

NNCI Plasma Etch Technologies

Silicon Deep Reactive Ion Etch (DRIE)

Plasmatherm Versaline

| |
|------------|
| Cornell |
| Stanford |
| Texas |
| U. Chicago |

Wafer Size(max)

| |
|-------|
| 100mm |
| 100mm |
| 100mm |
| 200mm |

Comments

also Ge DRIE

Plasmatherm 770

| |
|---------|
| Cornell |
|---------|

Wafer Size(max)

| |
|-------|
| 100mm |
|-------|

STS Rapier

| |
|---------------|
| U.Penn |
| Harvard |
| Washington |
| Minnesota |
| Virginia Tech |

Wafer Size(max)

| |
|-------|
| 100mm |
| 150mm |
| 100mm |
| 100mm |
| 200mm |

STS ASE

| |
|------------------------|
| Stanford |
| Georgia Tech |
| Arizona St. Louisville |

Wafer Size(max)

| |
|-------|
| 100mm |
| 100mm |
| 100mm |
| 100mm |

Oxford 100

| | |
|--------------|----------|
| Georgia Tech | cryoetch |
| Washington | cryoetch |
| Montana St. | cryoetch |
| UC San Diego | |

Wafer Size(max)

| |
|-------|
| 100mm |
| 100mm |
| 100mm |
| 150mm |

Alcatel

| |
|------------|
| N.Carolina |
| NCSU-NNF |

Wafer Size(max)

| |
|-------|
| 150mm |
| 150mm |

STS Pegasus

| |
|--------------|
| Georgia Tech |
| Duke-SMIF |
| Northwestern |

Wafer Size(max)

| |
|-------|
| 150mm |
| 150mm |
| 100mm |

Oxford Estrellas

| | |
|------------|------|
| Nebraska | cryo |
| Louisville | |

Wafer Size(max)

| |
|-------|
| 100mm |
| 200mm |

NNCI Plasma Etch Technologies

III-V Etching

Plasmatherm 770

| |
|--------------|
| Cornell |
| Harvard |
| Georgia Tech |
| U. Chicago |

Wafer size(max)

| |
|-------|
| 100mm |
| 150mm |
| 100mm |
| 150mm |

Comments

Oxford 100

| |
|-------------|
| Texas |
| Washington |
| NCSU-NNF |
| Minnesota |
| Montana St. |

Wafer size(max)

| |
|-------|
| 100mm |
| 100mm |
| 150mm |
| 150mm |
| 100mm |

Oxford Cobra

| |
|----------|
| Stanford |
| U.Penn |

Wafer size(max)

| |
|-------|
| 100mm |
| 100mm |

Plasmatherm APEX

| |
|-------------|
| Arizona St. |
|-------------|

Wafer size(max)

| |
|-------|
| 100mm |
|-------|

STS

| |
|---------------|
| Arizona St. |
| Georgia Tech |
| Virginia Tech |

Wafer size(max)

| |
|-------|
| 100mm |
| 100mm |
| 200mm |

Trion

| |
|---------------|
| UC San Diego |
| Virginia Tech |

Wafer size(max)

| |
|-------|
| 150mm |
| 200mm |

Si-based Dielectric Etching

Oxford 100

| |
|--------------|
| Cornell |
| Georgia Tech |
| Minnesota |
| Washington |
| UC San Diego |

Wafer size(max)

| |
|-------|
| 100mm |
| 100mm |
| 150mm |
| 100mm |
| 150mm |

Comments

Plasmatherm 770

| |
|--------------|
| Georgia Tech |
| U. Chicago |
| UC San Diego |

Wafer size(max)

| |
|-------|
| 100mm |
| 150mm |
| 150mm |

NNCI Plasma Etch Technologies

Si-based Dielectric Etching continued

| <u>Plasmatherm Versaline</u> | <u>Wafer size(max)</u> | <u>Comments</u> |
|------------------------------|------------------------|-----------------|
| Stanford | 100mm | |
| <u>Oxford Cobra</u> | <u>Wafer size(max)</u> | |
| U.Penn | 100mm | |
| <u>STS-LPX</u> | <u>Wafer size(max)</u> | |
| Harvard | 150mm | |
| <u>ULVAC 570-NLD</u> | <u>Wafer size(max)</u> | |
| Harvard | 150mm | |
| <u>STS-ICP</u> | <u>Wafer size(max)</u> | |
| Arizona St. | 100mm | Si3N4 |
| Virginia Tech | 200mm | |
| <u>AMAT P5000</u> | <u>Wafer size(max)</u> | |
| Stanford | 100mm | |
| <u>Trion</u> | <u>Wafer size(max)</u> | |
| Duke-SMIF | 200mm | |
| Louisville | 200mm | |
| Virginia Tech | 200mm | |
| <u>Alcatel AMS100</u> | <u>Wafer size(max)</u> | |
| N.Carolina | 150mm | |

