

Tutorial 5

Aims:

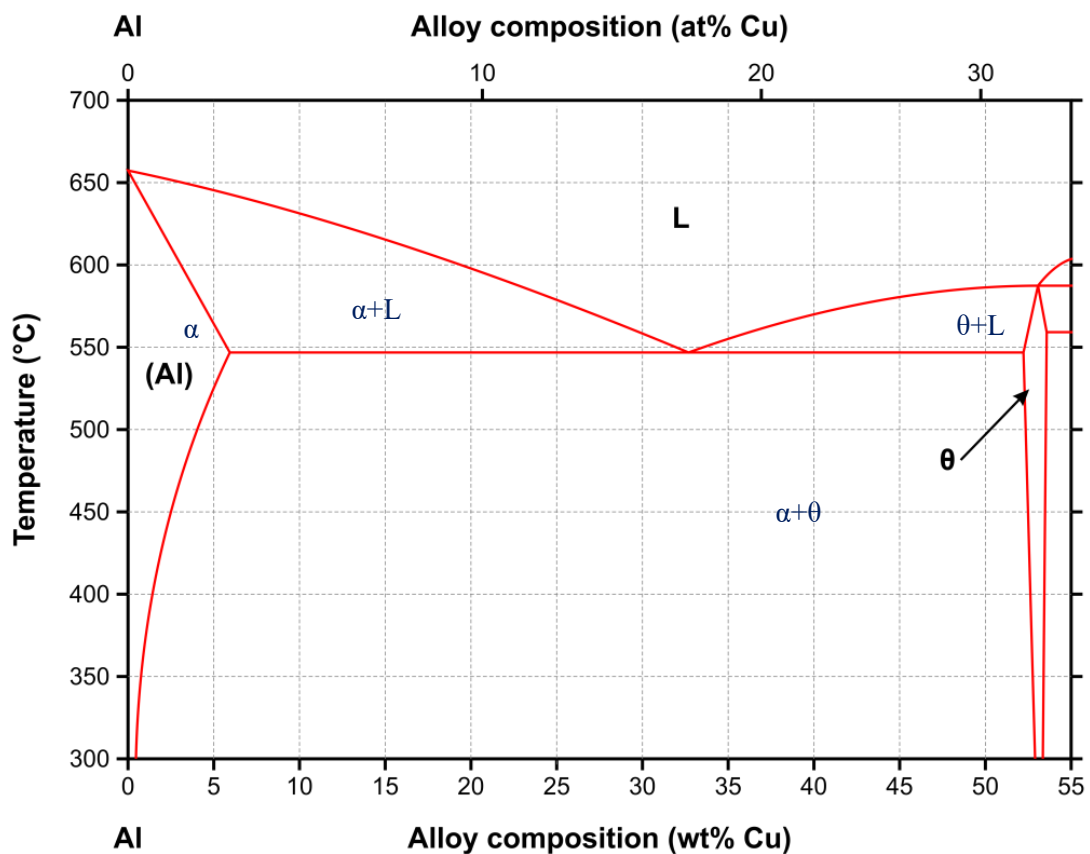
Upon successfully completing these tutorial exercises, students should be able to:

1. Make use of equilibrium phase diagrams to determine:
 - phases present under given conditions
 - phase compositions under given conditions
 - phase fractions under given conditions

Phase Diagrams

Exercise 5.1 Using the phase diagram for the Al-Cu binary system presented below, determine for an Al-12 wt% Cu alloy:

- a) The temperature at which the melt would be expected to begin solidifying
- b) The phases present at 600 °C
- c) The composition of each of the phases present at 600 °C (expressed in wt%)
- d) The fraction of each of the phases present at 600 °C



Exercise 5.2 Answer the following questions in respect to the Fe-C equilibrium phase diagram presented below.

- What is the eutectic temperature for the Fe-C system?
- What is the eutectoid composition for the Fe-C system?
- At what temperature would a cast iron containing 1.6 wt% C be expected to start melting?
- What phases are present in a steel containing 0.35 wt% C held at 750 °C?
- What is the maximum solubility of carbon in Austenite at 1000 °C?

