

## Lecture 20

Wednesday, May 21, 2008  
11:10 AM

### Ref:

1. G. Dieter, Mechanical Metallurgy, 3rd Edition, McGraw-Hill, 1986.
2. Reed-Hill, Abbaschian, Physical Metallurgy Principles, 3rd Edition, PWS Publishing Company, 1994.

### Course Notes:

- We are in the homestretch now --only 2.5 weeks and 7 lectures left
- No class next Monday -- Memorial Day
- This week Homework 6 is due on Friday
- You have your Formal Lab Report for Lab IV due
- And you guys are starting Lab V

### Review:

- So far in the class we have talked about fundamental atomic structure
  - We talked about crystallographic lattices, directions, and planes
  - We talked about crystalline defects
  - We talked about diffusion
  - We talked about stress and strain and tensile properties
  - We talked about elastic deformation
  - We talked about plastic deformation
  - We talked about slip and the underlying dislocation theory that explains plastic deformation
  - We talked about how dislocations are responsible for plastic deformation and therefore anything which impedes dislocation motion makes a material stronger
  - We talked about specific strengthening mechanisms
  - We talked about annealing -- specifically recovery, recrystallization, and grain growth
  - We then jumped to unary phase diagrams and binary phase diagrams
  - We talked about the steel phase diagram (at length)
  - We defined many reactions which occur on phase diagrams
  - We then discussed phase transformations
  - We discussed both the thermodynamics and kinetics of phase transformations
  - We talked about isothermal transformation diagrams (or TTT diagrams)
  - We talked about metastable phases in the iron carbon system
  - We specifically talked about Martensite, Bainite, and Spheroidite
  - We talked about tempering
  - And that's where we left off.
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- You may have noticed that we skipped Chapter 8 the first time through -- I'm going back to pick it up now...

Rest of Lecture is available in PowerPoint Presentation Paired with Lecture 20