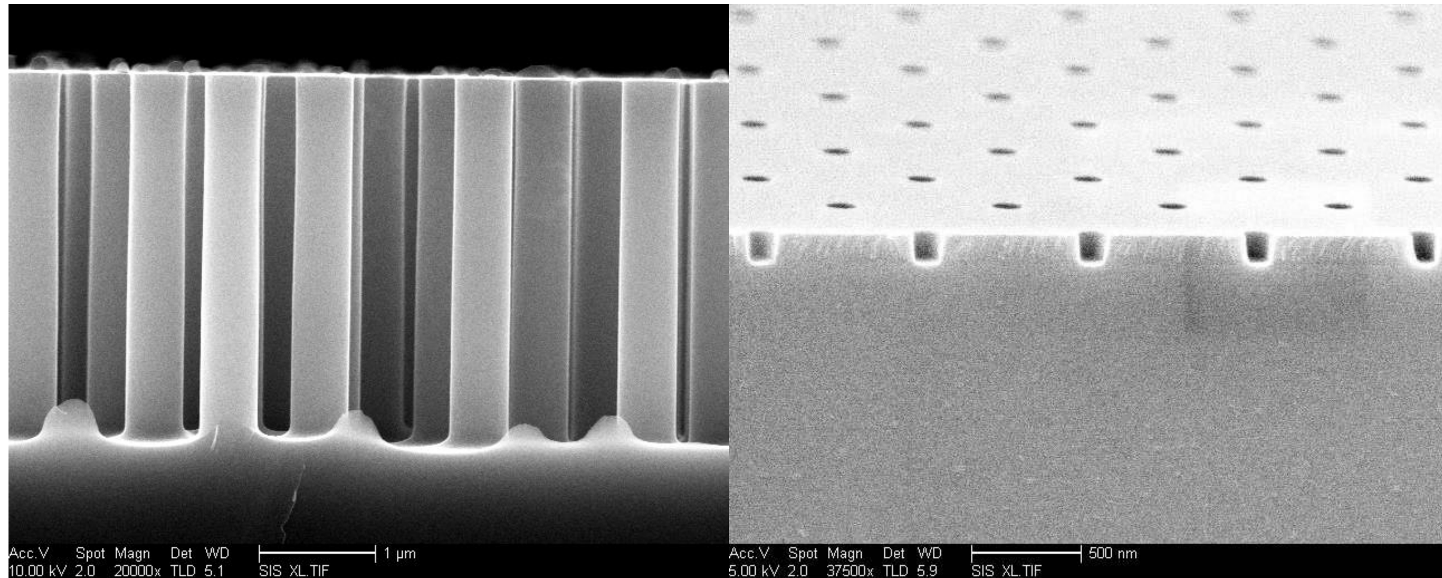
Dry Etch at Nano3/SDNI UC San Diego

2022 NNCI Etch Symposium-University of Pennsylvania, April 21-22

Conor Holzhall, Xuekun Lu



sdni San Diego Nanotechnology Infrastructure

National Nanotechnology Coordinated Infrastructure

nano3 SCIENCE ENGINEERING MEDICINE

UC San Diego

Current Etch Capabilites

RIE/ICP

- Oxford Plasmalab System 100
- PlasmaTherm SLR RIE/ICP
- Trion Minilock Phantom III RIE/ICP
- Oxford Plasmalab 80+

Ashers
- Plasma Etch PE100
- PVA Tepla Plasma System 100

Vapor Etch
- Xactix Xetch
- Idonus HF VPE

Wet Etch
Various Acid/Base Etchants
- Cr, Al, Cu, Mo, Au, SiC, SiO2, etc.

Oxford Plasmalab System 100

Options or Upgrades

- Cryo mode
- LF for notching control

Gases
CHF3, C4F8, CF4, Ar, SF6, O2

sdni San Diego Nanotechnology Infrastructure

National Nanotechnology Coordinated Infrastructure

nano3 SCIENCE ENGINEERING MEDICINE

UC San Diego

Plasma-Therm SLR RIE/ICP Plasma Etch System

New installation in 2020

Gases
CHF_3, C_4F_8, CF_4, Ar, SF_6, O_2

Trion Minilock Phantom III ICP

Options or Upgrades
- Temperature up to 150°C
- DC bias monitoring

Gases
SF_6, Cl_2, BCl_3, CF_4, CH_4, O_2, H_2, He, Ar

sdni San Diego Nanotechnology Infrastructure

National Nanotechnology Coordinated Infrastructure

nano3 SCIENCE ENGINEERING MEDICINE

UC San Diego

Oxford Plasmalab 80+

Gases
Cl2, BCl3, CHF3, CF4, SF6, O2, Ar

sdni San Diego Nanotechnology Infrastructure
National Nanotechnology Coordinated Infrastructure
nano3 SCIENCE ENGINEERING MEDICINE
UC San Diego

