Parcoater Process Monitoring
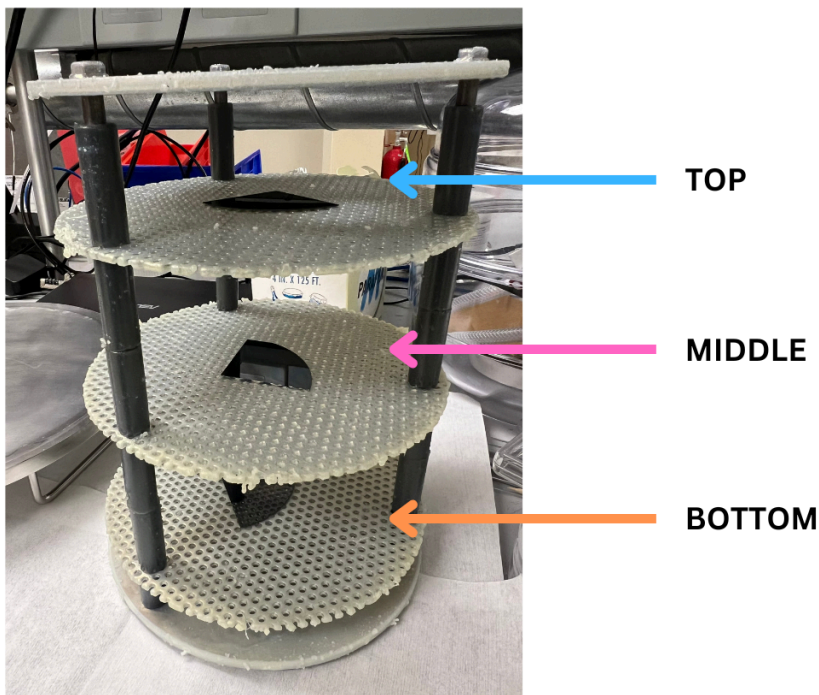
Emma Nguyen

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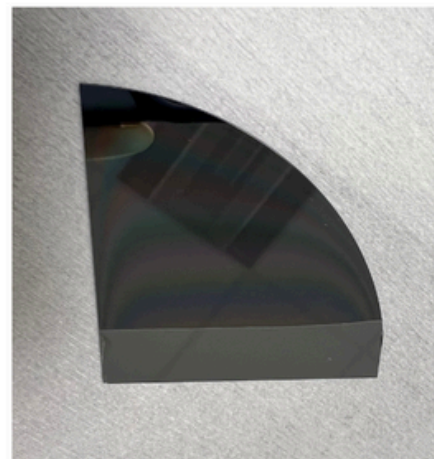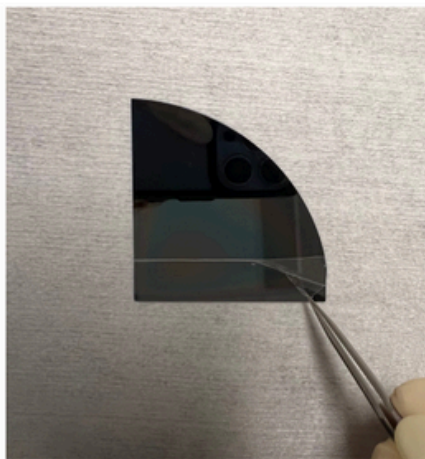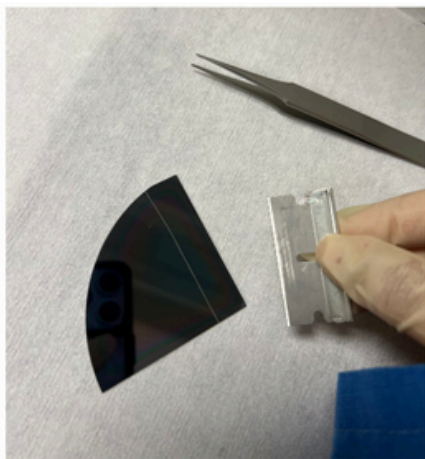
4, Dec. 2024

PROCESS:

- Pieces of silicon wafer were cleaved into 3 equal pieces and placed in the center of each level of sample tray (top, middle, bottom).

