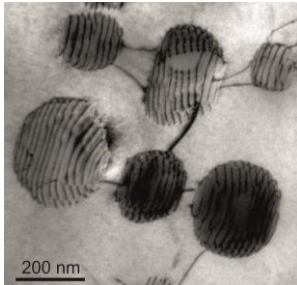


LECTURE ANNOUNCEMENT SS 2023

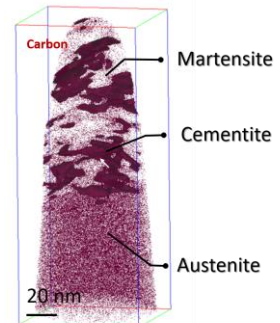
Scanning and Transmission Electron Microscopy / Advanced Characterisation Methods (STEM - ACM)



Fridays, 15.00 – 18.00

Room IC 04/410

Prof. Dr. Tong Li
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. Tong Li 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 introduce atom probe tomography (APT) and demonstrate how APT can be correlated with other microscopy techniques. 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.

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|------|----------------|---|
| (1) | 14. April 2023 | Crystals and waves |
| (2) | 21. April 2023 | Crystallographic techniques and working with orientations |
| (3) | 28. April 2023 | Exercise I |
| (4) | 05. May 2023 | Principles of atom probe tomography (APT) |
| (5) | 12. May 2023 | APT data analysis and correlative APT with exercise II |
| (6) | 19. May 2023 | Principles of scanning electron microscopy (SEM) |
| (7) | 26. May 2023 | Basics of orientation analysis in the SEM (EBSD) |
| (8) | 02. June 2023 | no lecture |
| (9) | 09. June 2023 | Exercise III |
| (10) | 16. June 2023 | no lecture |
| (11) | 23. June 2023 | Key elements of transmission electron microscopy (TEM) |
| (12) | 30. June 2023 | TEM diffraction contrast and analysis of defects and analytical TEM |
| (13) | 07. July 2023 | Exercise IV |

Teaching assistant responsible for this course:

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