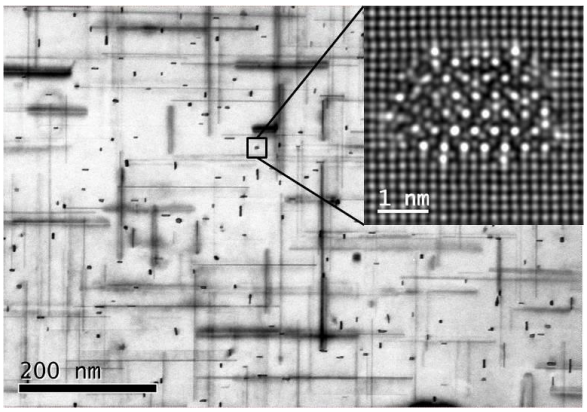
TEM Gemini Centre

NTNU

SINTEF

TEM investigations of aluminium alloys in collaboration with industry



Motivation

In the studies of light metal alloys there are challenges when it comes to establishing relations between the nano-structure and the mechanical properties, as for example strength and ductility. In Al-Mg-Si-Cu alloys, the strength increase is due to precipitation of nanometer-sized metastable phases (see TEM image) that form from solid solution during heat treatment. These so-called precipitates are studied by transmission electron microscopy (TEM).

NTNU (Departments of Physics and Materials Science and Engineering) and SINTEF have several ongoing collaboration projects with Norwegian (and international) aluminium industry. Within this collaboration, we offer specialization projects/masters within characterization of microstructure in aluminium alloys. The work will contribute in the development and design of new aluminium alloys, mainly for the automotive industry. This work can be connected to the SumAl project or the SFI PhysMet centre, where we work in close collaboration with SINTEF, Hydro, Benteler Automotive and Neuman Aluminium Raufoss and other industry. The students will be invited to internal aluminium meetings as well as to project meetings in Trondheim or/and at industry sites. **This year we offer a summer job at NTNU in Trondheim for a kick-start of the project/MSc work!** Within this field there are also possibilities for internships in Japan and continuation as a PhD student.

Your project

In SFI PhysMet we have currently a project with Hydro and Raufoss where we want to combine accurate TEM measurements with atom probe tomography (APT) measurements. The student(s) will here do experimental testing of properties (such as hardness, strength, conductivity..) with different heat treatments, and study the corresponding nanostructure (precipitates) in the TEM, supervised and in collaboration with PhD students and SINTEF researchers (who can help with more advanced microstructure characterization if needed). We also have two specific project offers with Hydro Extrusions (see end of this document + contact us!)

Requirements

Background in materials physics (solid state physics) and an interest in material science would be an advantage. We want students interested in doing experimental work and working independently in a larger group of scientists.

Contact persons

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The TEM Gemini Centre is a strategic collaboration between NTNU and SINTEF. We work within the fields of solid state physics, materials science and metallurgy, and study a broad range of materials down to the atomic level. Our lab hosts some of the most advanced transmission electron microscopes (TEM) in the world.

https://www.ntnu.edu/physics/temgemini