

# CME 568: Phase Transformation in Materials (Spring 2021)

Meetings: Thursdays 5-7:30 pm, Online Synchronous

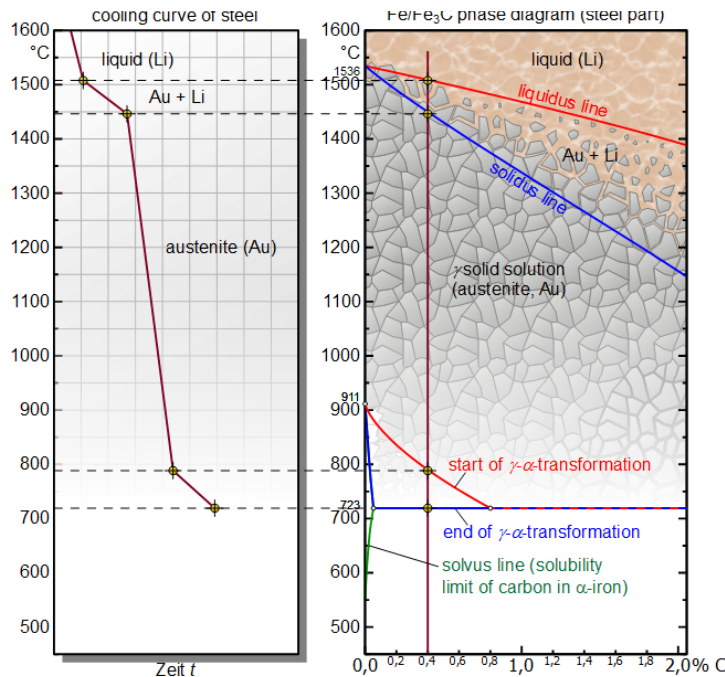
Instructor: Sara Kadkhodaei, PhD, Assistant Professor of Materials Engineering.

E-mail: sarakad@uic.edu

For all kinds of materials, phase transformations show common phenomena and mechanisms, and often turn a material, for example metals, multiphase alloys, ceramics or composites, into its technological useful form. Understanding the physics, thermodynamics, and kinetics of a transformation from the solid to liquid state or from one crystal form to another is therefore essential for creating high-performance materials.

In the first half of the course, we learn the basics of phase transformation in materials including thermodynamics and kinetics of solidification and solid-state transformations. The role of interfaces and microstructure on phase transformation will be discussed. In the second half of the class, we deal with specific transformations - solidification, diffusional transformation in solids, and diffusionless transformation. For each type of transformation, we will combine the theoretical tools discussed in the first part of the course to simulate a real transformation using the Thermo-calc software. We have access to the full software package, and you will learn how to benefit from the software even for your own research.

## Microstructure evolution during various phase transformations



## Sample simulation using the Thermo-calc software for precipitate mean radius

