

Series 11

28 November 2025

Exercise 1: Eutectic phase diagram

Using the eutectic diagram A+B of Figure 11.1 and considering an alloy made at 80% of B, calculate the percentage of pro-eutectic β_2 and eutectic $\alpha_3 + \beta_3$ phase and their respective concentrations using the lever rule.

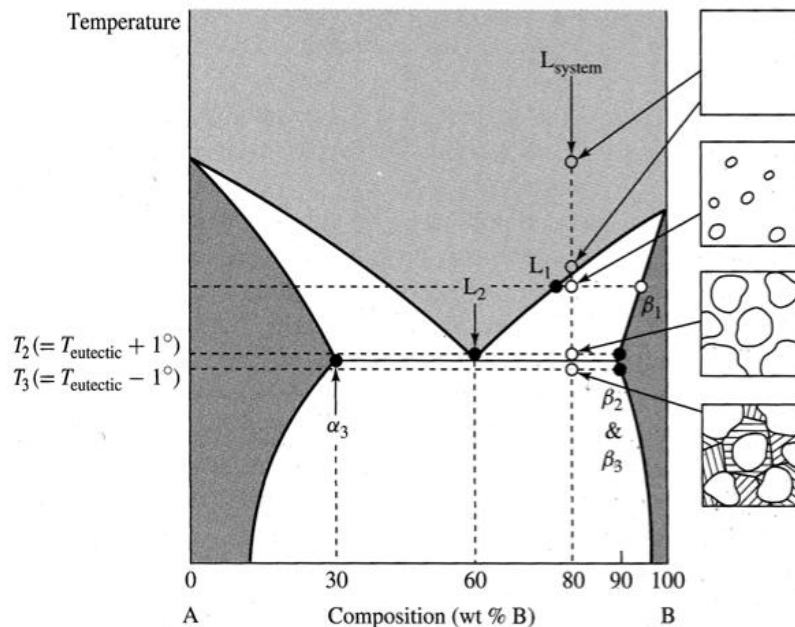


Figure 11.1 Diagram of a binary alloy A+B

Exercise 2: Iron-Carbon phase diagram

Let's consider the Iron-Carbon diagram given in Figure 11.2. We form cementite (iron carbide, Fe₃C) rather than graphite at practical cooling rates. We note the presence of a eutectoid (eutectic between solid phases) at 0.77wt% carbon.

- 1) Draw the microstructure morphologies qualitatively.
- 2) Calculate, for 1 kg of steel, the quantity of ferrite and cementite Fe₃C
 - a) for a eutectoid composition
 - b) for 0.5% C (hypo-eutectoid).

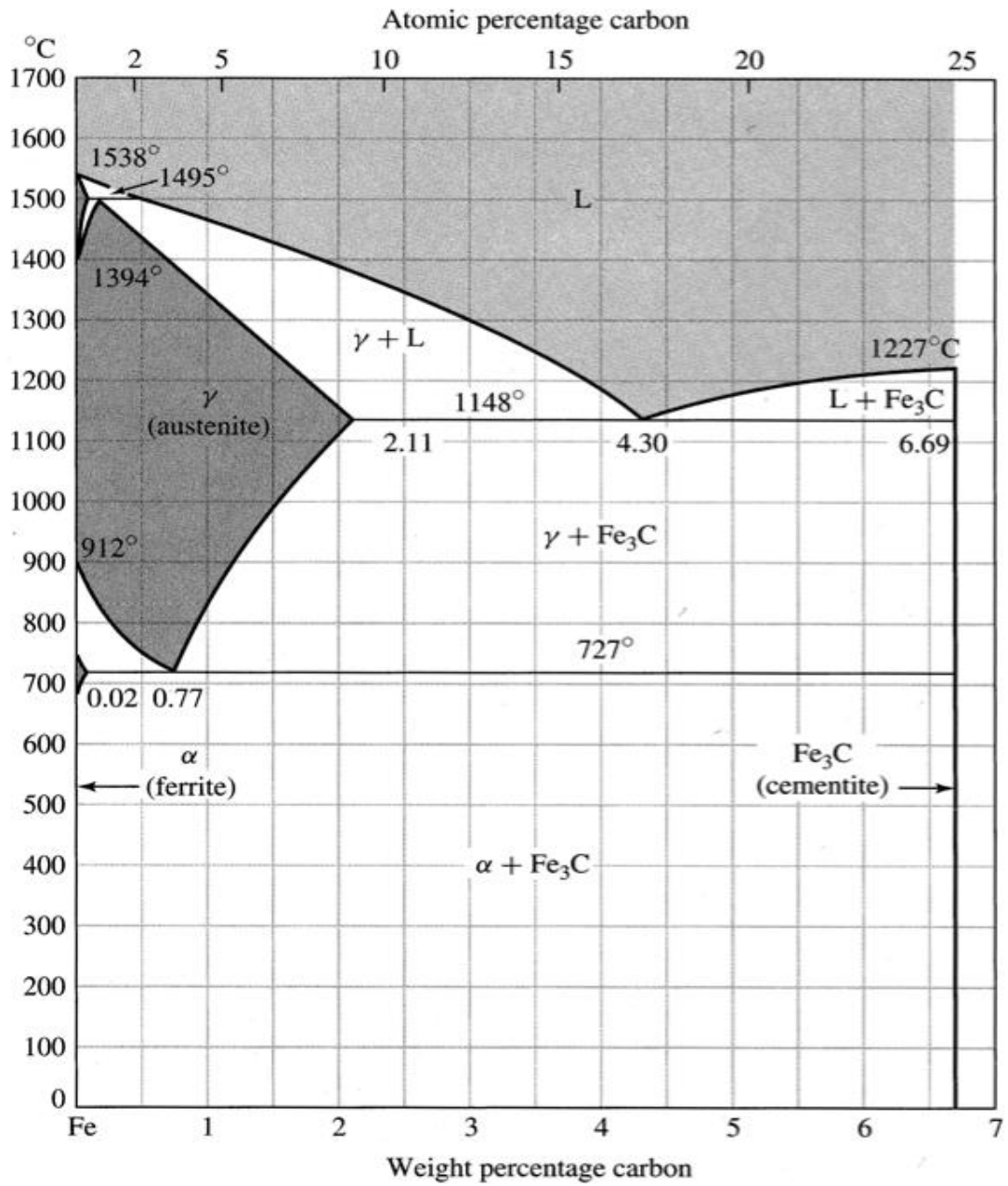


Figure 11.2 Phase diagram Fe-Fe₃C