

Laurell spin coater (WS-400BZ-6NPP/LITE) – Standard operating procedure

Updated 2018-05-31 (Roger Shih)

PURPOSE

The Laurell spin coater is used to spread a uniformly-thick layer of material on slides and wafers. In the Wheeler lab, this layer is typically a hydrophobic coating of either Teflon or Fluoropel, to enable aqueous droplet movement on microfluidic devices. This document provides instructions for safe usage of the spinner machine.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Lab coat
- Nitrile gloves
- Safety glasses/goggles

MATERIALS AND EQUIPMENT

- Fume hood
- Nitrogen gas cylinder and air gun
- Either 1% Teflon in FC-40, or 1% Fluoropel in PFC110
- Disposable pipette
- Item to be coated, e.g. glass slide
- Acetone squeeze bottle
- Wipes

PROCEDURE

1. Reserve fume hood in lab's Google calendar. (In CCBR, the hood is also used for laser cutter exhaust. Do not use spinner and laser cutter at same time, since debris from laser cutter will vent into hood and fall on objects to be coated.)
2. Open fume hood to working height, and turn on the spinner. (See Fig 1b for power button.)
3. Select desired program/settings on control panel (see Fig 2).
4. Open compressed house-air valve by turning red handle upward (Fig 1d). This enables suction on the spinner stage (Fig 1c) to secure object during spin. The pressure is typically 60 psi. If spinner panel flashes "CDA" and refuses to start spinning, adjust the black regulator knob to increase pressure. Do not exceed 80 psi.
5. Open spinner lid and add or remove stage adapter (Fig 1c), depending on size of object to be coated.
6. Use nitrogen gun to blow dust off of object to be coated. (Refer to **gas cylinder SOP** for safe operation of compressed gas.)

7. Place object on spinner stage, which applies a “weak” suction. (In practice, this suction is fairly strong without the adapter, and removing the object later may require a firm grip.)
8. Press “VACUUM” button on control panel to enable stronger stage suction, securing object in place for spinning.
9. Use disposable pipette to dribble coating solution (e.g. Teflon or Fluoropel) on object surface. Spread solution with pipette stem to cover important areas of surface, e.g. DMF electrodes. Get rid of any bubbles.
10. Close lid and press “RUN/STOP” button. Spin program will commence. Wait until it finishes.
11. Open lid. Press “VACUUM” to weaken stage suction. Grip coated object by edges and pry away from stage. Set aside for drying. (If using oven or hot plate, see corresponding SOPs.)
12. Repeat steps 5-9 as needed for coating multiple objects.
13. Use acetone and wipes to thoroughly clean waste liquids from spinner interior. (Bowl, lid, stage, etc.) **Do not skip this step.** Do not drip acetone on control panel. Check if lid opens and closes smoothly, and clean lid hinge as needed.
14. Turn off house air by turning red valve handle to horizontal position (Fig 1d).
15. Turn off spinner power.
16. Check if waste reservoir is full (Fig 2b). If needed, unscrew and empty out.



Fig 1: Laurell spin coater. **a)** Front view of spinner. **b)** Side view of spinner, with power button and waste reservoir circled. **c)** Inside of spinner. Removable adapter is used for smaller slides, e.g. 1"x3". **d)** Valve and regulator for compressed air from building source. Turn red handle upward to open valve and generate suction for spinner. Black regulator knob is typically left at 60 psi. If spinner display flashes "CDA" and refuses to spin, adjust knob to increase air pressure.



Fig 2: Spinner control panel. **a)** Program-select view. Press "PROGRAM SELECT" button to cycle through available saved programs (denoted by the letter in the upper-right corner). Each program has a number of steps (e.g., "001/002" means the first of two steps is being displayed), and each step has a spin speed in rpm, a duration "S", and an acceleration setting "A". To modify a program, press the "F1" button. **b)** Program editing view. Use the left/right "CURSOR" buttons to move the black cursor around, and use up/down "VALUE" buttons to change settings. To cycle through steps, press the "STEP" button. To add or remove steps, use the "ADD STEP" and "DEL STEP" buttons, respectively. To save changes, press "F1" again to return to program-select view.

HAZARDS

High pressure: The spinner uses pressurized air from the building to generate stage suction. Do not adjust pressure higher than needed (e.g. 60-80 psi). Also see gas cylinder SOP, for safe usage of nitrogen gas cylinder for dust removal.

Solvent vapors: The spinner should be operated inside a fume hood to minimize solvent vapor inhalation.

Shrapnel: If object is not secured properly during spinning or dust removal with nitrogen gun, it may be sent flying and shatter.