1. M 11/8/23

Lab notes/test procedure

1. Objective: Test copper, determine k value
2. Fill bucket with ice by loading ice in from ice machine in the front of the room
   1. Had to repurpose a bucket in the lab that had thermocouples, etc.
   2. (Note: Still need new cooler)
   3. Make sure there is room to submerge pump
      1. If not, use secondary bucket to remove some ice
   4. Make sure temperatures are accurate to what they should be
3. Turn Water pump on
   1. Make sure nothing spills
      1. If water spills, check outlet. Is it in the ice bath?
      2. Consider: changing the paper to silicone/ water resistant material
   2. Check temps with handheld thermometer, are they what they should be?
      1. Ice bath temp should not exceed 2C
      2. Outlet temp should be as close as possible to ice bath temp. (about <=1C)
   3. Listen to pump, is there enough water in the ice bath?
4. Build the heat tower
   1. Stack from bottom to top modules.
      1. Bottom-most module has holes on the upper side of the module.
         1. Add thermal paste to top and bottom of sample module/ where needed on other modules.
         2. Note: it helps to insert thermocouples to sample module before adding thermal paste. (see 4b)
      2. Sample module.
      3. Above sample module has holes on the bottom side of module.
      4. Heater module
   2. Add thermocouples (currently, the chips are oriented horizontally on desk)
      1. The rightmost chip corresponds to the uppermost hole on the tower.
      2. As the thermocouples descend on the tower, they correlate to the chips from right to left.
   3. Check if the heater is inserted to the tower. If not, insert it to the top module.
5. Turn on controller
6. Make sure the Arduino is connected to the computer and serial studio is running
7. Turn on heater
8. During experiment
   1. Periodically check and note the power, ice bath temperature, outlet temperature, and thermocouple temps.
   2. Periodically check to make sure the water pump is still running.

Notes from today’s copper experiment:

* Thermocouple A is not producing data and Thermocouple H appears cooler than Thermocouple G (physically impossible, H is closer to heater)
* Air pocket added to heater module seems effective!! At 95C, the top module is not too hot to touch as opposed to the previous module