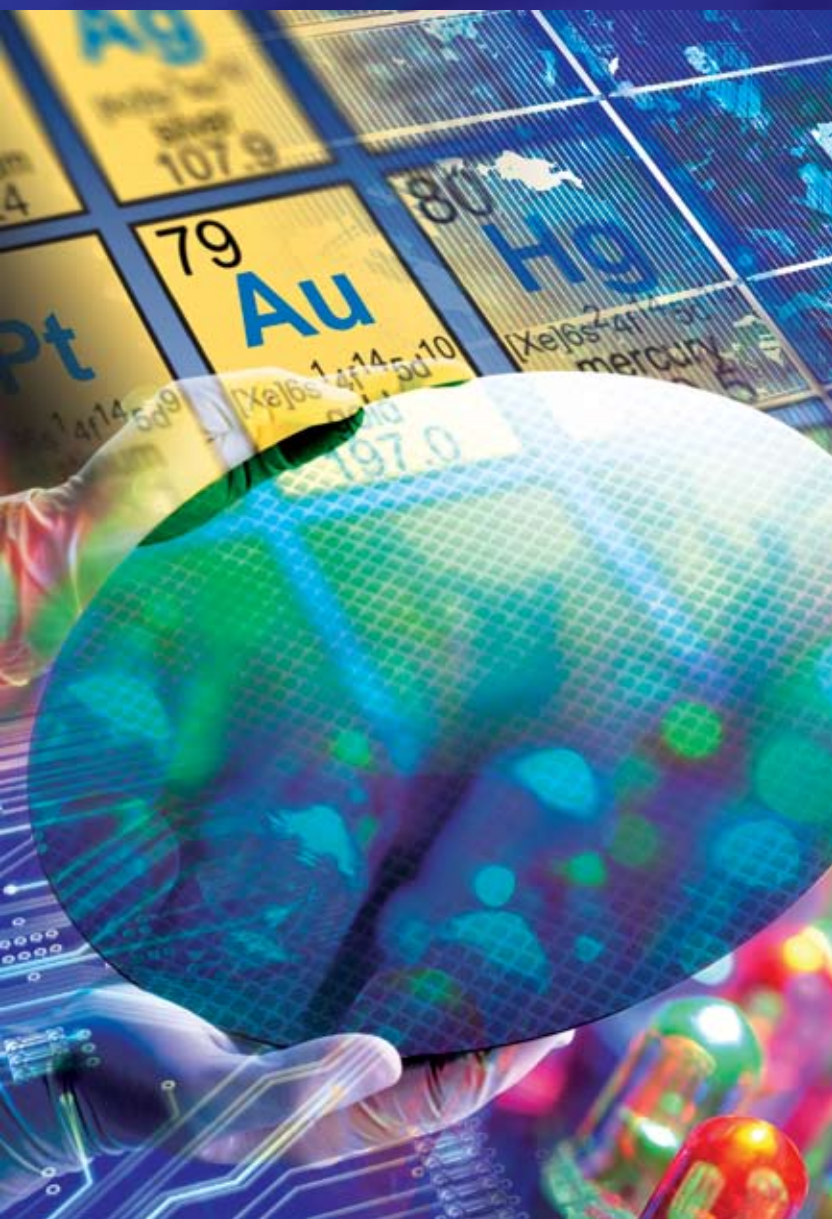


# SMA

## Oxford Instruments Plasma Technology

Systems & Process Solutions for  
Etch, Deposition & Growth







**OXFORD**  
INSTRUMENTS

*The Business of Science®*



Process tools and leading-edge processes for the precise, controllable and repeatable etching, deposition and growth of micro- and nano-structures



-  Plasma Etch & Deposition
-  Atomic Layer Deposition
-  Ion Beam Etch & Deposition
-  Nanoscale Growth Systems
-  Hydride Vapour Phase Epitaxy



Oxford Instruments Plasma Technology provides a range of high performance, flexible tools to semiconductor & electronic processing customers in both R&D and production

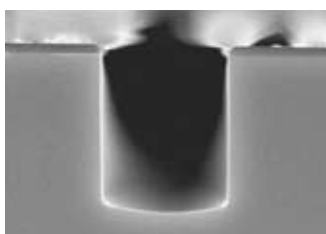


# Plasma Etch & Deposition

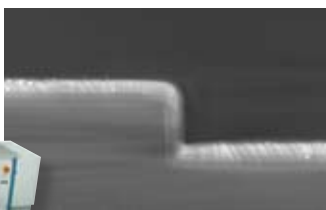
Oxford Instruments has a process library of over 6,000 recipes developed in our process laboratories

Our processes are backed by process guarantees for key parameters and repeatability such as rate and uniformity to ensure rapid start-up during installation.

