

## Series 11

6 December 2024

### 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  $\beta_2$  and eutectic  $\alpha_3 + \beta_3$  phase and their respective concentrations using the lever rule.

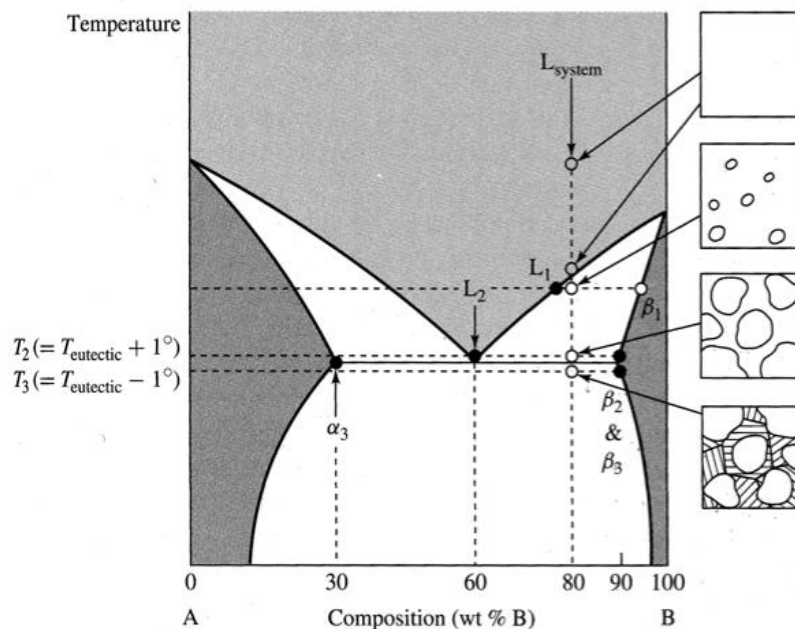


Figure 11.1 Diagram of a binary alloy A+B

### Exercise 2 Iron-Carbon phase diagram

Let's consider the Iron-Carbon diagram given in Figure 11.2. We form cementite (iron carbide)  $Fe_3C$  instead of graphite under 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  $Fe_3C$ 
  - a) for a eutectoid composition
  - b) for 0.5% C (hypo-eutectoid).

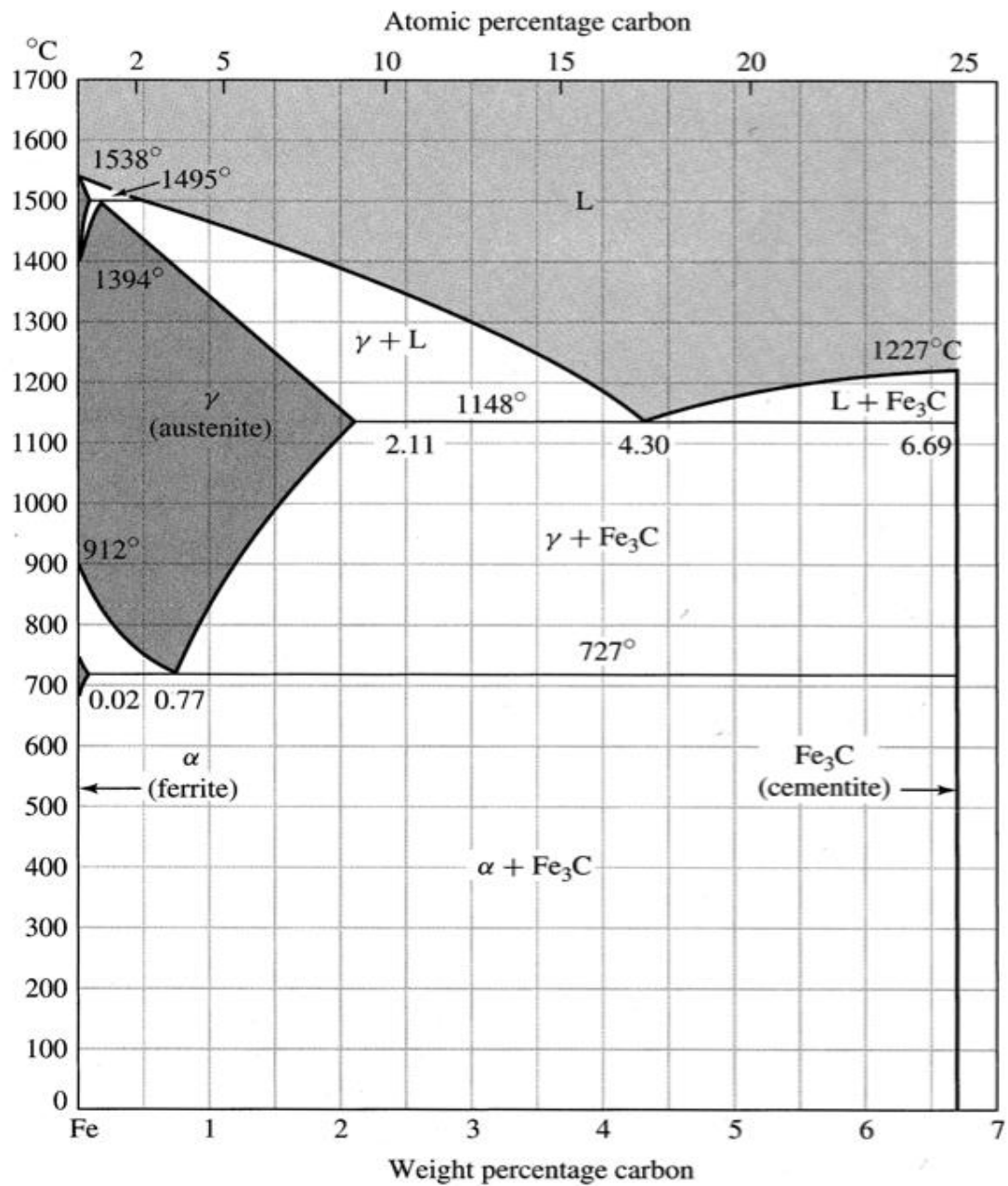


Figure 11.2 Phase diagram Fe-Fe<sub>3</sub>C