Dissipator Device Fabrication

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Process Link: **https://www.fabublox.com/process-editor/31f56fb8-05c3-4f83-a5d8-8a2963a2a5e3**

Description:

Reference:

Process Flow:

Dissipator Device Recipe

Substrate Stack:

- Silicon: 1000 nm
- Gunk: 100 nm
- Comments: 111 crystal axix

Step 1:

- Tool Name: **Beakers + Sonicator**
- Name: 3 Solvent Clean
  - Cleaning Agent: Acetone
  - Cleaning Time: 5 mins
  - Cleaning Temperature: 20 °C
  - Ultra-Sonication: true
  - **First Solvent:** Acetone
  - **2nd Solvent:** Methanol
  - **3rd Solvent:** Isopropanol
- Comments: Sonicate in Acetone for 6 minutes Sonicate in Methanol for 3 minutes Sonicate in IPA for 3 minutes

Step 2:

- Tool Name: **Beakers**
- Name: DI Water Rinse
  - Cleaning Agent: DI Water

  - Cleaning Time: 30 secs
  - Cleaning Temperature: 25 °C
  - Ultra-Sonication: false
- Comments: Dry with N2 gun

Step 3:

- Tool Name: **Bake Plate**
- Name: Dehydration Bake
  - Bake Temperature: 110 °C
  - Bake Time: 20 secs
- Comments: 110 to 180 degree C allowed

Step 4:

- Tool Name: **Spinner**
- Name: Spin Resist
  - Resist: MMA EL13
  - Resist Type: Positive
  - Spin Speed: 3000 rpm
  - Spin Time: 60 secs
  - Film Thickness: 620 nm
  - **Ramp Up:** 5 secs
  - **Ramp down:** 0 secs
  - **Ramp Up Speed:** 500
  - **Ramp Down Speed:** 0

Step 5:

- Tool Name: **Bake Plate**
- Name: Softbake
  - Bake Temperature: 180 °C
  - Bake Time: 300 secs

Step 6:

- Tool Name: **Spinner**
- Name: Spin Resist
  - Resist: PMMA A6
  - Resist Type: Positive
  - Spin Speed: 4000 rpm
  - Spin Time: 60 secs
  - Film Thickness: 300 nm
  - **Ramp Up:** 5 secs
  - **Ramp down:** 0 secs
  - **Ramp Up Speed:** 500
  - **Ramp Down Speed:** 0

Step 7:

- Tool Name: **Bake Plate**
- Name: Softbake
  - Bake Temperature: 180 °C
  - Bake Time: 300 secs

Step 8:

- Tool Name: **Raith EBPG 5150**
- Name: Electron-Beam Lithography
  - Accel. Voltage / Beam Energy: 100 kV
  - Exposure Dose: 290 µC/cm²
  - Beam Current: 100 nA
  - **Beam Current (Small Features) :** 200 pA

Step 9:

- Tool Name: **Beaker**
- Name: Develop
  - Developer: MIBK:IPA
  - Develop Time: 180 secs

  - Develop Temperature: 20 °C
- Comments: MIBK:IPA = 1:1

Step 10:

- Tool Name: **YES 02 Plasma**
- Name: Pre-Ash
  - Gas composition: Oxygen
  - RF Power: 60 Watts
  - Time: 30 secs
  - Etch Depth: 0 nm
  - Chamber Pressure: 0.3 Torr
  - **Flow Rate:** 110 sccm

Step 11:

- Tool Name: **Angstrom**
- Name: E-beam Evaporation
  - Deposited Material: Aluminium
  - Film thickness: 1000 Å
  - Deposition Rate: 4 Å/s

Step 12:

- Tool Name: **Beaker + Sonicator**
- Name: Lift-Off
  - Lift-Off Chemical(s): Acetone
  - Lift-Off Time: 3 hours
  - Lift-Off Temperature: 45 °C

Step 13:

- Tool Name: **Beaker**
- Name: 3 Solvent Clean
  - Cleaning Agent: Acetone
  - Cleaning Time: 30 secs
  - Cleaning Temperature: 25 °C

  - Ultra-Sonication: true
  - **First Solvent:** Acetone
  - **2nd Solvent:** Methanol
  - **3rd Solvent:** Isopropanol
- Comments: Sonicate the chip in the acetone liftoff beaker for 30 seconds (more time if the liftoff has not been completed.) With the acetone wash bottle in the other hand, take the chip out of the acetone slowly as maintaining a stable jet of acetone to the chip to make sure there is no liftoff metal chips left on the device; immediately dip the chip in the next beaker before the solvent dries out. Sonicate in methanol for 10s, similarly to step 2, transfer the chip from the methanol beaker to the IPA beaker. Sonicate in IPA for 10s, and transfer the chip from the IPA beaker to the DI water beaker with the same technique.

Step 14:

- Tool Name: **Beaker**
- Name: DI Water Rinse
  - Cleaning Agent: DI Water
  - Cleaning Time: 30 secs
  - Cleaning Temperature: 25 °C
  - Ultra-Sonication: false
- Comments: Dry with N2 gun