- Samples were coated with parylene with various weights of dimer (in grams).
- Samples were then measured using alpha-step2 by slicing parylene film with a razor blade.


- Alpha-step2 parameters: 0.20 seconds with 1.0 mg force

RESULTS:

- Chart below shows weight and thickness measured on alpha-step2 for each top, middle, and bottom level and their average.
  - Started to show significant difference between levels at 10 g
  - Largest thickness difference was ~4 µm at 30 g
  - Top level was thought to be thicker than bottom
  - At 20 g, data began to show bottom level was thicker than top level
    - Baffle tube was changed around this time and may have impacted measurements

| weight (g)	top (µm)	middle (µm)	bottom (µm)	average (µm)
5	2.8669	2.6387	2.214	2.5732
10	6.2669	4.9115	4.6753	5.284566667
15	8.7079	7.3478	6.1703	7.408666667
20	10.308	13.33	13.957	12.53166667
30	16.168	18.574	20.157	18.29966667
50	32.272	31.23	30.322	31.27466667

- ***Graph of relationship between thickness and weight (includes an estimated thickness based on measurements)***
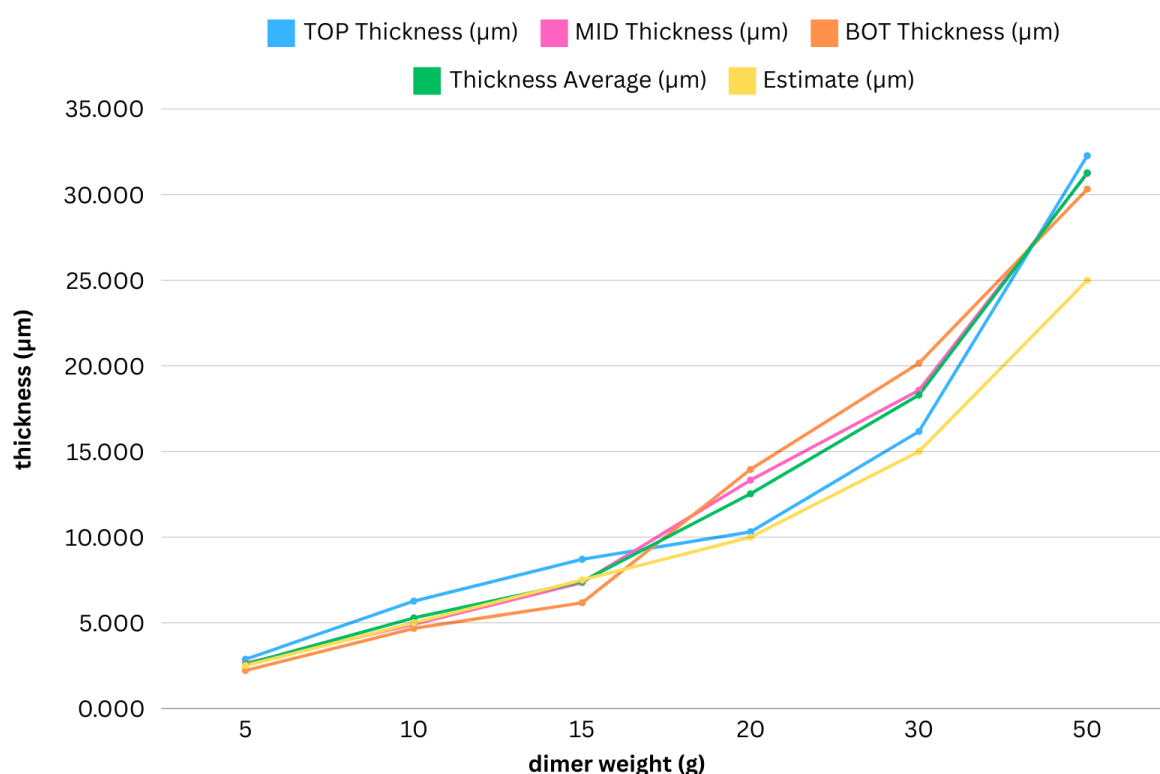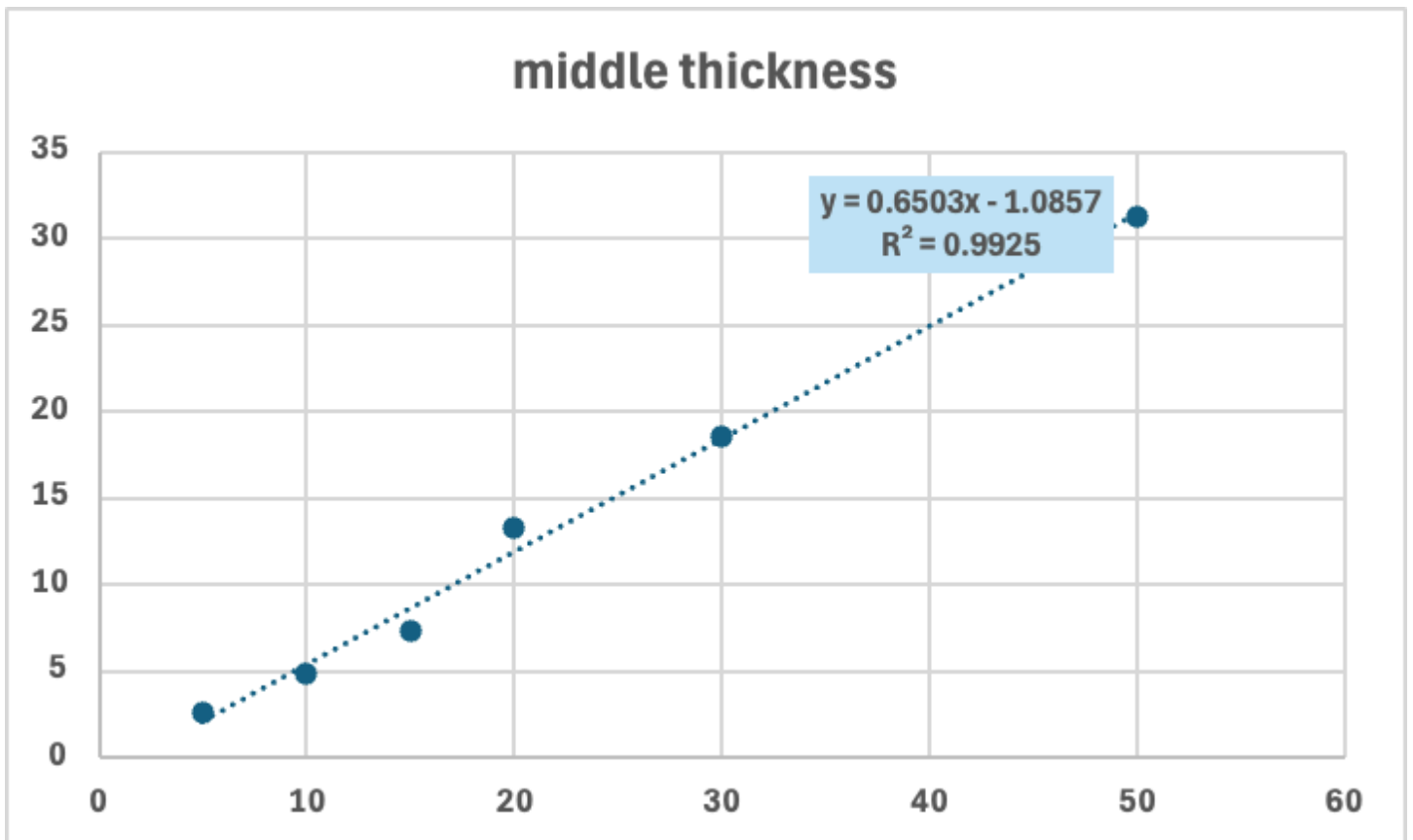