Plasma Etch PE100

Gases
O2

sdni
San Diego Nanotechnology Infrastructure

National Nanotechnology Coordinated Infrastructure

nano3
SCIENCE ENGINEERING MEDICINE

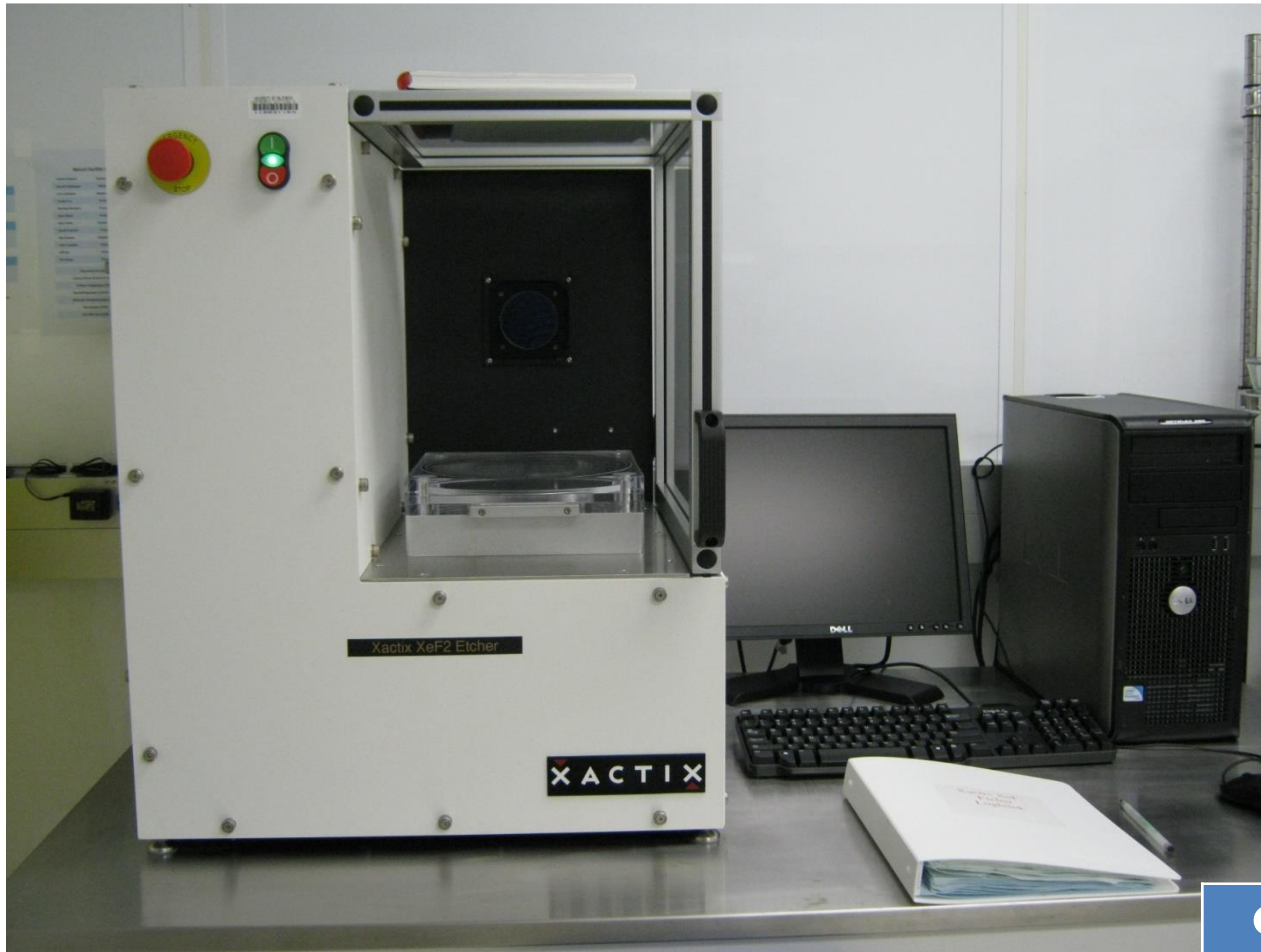
UC San Diego

PVA TePla Plasma System 100

Gases
O2

sdni San Diego Nanotechnology Infrastructure
National Nanotechnology Coordinated Infrastructure
nano3 SCIENCE ENGINEERING MEDICINE
UC San Diego

Xactix Xetch e1 Series



Gases
XeF_2

sdni San Diego Nanotechnology Infrastructure

National Nanotechnology Coordinated Infrastructure

nano3 SCIENCE ENGINEERING MEDICINE

UC San Diego

Idonus HF VPE-150

Gases
HF Vapor

sdni San Diego Nanotechnology Infrastructure

National Nanotechnology Coordinated Infrastructure

nano3 SCIENCE ENGINEERING MEDICINE

UC San Diego

Future plans: Looking to buy a new RIE etcher

P80-type tool (oxide, nitride, metal etching) with load lock

Available tools

Tool	Type	Gases	Applications	Wafer Size
Oxford Plasmalab System 100	ICP	CHF3, C4F8, CF4, Ar, SF6, O2	Si, SiO2	Up to 150mm
Plasma-Therm SLR RIE/ICP Plasma Etch System (*new*)	ICP	CHF3, C4F8, CF4, Ar, SF6, O2	Si, SiO2	Up to 150mm
Trion Minilock Phantom III ICP	ICP	SF6, Cl2, BCl3, CF4, CH4, O2, H2, He, Ar	III-Vs, oxides, polymers, metals	Up to 150mm
Oxford Plasmalab 80+	RIE	Cl2, BCl3, CHF3, CF4, SF6, O2, Ar	Oxides, nitrides, metals	Up to 150mm
Plasma Etch PE100	Asher	O2	Resist removal, polymers	Up to 200mm
PVA TePla Plasma System 100	Asher	O2	Resists, polymers	Up to 100mm
Xactix Xetch e1 Series	Release	XeF2	Release, Si etch	Up to 100mm
Idonus HF VPE-150	Release	HF Vapor	Release, SiO2 etch	Up to 150mm

sdni San Diego Nanotechnology Infrastructure

National Nanotechnology Coordinated Infrastructure

nano3 SCIENCE ENGINEERING MEDICINE

UC San Diego