

Week 5 – LEC Section

- Reminder – Quiz 1 is next week (calibration, standards, tensile testing, Cu testing). 7 questions, all q's are on the web page.
- Review CW and Annealing lab – what happened? $T_{\text{melt Cu}} = 1085\text{C} = 1358\text{K}$; $1/3T_{\text{melt}} = 462\text{K}$ (189C, 372F), $1/2T_{\text{melt}} = 679\text{K}$ (406C, 763F). At 450F, change was very slow, at 650, it was fast.
- Discuss grading for technical letters:
 - ❖ A – very professional, well written, good graphs... (27-30)
 - ❖ B – overall, nicely done but missing a few key items (24-27)
 - ❖ C – missing quite a bit, or things not done very well (21-24)
 - ❖ D – really needs work (18-21)
 - ❖ F – wow, is this a letter? (<18)
- What's due next week: technical letter for this week's lab (HT of 2024). Graphs – TRENDLINES! (hardness (HRB) vs. aging time – all data on 1 graph. Background req'mnts are described in the letter I'll give you. **Grading will get STRICTER as the semester progresses, so be sure to read comments and improve.**
- **Background information for HT of aluminum 2024:**
 - ❖ What is precipitation hardening? What are the three steps in precipitation hardening, and describe the microstructure during/after each step. Based on the microstructure, what do expect the mechanical properties to be at each step (hard or soft, strong or weak)? Use a phase diagram to help explain the above.
 - ❖ What characteristics shown in a phase diagram would indicate an alloy is precipitation hardenable?
 - ❖ Regarding aluminum alloys, what is meant by “heat treatable”?
 - ❖ Are all aluminum alloys heat treatable?
 - ❖ What is meant by “artificial aging”? What is meant by “natural aging”? What is meant by “over aging”?
 - ❖ What are the implications of over aging in terms of using susceptible alloys in various design applications?
 - ❖ Do all heat treatable aluminum alloys naturally age?
 - ❖ We will be studying 2024 aluminum. What does the designation “2024” tell us? We will start with 2024-T351, what does “T351 mean”?
 - ❖ Are the following terms applicable for this lab: austenite, martensite, pearlite?
- What are we doing in lab?
 - Fixed control variable: material (2024 aluminum)
 - Control variables: aging temperature and aging time.
 - Response variable: hardness (Rockwell B scale, HRB).
 - Taking small pieces of 2024-T351 and solution heat treating followed by aging (at room temperature, 350F, 500F).
 - Each section will do their own specimens for aging times of zero to 20 minutes
 - Section A will provide samples for long term aging – each other section will measure these specimens (18 hrs, 48 hrs, 66 hrs).