

Lithography resists coating workstation

AggieFab

Texas A&M University

Introduction and operational procedure

- ☐ Workstation
- ☐ Spin coaters
- ☐ Baking plate
- ☐ HMDS primer

Resists coating workstation

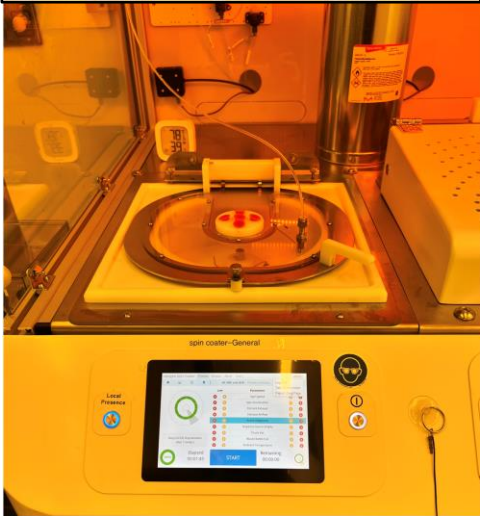


- Two spin coaters
- Baking plate
- HMDS vapor primer
- Drainage sensors
- Automatic chemical supply for edge bead removal, backside rinse, and HMDS priming
- Substrate cooling station

