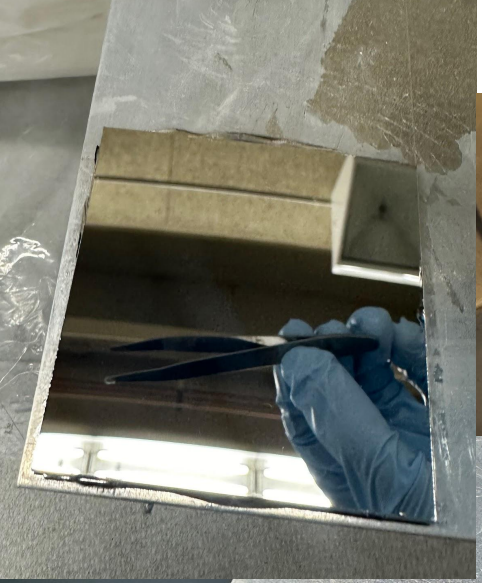
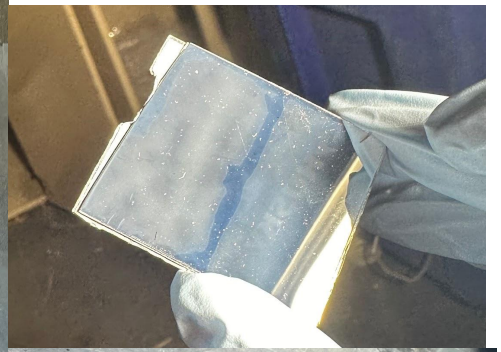
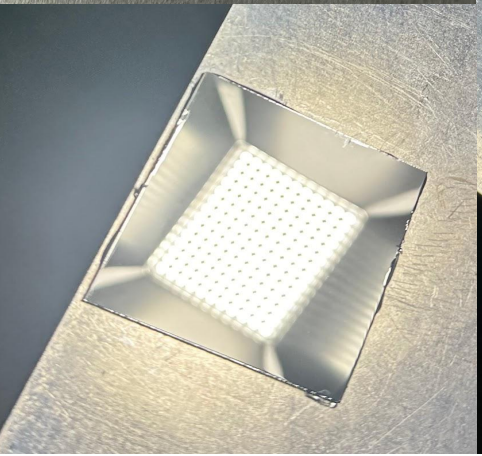
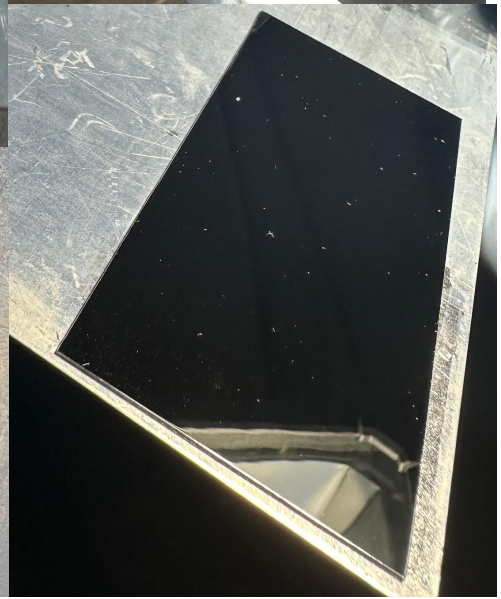




