11/17 Graphene Exfoliation Summary

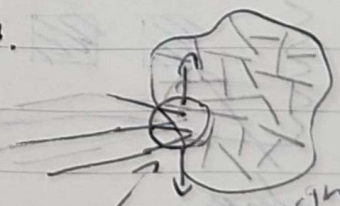
1. SiO_2 chips were prepared a few days ahead. They were stored under vacuum at room temperature for 2 days (before, took hot SiO_2 right from the furnace...)

2. Put SiO_2 chips onto a hotplate at 110°C - ~~temperature~~ steady state temperature as read on the screen.

first put SiO_2, then turn ~~off~~ up temperature

3. Cleaned work station (table, tweezers) with IPA and got flakes and tape.

4. Flake selection focused on:
   - find thin & shiny ~~flake~~ smaller flake from a bigger parent.
   - appropriate flake was selected & positioned on the tape.
   - see "initial_flake_size".

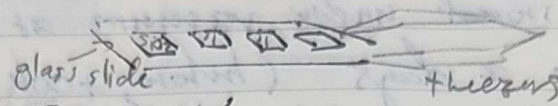


separating top & bottom layers to get to the shiny middle

5. Tape was folded multiple times, starting from the center & making way out towards the ends.

folding was stopped after tape looked like "folded_flake_side" or/and "folded_flake_top".

6. Slide with SiO_2 chips on top was taken away from the hot plate & put near exfoliated tape.



SIMULTANEOUSLY, timer was started for *30-35s.

chips must be began to press at this time

7. At *30s, the first chip was placed onto the exfoliated tape. Additional chips were placed immediately after.

8. after all chips were placed onto tape, the same glass slit was put on top

fast pace step

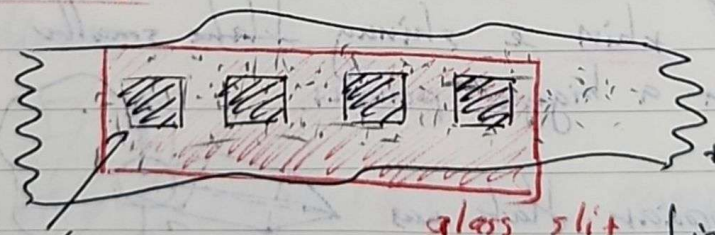


fig. 1

the whole object was flipped by 180°.

using small rubber pipper bulb, gently press on tape in the areas where chips are located.

DO NOT press to many times; this was found to makes flakes stick too firmly to the chip surface ⇒ too only tell teachers

*depending on surroundings temperature, may need longer cooldown time.

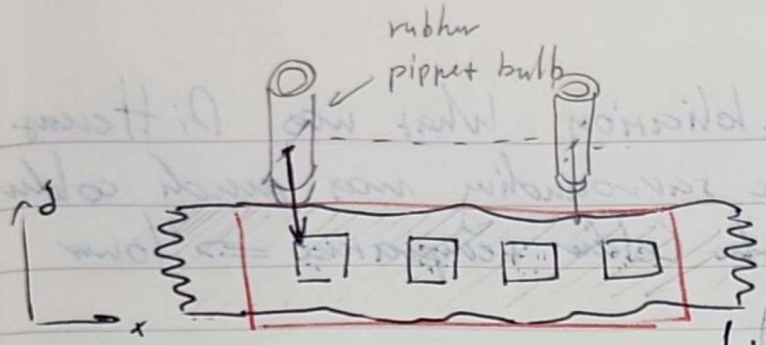


fig. 2

press across the whole surface

9. Change hotplate temperature to 66°-67°C at the steady state.

10. Place whole objects (tape-chip-slid... tes?") onto the hotplate and start timer for 2min.

during these 2min, press (firmly, harder than during step 8) into a similar manner as before.

make sure to work through each chip's surface area.

11. Stop after 2min and take off the hotplate to cool down for another 2min.

12. After 2min, SLOWLY pill off tape from the 8 chips.
peal

NOTE:

→ ~ 90s per chip
→ uniform peel velocity
→ peel direction only in $\hat{x}$ (see fig. 2) {for coordinate reference}
→ peeling must be parallel to the ~~sta~~ surface

→ minimize!

11/17 Graphene Exfoliation What was Different

1. Temperature of the surrounding was much colder than usual. ~~Hypothe~~ Colder temperature ⟹ lower relative humidity

2. SiO_2 chips were old. ~~I Bcha~~ They were stored for 3 days in vaccum chamber.

3. Fewer and lighter tapping during step 8.

4. Longer peal off time per chip (increased from ~30s previously to ~90s this time)