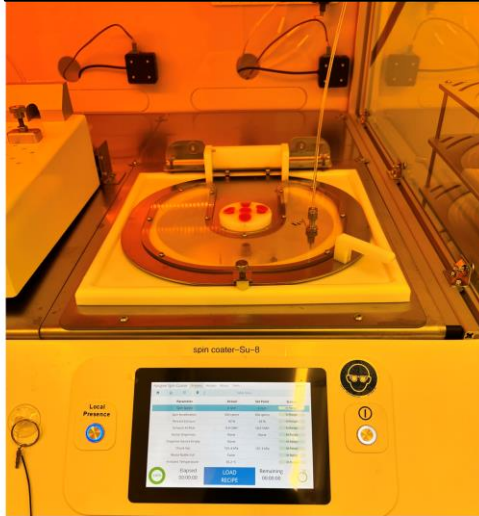
Apogee® 200 Spin Coaters

Two Spin Coaters

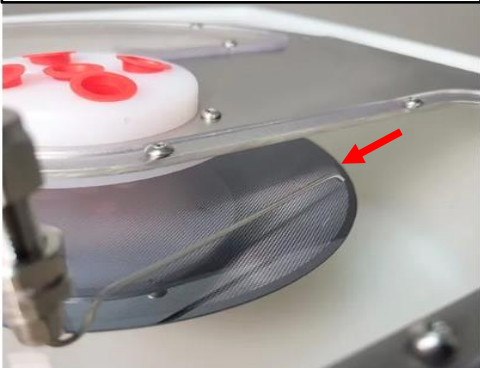
General photoresists



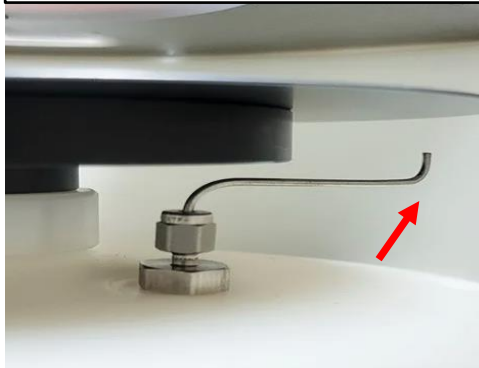
SU8 series



Edge beam removal



Backside rinse

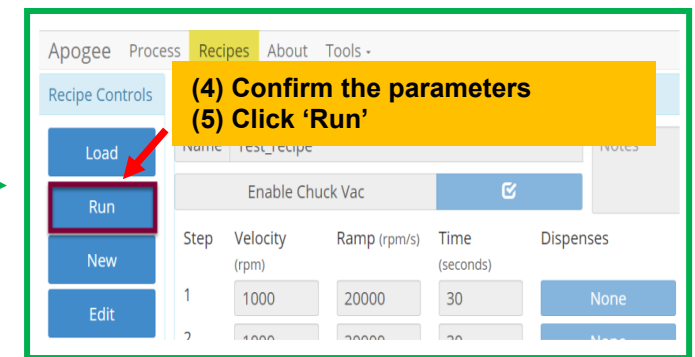
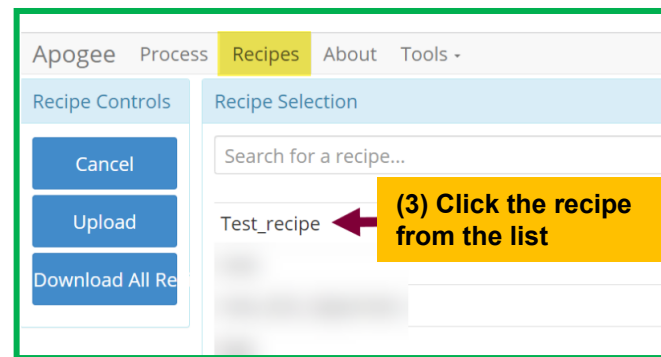
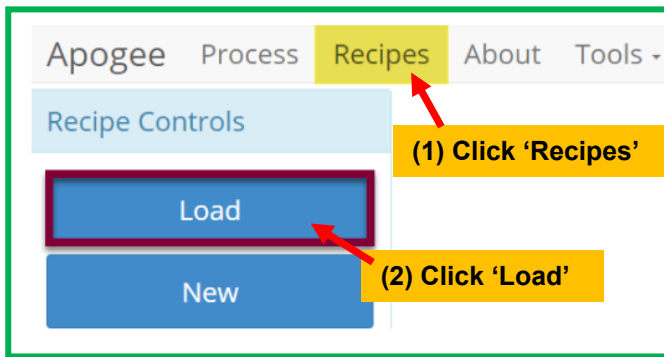


- ❑ Substrate size: 4mm to 200 mm
- ❑ Spin speed: up to 12,000 rpm
- ❑ Edge bead removal
- ❑ Back side rinse
- ❑ OptiFlow Exhaust: solvent vapor control for uniform coatings
- ❑ DataStream™ OS: data handling software for real time monitoring and post experiment data analysis
- ❑ Manual nozzles adjustment
- ❑ Automatic chemical dispensing with the recipe

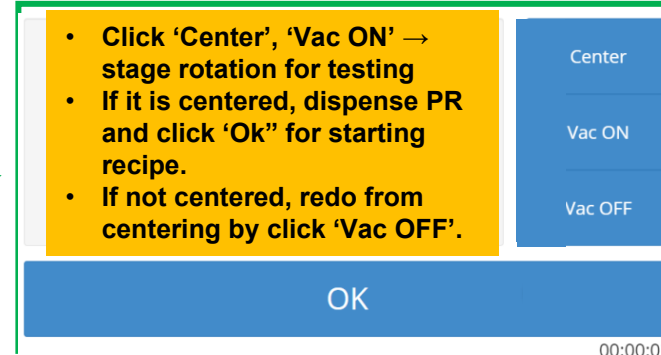
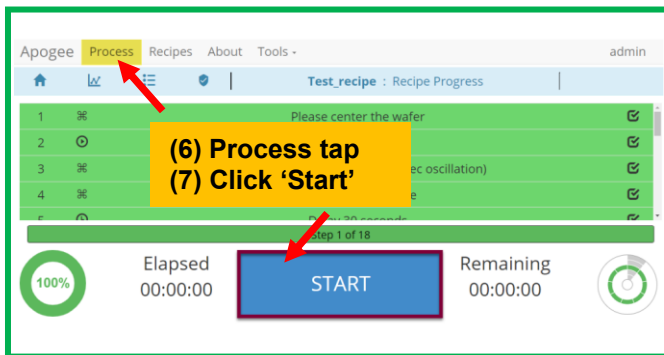
Spin coater procedure