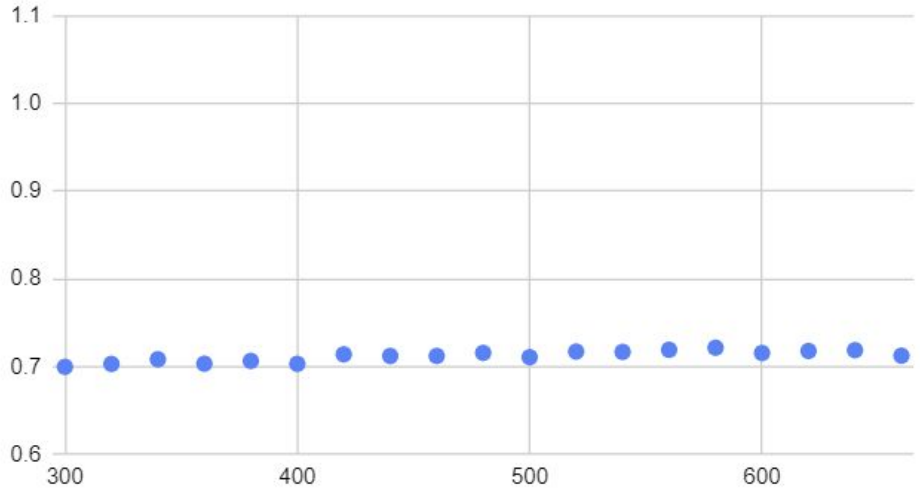


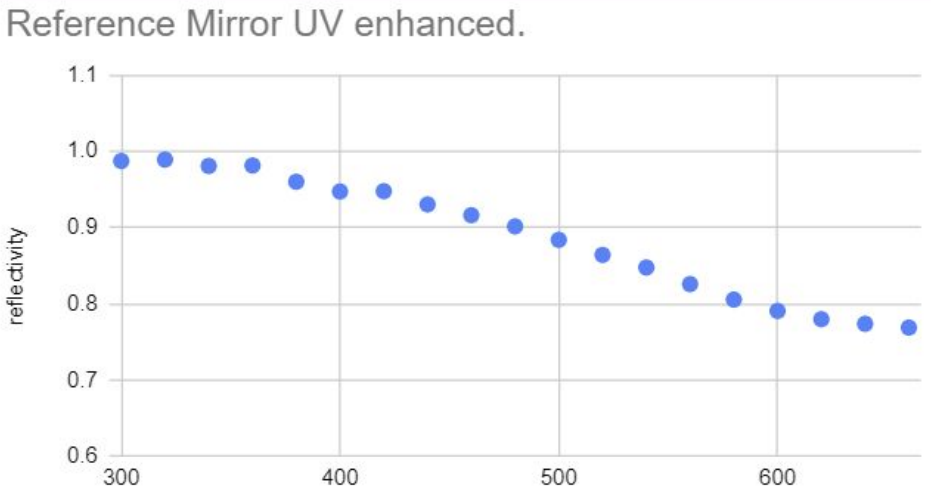


Coating Results from Evaporation #6:

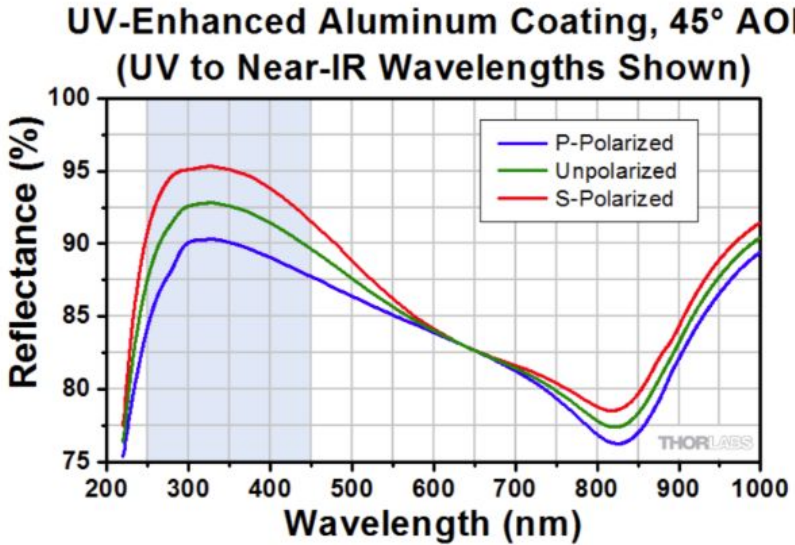
The top right image is from Evaporation #5

Visually, the evaporation went well, when the mirrors are held up to light we cannot see through the coating as in evaporation #5, nor is the surface of the film “hazey”. The exact reason for this is still unknown to us, we suspect either the large quantity of chromium is responsible, or since these samples were left in the chamber (under vacuum) overnight that perhaps instantly flushing the system with nitrogen gas could be causing some unwanted haziness, we will attempt to replicate this evaporation next week using the time stamps and currents that are recorded in order to acquire data and test whether leaving samples in the chamber prevents the haziness.





Reflectivity: Evaporation #6 has more stable reflectivity throughout but despite the reduced haziness, it still suffers poor reflectivity. Note that these samples are “older” generally having collected dust and were characterized first, any discrepancies from the source heating up would be present here.



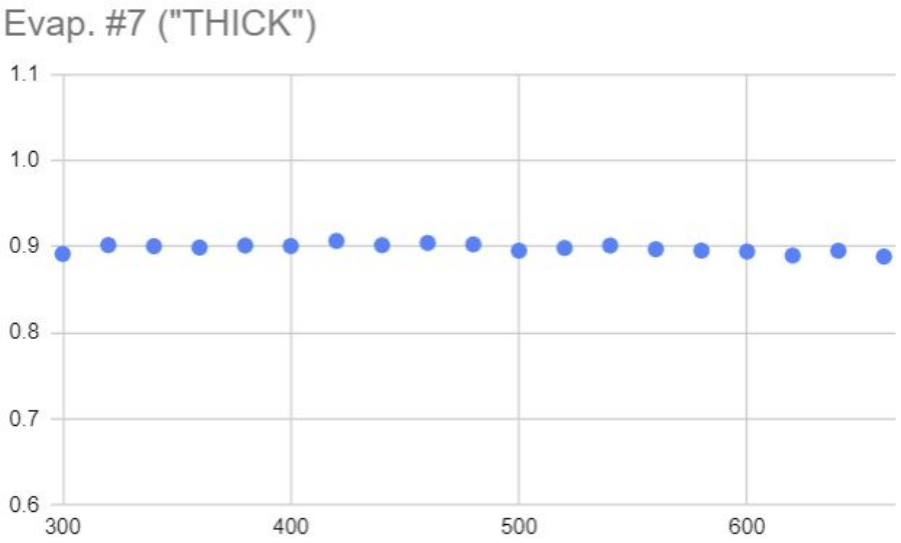
Evaporation 7:

