Reactive Ion Etcher

General note: Although the Leybold F1 and F2 are similar in principle, the F2 seems to yield higher etch rates for the same parameters than the F1. (Is this still true???) Leybold F3 is only allowed for NbTiN etching.

Contents

NbTiN etch recipe for use in Leybold F3

- Gas flow: **SF6 at 13.5 sccm + O2 at 10 sccm** (146+10 on the dials)
- Chamber pressure set point: **open** (6-7 μbar)
- Microwave power: **50 W** (less than 10 W reflected)
- Time: about **2:45 min/100nm** + 15s OE after derivative minimum
- Etch rates:
  - NbTiN: 36 nm/min
  - AR-P: 127 nm/min

MoRe/NbTiN etch recipe

Note: If changing He to O2 the etch rate for metals is identical

- Gas flow: **SF6 at 12.5 sccm + He at 10 sccm**
- Chamber pressure set point: **10 μbar**
- Microwave power: **50 W**
- Time: about **2:00 min** (Was stopped using laser tracking)
- Etch rates:
  - NbTiN: 25 nm/min
  - MoRe: 25 nm/min
  - HSQ: 30-40 nm/min
  - PMMA:
  - AR-P:

Note: 200 nm of SX AR-P6200/09 is not enough for 50nm of MoRe, there will most likely be only 37-40nm left afterwards!!

Nitrides etch recipe

This recipe can be used as a starting point to etch nitrides of various kinds. Originally intended to etch hBN/G/hBN stacks, it also works for PECVD-Si3N4.

Note: all etch rates are for Leybold F2

- Gas flow: **CHF3 at 40 sccm + O2 at 4 sccm**
- Chamber pressure set point: **50 μbar** (or 80 μbar for side-contacts)
- Microwave power: **60 W**
- Time: ??
- Etching rates:
  - hBN: 60 nm per minute (on the F1! The F2 etches significantly faster)
  - Graphene: ??
  - Si3N4 (PECVD, high quality): 100 nm per minute
  - Si: 0.5 nm - 1 nm per second (!)
  - HSQ:

O2 plasma recipe

Can be used to etch graphene and to descum resists For descumming recipes, see also Descum

- Gas flow: **O2 at 20 sccm**
- Chamber pressure set point: **50 μbar**
- Microwave power: **60 W**
- Time: 1min
- Etching rates:
  - Graphene: Very quick
  - PMMA: ??
  - CSAR: ??
  - AR-N: ??

Manual

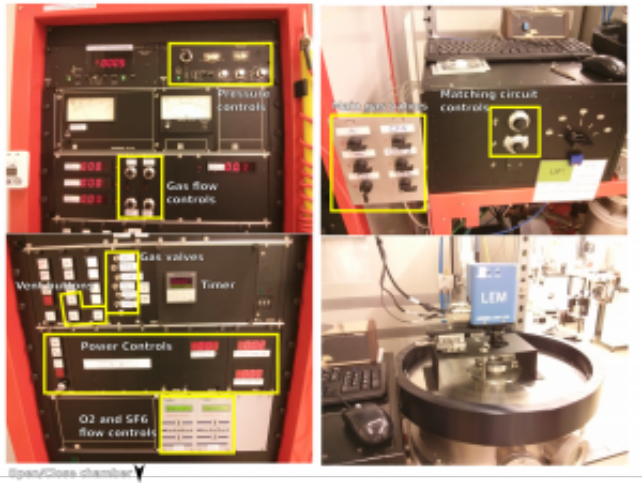
Leybold F1

Media:RIE-F1.docx
Media:RIE-F1_in_pdf.pdf

Leybold F2

The procedures for F2 are almost identical to F1. However, the control panels and valves are different and in different places. Also, there are only two large buttons (on lower panel, just below what is visible in the photo) that both open and close the chamber. Unlike F1, they do not need to be held down to open/close the chamber, just pressed simultaneously.

- This page was last modified on 20 July 2018, at 10:25.



Leybold F2 etcher control panels.