1. Start iLab and power on
2. Login the spin coater software
3. Run a recipe

-. Parameter setting detail, reference next slide



4. Load & center substrate, dispense PR, and run start recipe



6. Clean spin coater

- Place a cleaning wafer
- Run the cleaning recipe

Spin coater parameter setting

Apogee

Process

Recipes

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Tools

Editor Controls

Save

Cancel

Insert

^

v

Delete

Editing Recipe-

Name

Test_Recipe

Notes

Enable Chuck Vac

Step	Velocity (rpm)	Ramp (rpm/s)	Time (seconds)	Dispenses
1	1000	20000	30	1
2	2000	10000	15	None
3	1000	20000	30	2
4	100	500	60	None
5	1000	20000	30	3

Apogee

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Select Active Dispenses

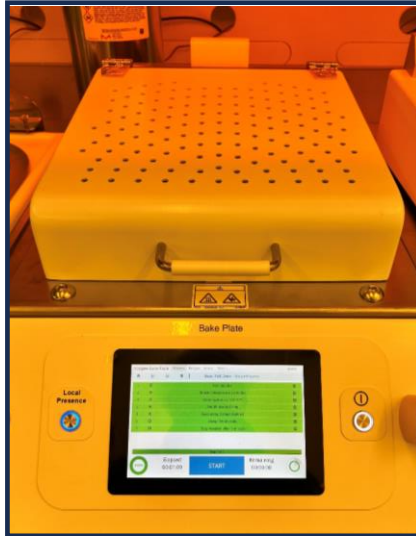
1	Dispense 1	<input checked="" type="checkbox"/>
2	Dispense 2	<input type="checkbox"/>
3	Dispense 3	<input type="checkbox"/>
4	Dispense 4	<input type="checkbox"/>

Click for dispensers setting
Dispenser 1: edge bead removal (acetone)
Dispenser 2: backside rinse (acetone)

Recipe parameters	Explanation
Name	Recorded in log files and used as criteria when searching for recipes
Enable Chuck Vac	Used when the substrate requires vacuum to remain on the spin chuck. *If disabled, the centering step does not occur
Step Velocity	Speed in rpm the spin chuck will achieve on a given step
Step Ramp	Rate in rpm/s the spin chuck will ramp on a given step
Step Time	The duration in seconds for a given step
Exhaust	Percent of exhaust opening
Dispense	The dispense triggered during a given step

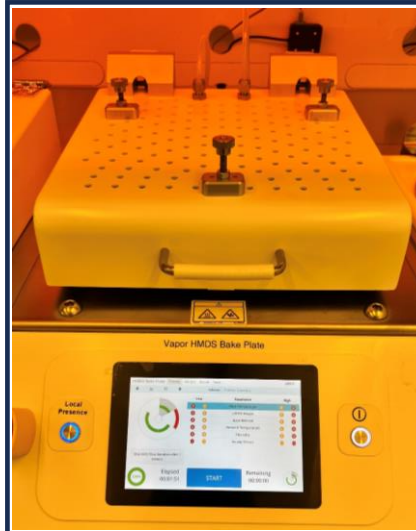
Apogee® 200 Bake plate and HMDS vapor primer

Bake plate



- ☐ Substrate size: up to 200 mm
- ☐ Max temperature: 300 °C
- ☐ Versatile bake methods
 - Hard contact: holding a substrate using vacuum
 - Proximity: lift a substrate 25-100 μm using N₂ gas from the bottom, allowing slow temperature ramping for thick resists
- ☐ Exhaust cover: removal of fume
- ☐ Smart pins for substrate temperature control