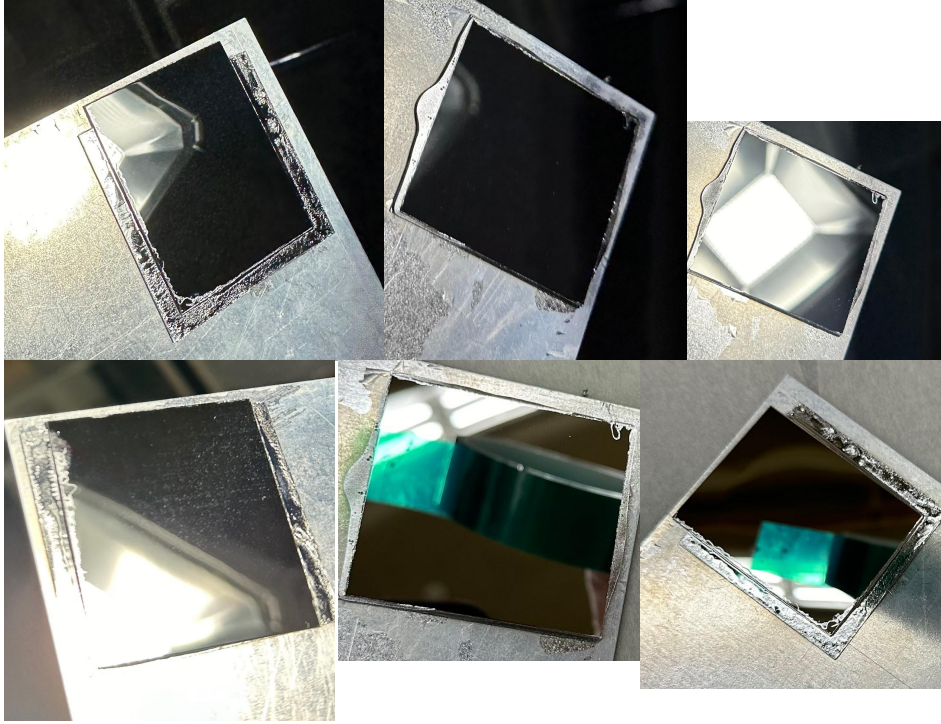
Coming away from coating #6 we wanted to test a couple of ideas as to what reduces haziness.

- thick Cr w/ thin Al
- thick Cr w/ thick Al
- thick/thin epoxy samples for all evaporations
- leaving the samples in overnight
- Taking the samples out immediately

We decided to coat 5 kAng of Cr (a generally thin coating) while replicating the amount of Al from evaporation #6 by using the current and times we recorded by hand. This resulted in ~20 kAng of Al total, the samples were then left for 24 hours.

Combinations such as thin Cr w/ thick Al were also possible but as we began to coat we ruled out this option as less likely. This was a result of a much more stable and “normal” rate of deposition (in line with the earlier evaporations) we believe that the older the crystal was, the less accurate the deposition data we acquired is. Making it likely that evaporation #5 (extremely thin Cr with the usual 70 kAng Al) was much more Al than we initially recorded.





Akin to evaporation #6 we coated 2 thin and 2 thick 30 ml lexan. We found little to no difference that resulted from epoxy thickness BUT a stark difference by using thin Cr vs thick. Seemingly thinner Cr gave us a more reflective and consistent coating, the haziness also seemed to have gone away but whether this is a result from leaving it in the chamber or the ratio of materials still remains to be seen.

Moving Forward:

Potentially we will coat again in the coming week to see the last combination where we coat relatively thick Cr + Al and immediately remove the samples from the chamber to see whether haziness exists. The samples from evaporation #7 should also be cross checked, whether again at BNL or somewhere like JLab, to be certain that this high reflectivity is not a one off, and whether we can reproduce these results again.

Ideas:

1. Examine the rate of deposition at some constant current through evaporation 1-7 to see the impact of QCM life decay on deposition rate
2. Look at the rate of deposition for the TPC group (especially the start of their data collection compared to evaporation #7) to see if they experienced any changes in deposition rate
3. Attempt to extrapolate the rate of deposition via the time/currents recorded for evaporations 3,4,5 after finding the impact of QCM life to deposition as the recorded values at this time are likely inaccurate to the true deposition amount.