- Estimated deposition rate is **0.515 µm / g** based on average of 5 g measurement **OR** estimated deposition rate is **0.566 µm / g** based on average of all deposition rates
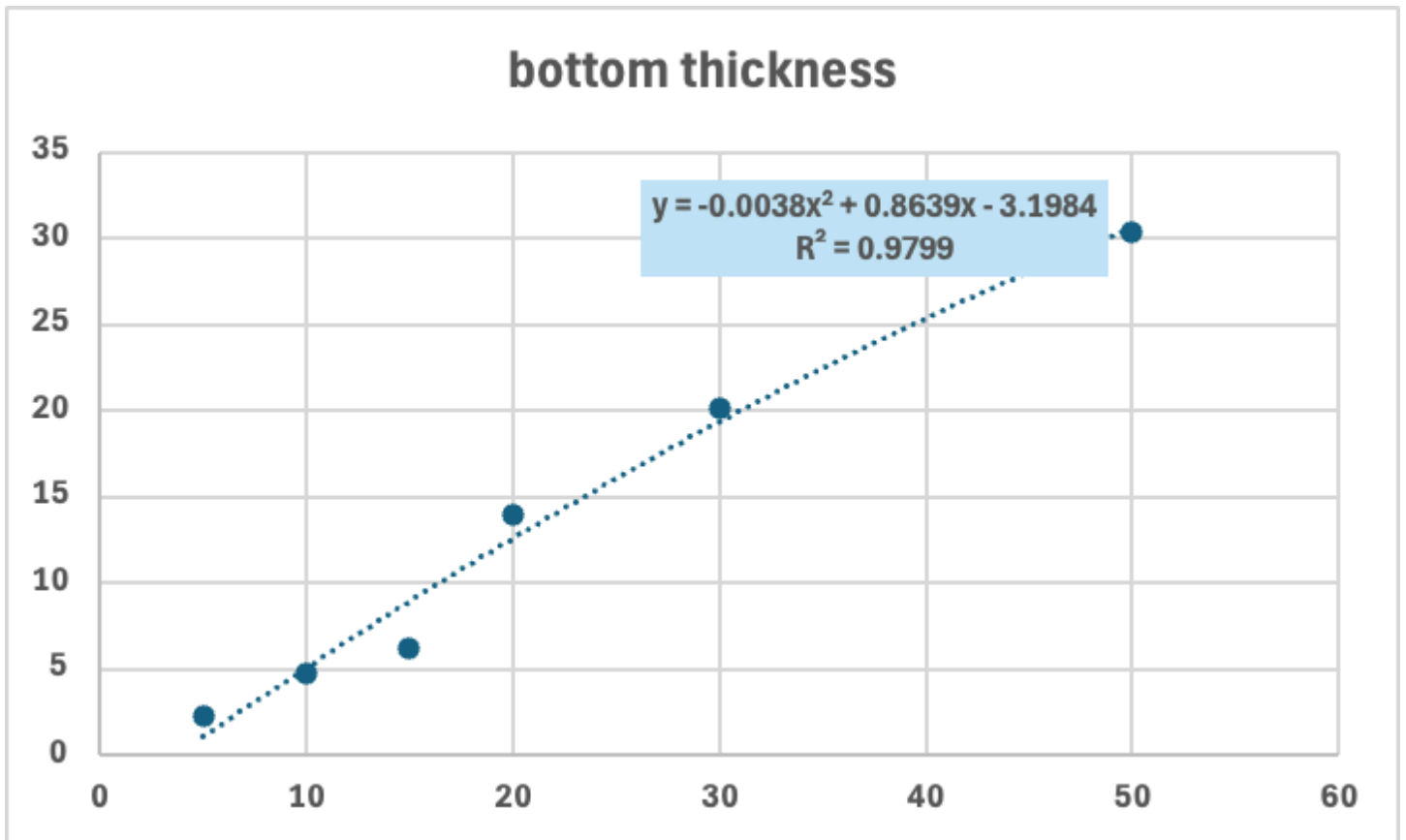
DEPOSITION FORMULAS:

Top tray thickness: y = 0.0055x2 + 0.3299x + 1.7868

top thickness

$$y = 0.0055x^2 + 0.3299x + 1.7868$$
$$R^2 = 0.9968$$
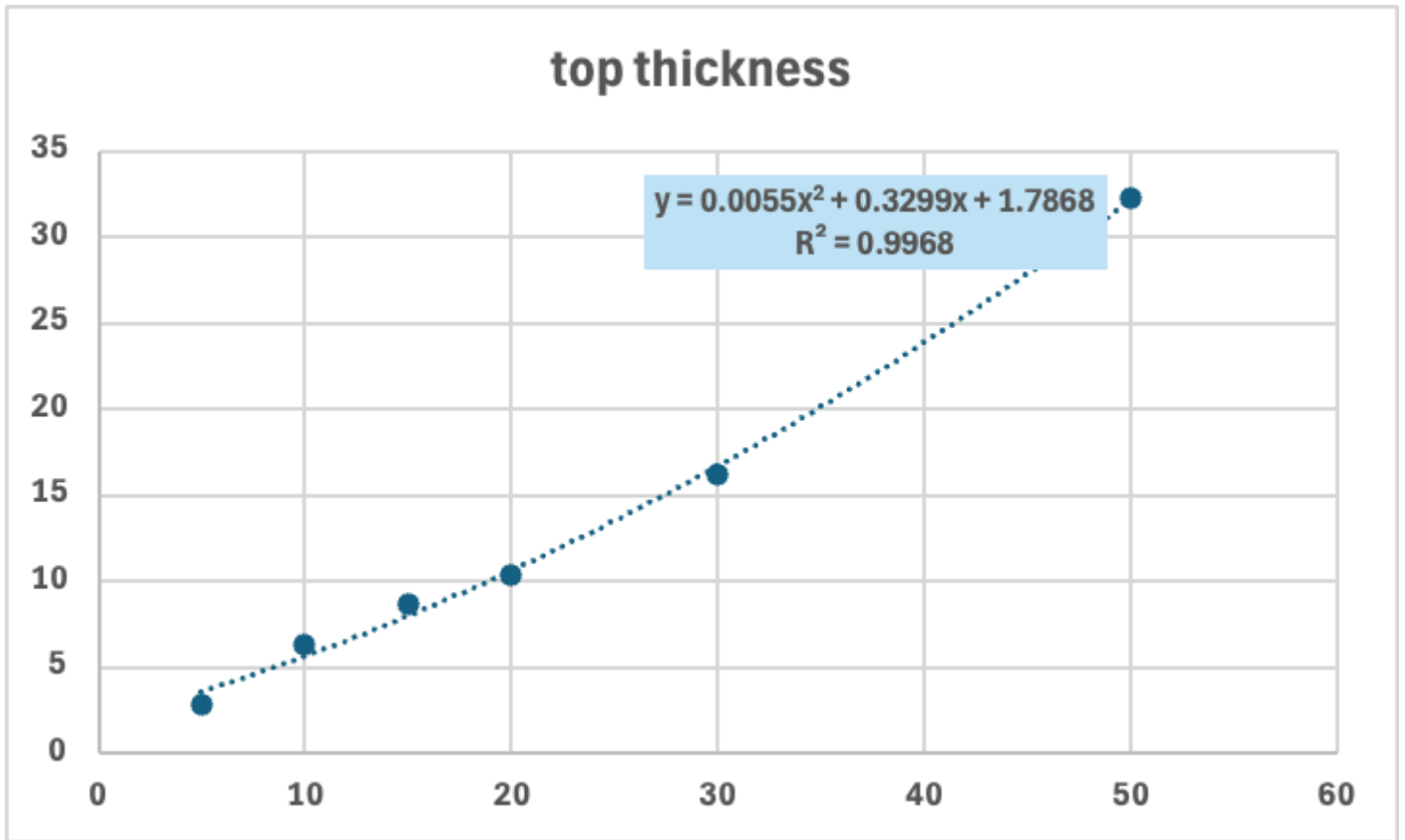
Middle tray thickness: y = 0.6503x - 1.0857

middle thickness

$$y = 0.6503x - 1.0857$$
$$R^2 = 0.9925$$

Bottom tray thickness: $y = -0.0038x^2 + 0.8639x - 3.1984$

bottom thickness

$y = -0.0038x^2 + 0.8639x - 3.1984$
$R^2 = 0.9799$

Average deposition thickness: $y = 0.6477x - 1.1401$

average thickness

$y = 0.6477x - 1.1401$
$R^2 = 0.9963$