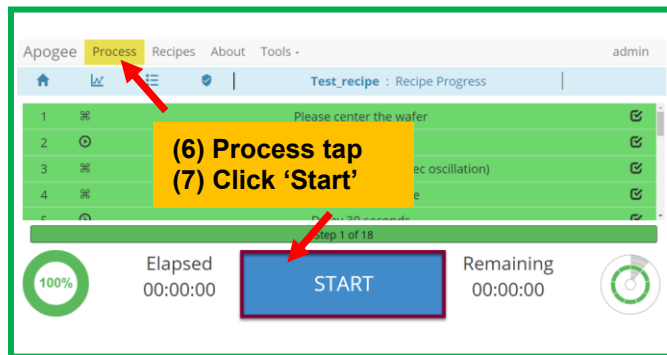
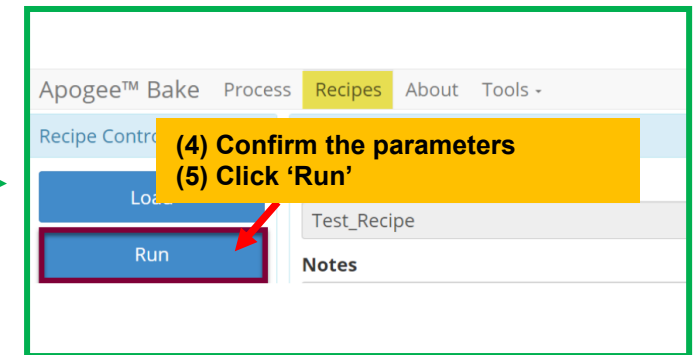
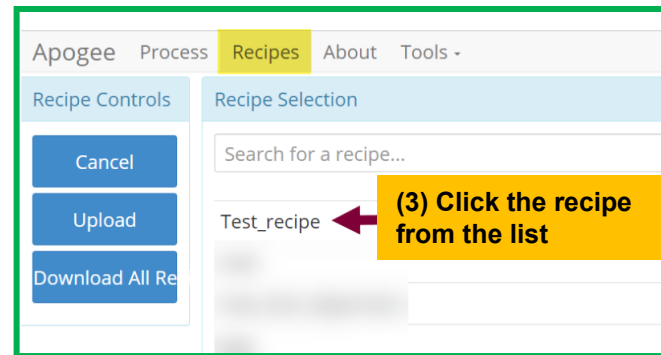
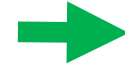
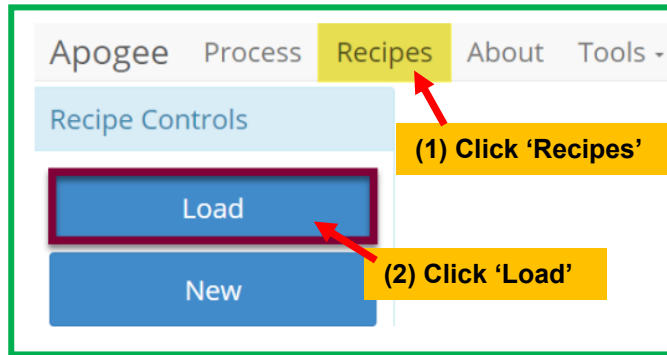
HMDS Primer



- ☐ Substrate size: up to 200 mm
- ☐ Quick and easy operation
- ☐ Fast process: 90 seconds
- ☐ Max temperature: 180 °C

Bake plate and Primer procedure

1. Start iLab and power on
2. Login the bake plate
3. Load substrate
4. Run a recipe



5. Unload substrate
6. Power off

Note:

the primer is a tool modified from a bake plate, the running procedure is the same.

Baking plate and Primer parameter setting

Parameter	Actual	Set Point	Status
Plate Temperature	59.4 °C	60.0 °C	In Range
Lift Pin Height	19.0 mm	19.0 mm	In Range
Bake Method	Contact	Contact	In Range
Ambient Temperature	26.5 °C		In Range
Humidity	44.8 %		In Range

Parameters	Explanation
Plate Temperature	The current temperature of the hot chuck displayed against the target set point in degrees Celsius
Lift Pin Height	The height of exposed lift pins in relation to the chuck in millimeters; precision control settings range from 0.0-19.0
Bake Method	Dictates the way in which the substrate is heated; contact, proximity, lift pins
Ambient Temperature	The air temperature of the environment where the equipment is housed
Humidity	The ambient relative humidity in the environment where the equipment is housed
Empty Sensor	Indicates when HMDS source is low or empty

Note:
Baking plate: temperature is set as 115°C
Only baking time is adjustable.

Primer: A single recipe is provided, which is not allowed to change.