ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

Minnesota Nano Center at the University of Minnesota has two clean room labs for micro and nanotechnology fabrication.

Keller Lab has a 3000 square foot Class 100 clean room, and an additional 4000 square feet of non cleanroom lab space.

PAN Lab has 5000 square foot Class 100 cleanroom and is the newer ~ 2.5 years now. Next to this is a bio- nanotechnology and nano-and micrometer-scale materials lab space.

Staff of 18 (12 Technical, 6 Administration)

Mix of Grad students and outside companies use the lab including a few local universities are doing limited class and research.

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

List etching systems:

STS - General purpose etcher, Fluorine gases

PlasmaTherm Deep Trench Etcher - Si etch SLR-770

FEI Quanta 200 3D FIB

Av etch Vision 320

Intlvac Ion Mill

Xetch e1 series, Si XeF_2

Oxford etcher 180-ICP

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

STS Etcher

Model 320 PC

Gases: Ar CF4 CHF3 O2 SF6

600 Watt supply use at 300 or less.

Heated chamber wall, heat tape.

Platen cooled by chiller, set to 25C.

Great up time ! Most used etcher.

Turbo pump & chillers every other year.

Runs DOS

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

Deep Trench Etcher

Plasmatherm SLR-770

Set for 4” wafers

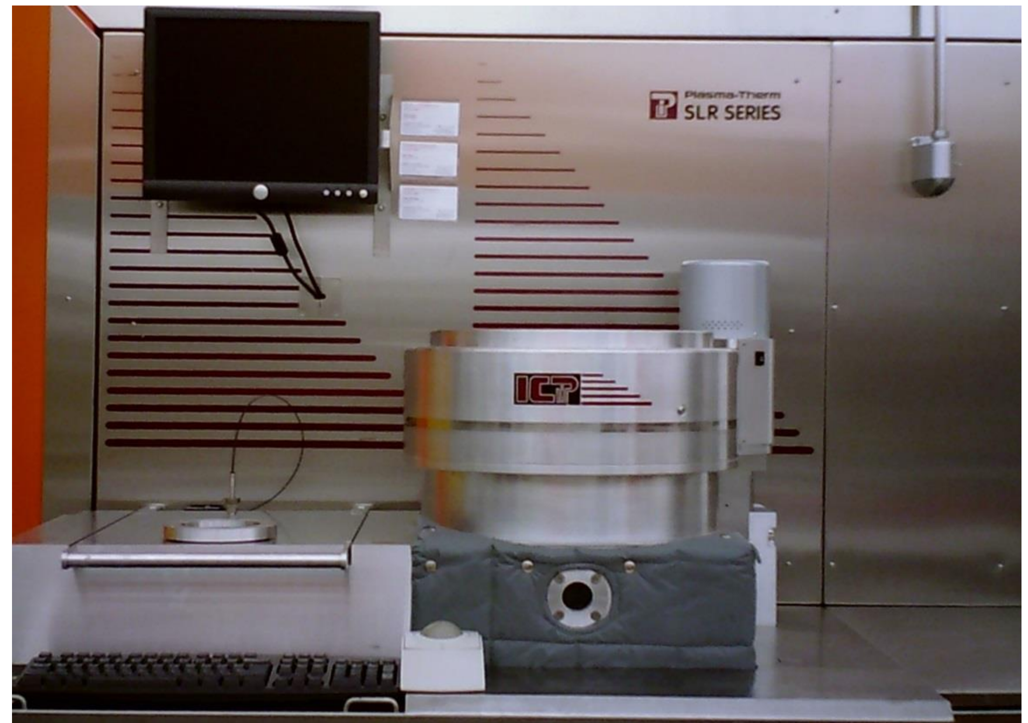
Electrostatic chuck

Gases: C4F8 SF6 Ar O2

Si etching only.

Masking, Oxide, Nitride, PECVD,

Resist, AlD and (no SU-8).



ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

FEI Quanta 200 3D

FEI system has been in use several years.

Mostly used for FIB prep work Ga ion source.

Pt pattern deposition rarely used but works.

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

Av etch Vision 320

Model 320 AV

Gases: Ar, CF_4, CHF_3, O_2, SF_6, and methanol.

Normal films Si, Oxides, nitrides films and methanol is for Co, Fe, and Ni metals.

Only a few minor issues – good up time.

Not many users at first but usage is increasing.

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

Intlvac Ion Mill

Great improvement over older ion mill it replaced.

System cooling runs at 6C.
Faster etching, less heating,
less damaged resist.

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

Xetch e1 series, Si XeF_2

Good up time, and results, very limited usage.

Gases: XeF_2

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

Oxford etcher 180-ICP

Model 180-IPC

Gases: Ar, N2, O2, CF4, CHF3, SF6, Cl2, and Bcl3

Switched from LN2 to chiller cooling.

On going issues limits user base.

Julabo chiller kept leaking – removed.

PLC was changed with newer software

Electrical connection problems found

A non-software controlled chiller in place now. Re-connection of LN2?

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

Preventive maintenance, continue with an eye on improvments.

Spare parts - besides known failing parts, include multiple shared item – pumps.

Software operating system backup including swapping in solid state HD spares.

(In case of emergency -break glass)

Future upgrades ? Cost V.S. doing nothing

Legacy systems ? What options do you even have ?

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

Future plans to purchase, modify, or upgrade systems

The plan is to install newer version of software for Plasma Therm DRIE.

Resolve any future issues with Oxford ICP.

ETCHING SYSTEMS AT UNIVERSITY OF MINNESOTA

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