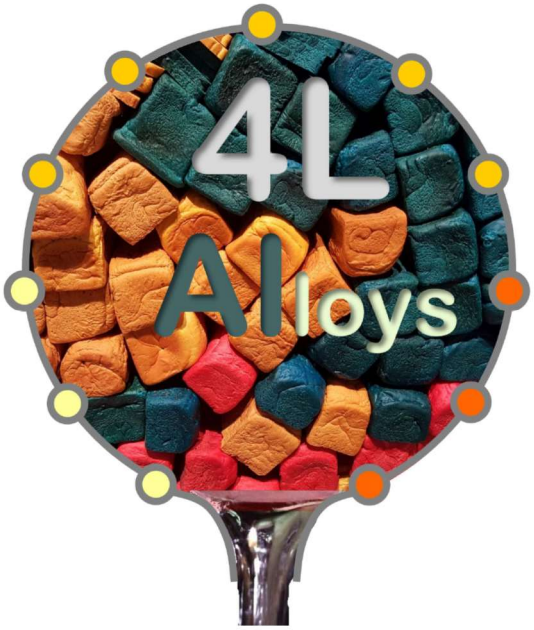


Life Long Learning on Light Alloys:
from Raw Materials to Sustainable Products

In-Field Lab Session #1:
Alloy design – Principles and Theory

Stockholm – September 25th-27th, 2017

in cooperation with

This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation

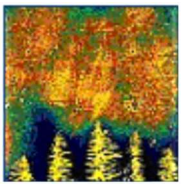
Presentation

This 2-day session will introduce the students to the principles of Alloy design. The underlying theory, computational thermodynamics and kinetics (CALPHAD) will be briefly presented. The calculation of phase diagrams, phase equilibria and simulation of phase transformations with special applications to Al-based alloys will be presented and practical examples will be discussed. The emphasis will be on the computational tools to give the students an overview of what can be done. The Thermo-Calc code will be used in all exercises.
The session also covers hands-on exercises demonstrating calculation of phase diagrams, solidification paths, heat treatment etc. In addition, there is time allocated for the students to consider problems defined by themselves.

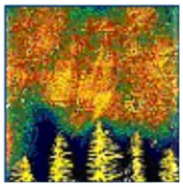
Teachers

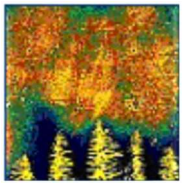
Prof Lars Arnberg
Prof. John Ågren

Programme

September 25th, 2017	Alloy design Principles and Theory	

13.00-13.30	Registration and Coffee
13.30-14.00	Welcome and introduction – purpose of session
14.00-15.00	Basics of computational thermodynamics and alloy design
15.00-17.00	Hands-on exercise 1 Calculation of Al-base phase diagrams; Al-Si, Al-Si-Fe, Al-Si-Mg, Al-Cu…
17.00-18.00	The Scheil-Gulliver model, examples
18.30	*Joint Dinner*

September 26th, 2017	Alloy design Principles and Theory	
09.00-11.00	Hands-on exercise 2 Scheil simulations in Al-base phase diagrams; Al-Si, Al-Si-Fe, Al-Si-Mg, Al-Cu…	
11.00-11.30	Discussion of exercises	
11.30-12.00	Presentation of Thermo-Calc Software	
12.00-13.00	*Joint Lunch*	
13.00-14.00	Kinetic simulations – DICTRA	
14.00-16.00	Hands-on exercise 3 DICTRA simulations of solidification in Al-base alloys and homogenization	
16.00-17.00	Simulation of precipitation and dissolution	
17.00-18.00	Computer demonstration	
18.00	*End of second day*	

September 27th, 2017	Alloy design Principles and Theory	
09.00-11.30	Hands-on exercise 4 Problems defined by the students	
11.30-12.00	Questions and summation	
12.00	*Adjourn*	

Venue

The In-field lab session will be hosted at

Thermo-Calc Software (http://www.thermocalc.com)

Råsundavägen 18A, Solna (suburb to Stockholm)

Accommodation

Stockholm offers a great variety of accommodation which can be easily booked on the most common dedicated websites.

Language

The In-field Lab Session will be held in English.

Insurance

The Organising Secretariat cannot assume any responsibility for personal accident, loss or damage to the private property of participants and accompanying persons, which may either occur during or arise from the School. Participants should therefore take whatever steps they consider necessary as regards insurance.

Website

The official website of the 4L-Alloys School and of this In-Field Lab Session is

www.gest.unipd.it/4L-Lab1/

Registration

The participation is free of charge. Registration to the In-field lab 4L-Alloys will be managed by KTH in cooperation with Padova University (DTG).
Contacts for registration:

- Prof. Lars Arnberg (KTH) lars.arnberg@ntnu.no
- Prof. Franco Bonollo (Padova University) bonollo@gest.unipd.it

Photo & Video policy

Due to industrial confidentiality, photos and videos MUST NOT be taken by participants during the event. Some photos may be taken by organisers for simple dissemination purposes.