3.020 Lecture 24

Prof. Rafael Jaramillo

1 Peritectic reactions

$$\underbrace{\mathbf{L + Solid\ 1}}_{high\ temp} \quad \leftrightarrow \quad \underbrace{\mathbf{Solid\ 2}}_{low\ temp}$$
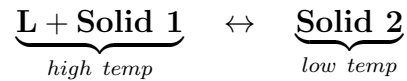
- DoF = C - Ph + 2 = 1
  a line in (T, P, X_2) space, as for eutectic reactions

- Peritectoid reactions

$$\mathbf{Solid\ 1 + Solid\ 2} \quad \leftrightarrow \quad \mathbf{Solid\ 3}$$
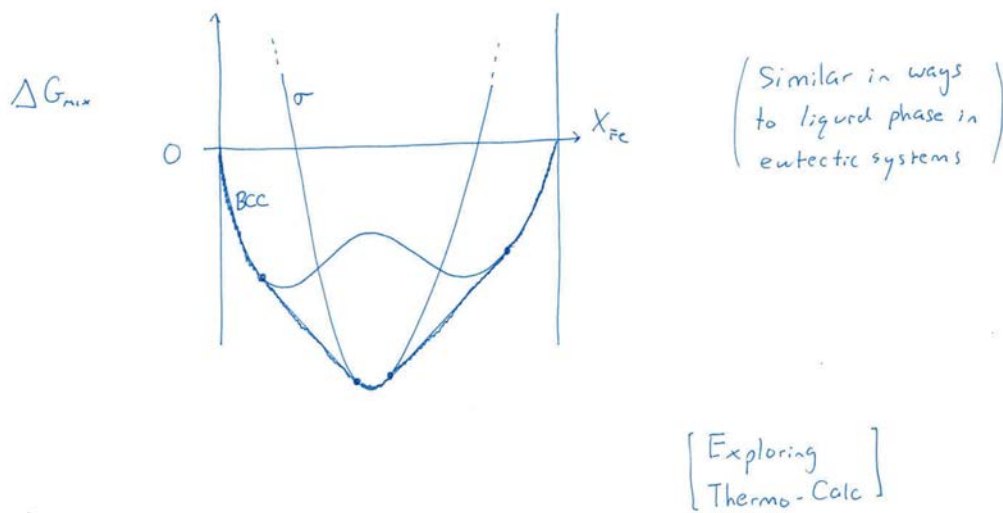
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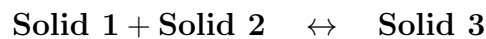
2 Intermediate phases

- Phase that is stable for some intermediate composition range, but not for the pure components

- Structurally distinct from the reference states of the pure components

slides: Cr-Fe

- Free energy-composition diagrams for intermediate phases
  e.g. Cr-Fe, case of a spinodal interupted by intermediate

- more generally: intermediate phase in a three-phase diagram

ΔG_m

O X_2

α ε β

α solid Sol'n

β solid Sol'n

$\alpha + \varepsilon$ $\varepsilon + \beta$

ε Solid Sol'n
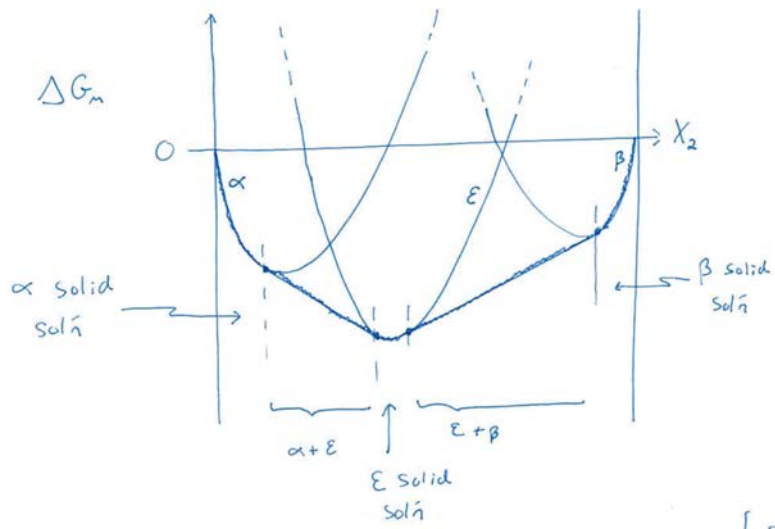
[slides: images from DeHoff]

3.020 Thermodynamics of Materials
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