Metal Etching-ICP based

| <u>Plasmatherm 770</u> | <u>Wafer size(max)</u> | <u>Comments</u> |
|------------------------|------------------------|-----------------|
| Cornell | 100mm | |
| Georgia Tech | 100mm | |
| U. Chicago | 150mm | |
| <u>Oxford 100</u> | <u>Wafer size(max)</u> | |
| Georgia Tech | 100mm | |
| Minnesota | 150mm | |
| Montana St. | 100mm | |
| Washington | 100mm | |
| <u>Oxford Cobra</u> | <u>Wafer size(max)</u> | |
| Harvard | 150mm | |
| U.Penn | 100mm | |

NNCI Plasma Etch Technologies

Metal Etching-ICP based

continued

Plasmatherm Versaline

Stanford

Wafer size(max)

100mm

Comments

Trion

Louisville

UC San Diego

Virginia Tech

Nebraska

Cornell

Wafer size(max)

200mm

150mm

200mm

300mm

200mm

chrome

Alcatel AMS100

N.Carolina

Wafer size(max)

150mm

Diamond Etch-ICP

Oxford Cobra

Cornell

Wafer size(max)

100mm

Comments

Plasmatherm Versaline

Stanford

Harvard

Wafer size(max)

100mm

100mm

Unaxis 770

Harvard

Wafer size(max)

150mm

Intlvac IBE

Harvard

Wafer size(max)

150mm

XeF2 Release

Xactix X3

Cornell

Stanford

U.Penn

U. Chicago

Wafer size(max)

150mm

150mm

150mm

150mm

Comments

Xactix E2

Harvard

Louisville

Washington

Wafer size(max)

150mm

150mm

150mm

NNCI Plasma Etch Technologies

| <u>XeF2 Release</u> | | continued | |
|---------------------------------|--|---------------------|-------------------------------|
| <u>Xactix E1</u> | | | <u>Wafer size(max)</u> |
| Georgia Tech | | 100mm | <u>Comments</u> |
| Arizona St. | | 200mm | |
| UC San Diego | | 150mm | |
| Minnesota | | 150mm | |
| | | | |
| <u>VHF Release</u> | | | |
| <u>Primaxx SPTS</u> | | | <u>Wafer size(max)</u> |
| Cornell | | 200mm | |
| Stanford | | 200mm | |
| Washington | | 150mm | |
| Louisville | | 200mm | |
| Virginia Tech | | 200mm | |
| <u>AMMT</u> | | | <u>Wafer size(max)</u> |
| Georgia Tech | | 100mm | |
| | | | |
| <u>MEMSStar</u> | | | <u>Wafer size(max)</u> |
| U. Chicago | | 200mm | |
| | | | |
| <u>Idonus</u> | | | <u>Wafer size(max)</u> |
| UC San Diego | | 150mm | |
| | | | |
| <u>Ion Milling</u> | | | |
| <u>AJA</u> | | | <u>Wafer size(max)</u> |
| Cornell | | 150mm | <u>Comments</u> |
| | | | |
| <u>Oxford Ionfab 300</u> | | | |
| Texas | | 100mm | |
| | | | |
| <u>Intlvac Nanoquest</u> | | | <u>Wafer size(max)</u> |
| Stanford | | 100mm | |
| Harvard | | 150mm | |
| Minnesota | | 150mm | |
| Nebraska | | 100mm | |
| | | | |
| <u>Deep Oxide Etching</u> | | <u>(pyrex, etc)</u> | |
| <u>STS AOE ICP</u> | | | <u>Wafer size(max)</u> |
| Georgia Tech | | 150mm | <u>Comments</u> |

NNCI Plasma Etch Technologies

Si Photonics (smooth sidewall etch)

| <u>LAM 9400</u> | <u>Wafer size(max)</u> | <u>Comments</u> |
|------------------------|------------------------|-----------------|
| Stanford | 100mm | |
| <u>Oxford Cobra</u> | | |
| Cornell | 100mm | HBr based |
| <u>STS-LPX</u> | | |
| Harvard | 150mm | |
| <u>Plasmatherm 770</u> | 150mm | mixed etch |
| Cornell | | |

2D Materials (MoS2, WSe2, MoSe2, BN, etc..)

| <u>STS-LPX</u> | <u>Wafer size(max)</u> | <u>Comments</u> |
|----------------------------|------------------------|-----------------|
| Harvard | 150mm | |
| <u>Plasmatherm 720/740</u> | | |
| Cornell | 200mm | RIE only |

Other dielectrics (TiO2, Ta2O5, Nb2O5,..)

| <u>Oxford 100-ICP</u> | <u>Wafer size(max)</u> | <u>Comments</u> |
|-----------------------|------------------------|-----------------|
| Cornell | 100mm | |
| <u>Oxford Cobra</u> | | |
| Harvard | 150mm | |

Difficult materials (LiNbO3, Zn-based materials)

| <u>Ulvac 570 NLD</u> | <u>Wafer size(max)</u> | <u>Comments</u> |
|-----------------------|------------------------|-----------------|
| Harvard | 150mm | |
| <u>AJA</u> | | |
| Cornell | 150mm | LiNbO3 |
| <u>Oxford 100-ICP</u> | | |
| Washington | 150mm | LiNbO3 |