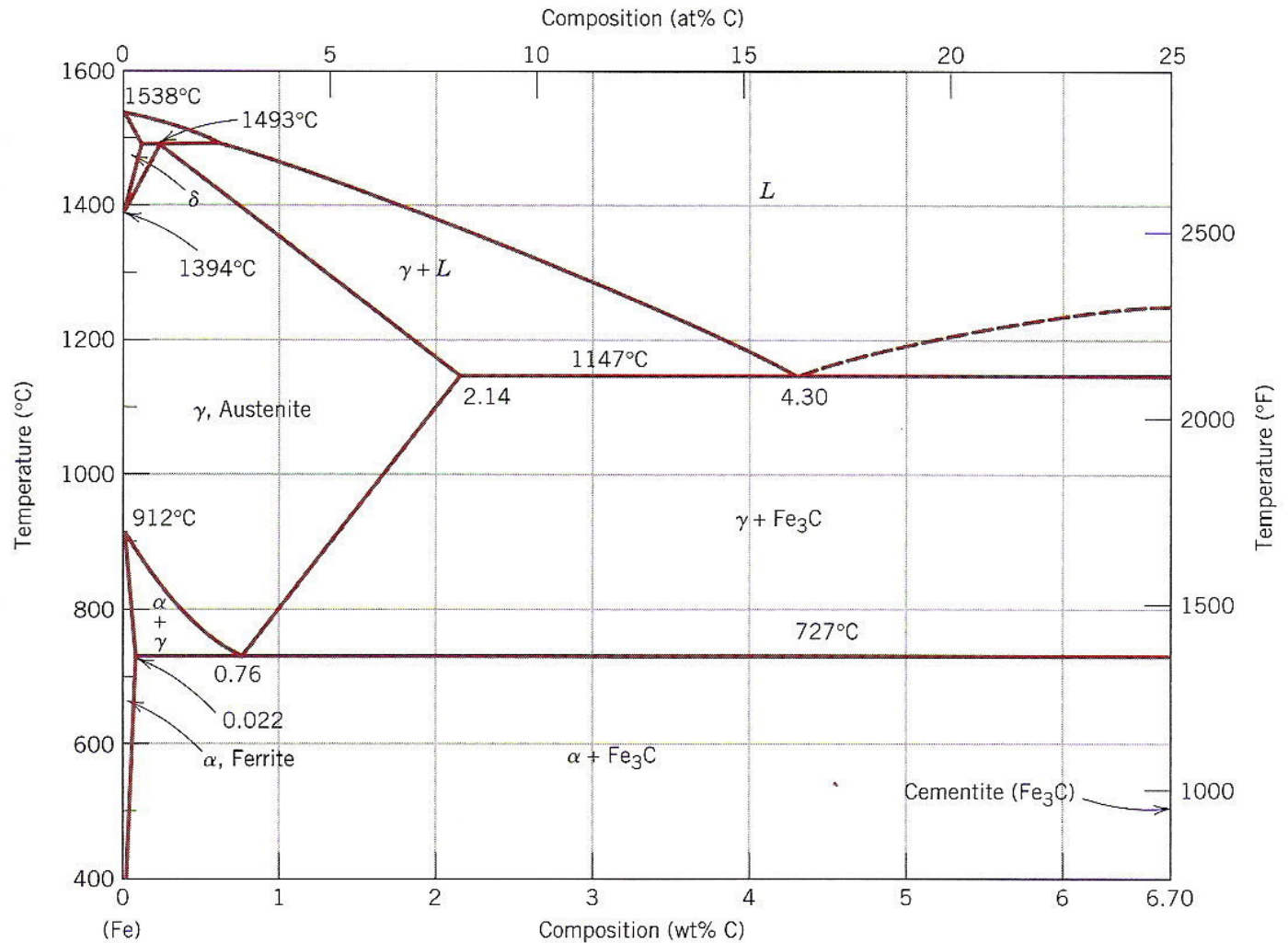


Figure. The iron-rich portion of the equilibrium phase diagram for the Fe-C binary system. (Source: <http://s3.amazonaws.com/chegg.media.images/board/a60/a601eb4c-9eaf-468b-8410-f3d92cf90c5f-original.png>.)