



Materials Science (MSE 201) Spring 2014

March 10, 2014

Phase Transformations

(Ch. 10)



Ch.9 – Phase Diagrams → What do phase diagrams tell us??

Also consider rate!

Ch. 10 – phase transformations → Alteration in the number and/or character of phases

Need to know the conditions required for specific phase transformation

WHY??



Phase Transformation

- Takes time (transformation rates: kinetics).
- Involves movement/rearrangement of atoms.
- Usually involves changes in microstructure.

Three types:

1. “Simple” diffusion-dependent transformation: no change in number or compositions of phases present (e.g. solidification of pure elemental metals, allotropic transformation, recrystallization, grain growth).
2. Diffusion-dependent transformation: transformation with alteration in phase composition and often with changes in number of phases present (e.g. eutectoid reaction).
3. Diffusionless transformation: e.g. rapid T quenching to “trap” metastable phases