Somsen will explain the structure of a transmission electron microscope (TEM) and introduce contrast theory and analytical electron microscopy. In four exercises, integrated into the lecture plan, the subject matter will be consolidated and illustrated with practical examples. The lecture documents such as the script and slides are digitally available in Moodle. In addition, the lecture is filmed and the film recordings are stored in Moodle. Exercises are given over Zoom.

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|------|----------------|---|
| (1) | 16. April 2021 | Crystals and waves |
| (2) | 23. April 2021 | Crystallographic techniques and working with orientations |
| (3) | 30. April 2021 | Exercise I |
| (4) | 07. May 2021 | Principles of atom probe tomography (APT) |
| (5) | 14. May 2021 | APT data analysis and correlative APT with exercise II |
| (6) | 21. May 2021 | Principles of scanning electron microscopy (SEM) |
| (7) | 04. June 2021 | Basics of orientation analysis in the SEM (EBSD) |
| (8) | 11. June 2021 | Exercise III |
| (9) | 18. June 2021 | Key elements of transmission electron microscopy (TEM) |
| (10) | 25. June 2021 | TEM diffraction contrast and analysis of defects and analytical TEM |
| (11) | 02. July 2021 | Exercise IV |

Teaching assistant responsible for this course:

M.Sc. Felicitas Scholz, Room ICFO 04/337

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