Weekly Progress Report

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1 Major Tasks

1. Reading the Research Papers (Semi Lee, Jaeki Lee, Gates).
   - Reading Prof. Gates' thesis[1] and Semi Lee's thesis for Frequency Analysis.
   - Reading the papers of Jaeki Lee[2] and Semi Lee[3].
2. FEniCS and git
3. Silver Nanowire Project.
   - Integrating equations of analytic 1-D Visco-Capillary model by using Python.

2 Works Completed

1. Experiment note and KIMM ppt.
2. 4-AP experiment with KA.
3. Raman spectrum. Because the wavelength of the laser is 532 nm, it was impossible to measure the thin film.
4. XPS(X-ray photo-electron spectroscopy) and SEM-EDS(Energy-dispersive spectrometry) are recommendable.

3 Works in Progress

1. FEM Study.
2. Silver Nanowire Project.
   - Reviewing the thesis of Prof. Gates[1].
   - Utilizing the dynamic contact angle of Cox[4].
   - Confinement makes me ask definition of DCA. Therefore, I am now following up the paper of O.K. and Wonki Ahn.

DCA Measurement 1. 유량 또는 기재속도 조절

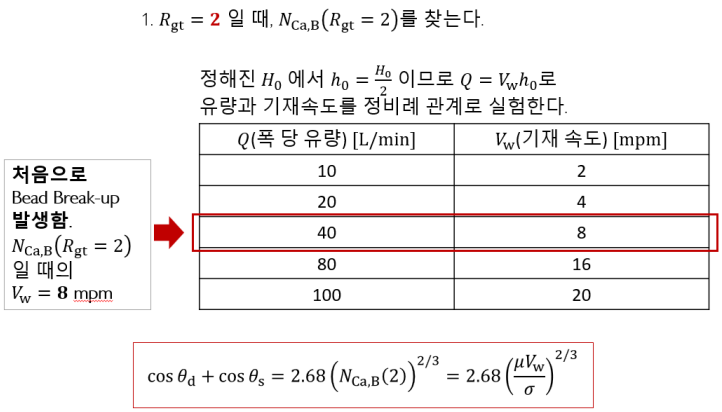

Figure 1: DOF=1, MV=q or v

- DCA in slot coating

  V_w^* is the critical velocity when the Bead Break-up firstly appears at that configuration of die lip.
  θ_d^* is the critical dynamic contact angle in a confined system(slot coating station) when the Bead Break-up firstly appears at that configuration of die lip.

  $$at\ R_{gt} = 3$$

  : We can manipulate H_0. However, this equation is a simplified form and not accurate.

  $$\cos\theta_d^* + \cos\theta_s = 6\left[\frac{L_d}{H_0}\left(1-\frac{2}{3}\right)\right]\frac{\mu V_w^*}{\sigma} + 1.34\cdot 3\cdot\left(\frac{\mu V_w^*}{\sigma}\right)^{2/3}$$

  $$at\ R_{gt} = 2$$

  : We cannot manipulate anything. However, this equation is accurate because $R_{gt} = 2$ is a role of magic number in this physical system. This equation is the key of the idea of DCA in a slot coating process.

  $$\cos\theta_d^* + \cos\theta_s = 1.34\cdot 2\cdot\left(\frac{\mu V_w^*}{\sigma}\right)^{2/3}$$

Table 1: Caption of my Table

	Sensitivity	Specificity	BACC	Threshold
Full	0.555(118)	0.924(28)	0.738(59)	0.235(29)
AIC	0.560(110)	0.927(29)	0.743(54)	0.234(30)
BIC	0.527(126)	0.924(33)	0.725(68)	0.231(31)

References

[1] Ian D Gates. *Slot coating flows: Feasibility, quality*, volume 1. University of Minnesota, 1999.

[2] Jaeki Lee and Jaewook Nam. A simple model for viscoplastic thin film formation for coating flows. *Journal of Non-Newtonian Fluid Mechanics*, 229:16–26, 2016.

[3] Semi Lee and Jaewook Nam. Analysis of slot coating flow under tilted die. *AIChE Journal*, 61(5):1745–1758, 2015.

[4] RG Cox. The dynamics of the spreading of liquids on a solid surface. part 1. viscous flow. *Journal of Fluid Mechanics*, 168:169–194, 1986.