- Compound Semi (III-V) processes
- Micro/Nano Applications
- Si front-end processes
- Si back-end processes



*ICP etching of InP with  $CH_4/H_2/Cl_2$  chemistry.*



*Low stress SiN film (400nm).*



**PlasmaPro™**  
System 100

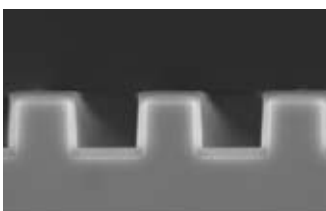
Oxford Instruments' process tools offer a powerful range of stand-alone and clusterable process modules to enable the widest range of applications:

## Plasma Etch

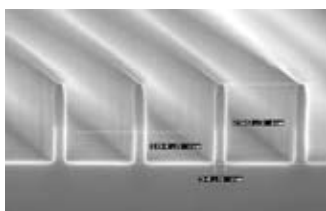
- ICP
- RIE
- RIE/PE switchable
- DRIE

## Plasma Deposition

- PECVD and ICP CVD
- ALD (PE & thermal)
- DLC
- PVD



*Si step coverage with 170nm  $SiO_2$  TEOS PECVD*



*Polycrystalline Si etch 34nm gates.  
Courtesy of AMO Aachen*

# Atomic Layer Deposition

Flexibility and capability in the engineering of Nanoscale structures and devices

## FlexAL® automatic insertion load locked ALD system

- Plasma and thermal ALD in one tool
- Can be clustered to other modules using hex handler with robot and 25 wafer cassette for 4", 6" or 8" wafers (no tools required to swap between wafers)
- 100% conformal coatings of up to 200mm wafers handling and pieces on carrier plate



## OpAL® open-load ALD System

- Thermal ALD system with easy upgrade route to plasma
- Fits in compact space of 1 x 1.5m
- Up to 200mm wafers and pieces directly on stage

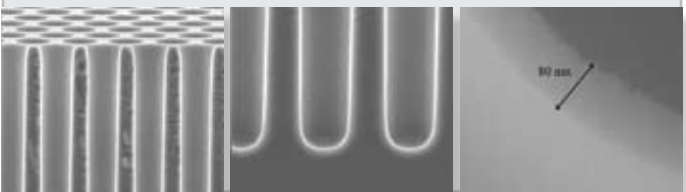


### Thermal and/or plasma chemistries including:

**Oxides:**  $\text{Al}_2\text{O}_3$ ,  $\text{HfO}_2$ ,  $\text{SiO}_2$ ,  $\text{Ta}_2\text{O}_5$ ,  $\text{TiO}_2$ ,  $\text{ZnO}$

**Nitrides:**  $\text{AlN}$ ,  $\text{HfN}$ ,  $\text{SiN}$ ,  $\text{TaN}$ ,  $\text{TiN}$

**Metals:** Pt, Ru



Plasma ALD of 80 nm  $\text{Al}_2\text{O}_3$  from TMA and  $\text{O}_2$  plasma in a 10:1 aspect ratio deep trench capacitor structure. Courtesy of Eindhoven University of Technology and NXP

# PPLA

## Ion Beam Etch & Deposition

Oxford Instruments' Ion Beam technology offers unique abilities in etch and deposition

### Etch and Deposition tools

- Versatile tool for a wide range of applications
- Flexible system configuration to match specific process applications
- Easy optimisation for repeatable process results

### Multiple mode functionality

- Ion Beam Etch (IBE)
- Reactive Ion Beam Etch (RIBE)
- Chemical Assisted Ion Beam Etch (CAIBE)
- Ion Beam Deposition (IBD)
- Reactive Ion Beam Deposition (RIBD)



**Ionfab®300Plus** Etch & deposition in one tool.

**Optofab®3000** Specifically developed for high quality optical applications.

**Ionfab500Plus** Ion beam sputter deposition, meets high throughput demands.

### Processes Including:

**IBE/RIBE:** InP/InGaAsP, CMT, SrTiO<sub>3</sub>, LaAlO<sub>3</sub>, MgO, NiFeCo, Au, Pt, TaN

**IBD/RIBD:** Al, Au, Ti, Mo, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Si<sub>3</sub>N<sub>4</sub>, VO<sub>x</sub>



Thin film magnetic heads



Night vision security equipment

# Nanoscale Growth

Nanoscale features can be formed by growth techniques ('bottom up') and etching ('top down'). The **Nanofab™** Systems are aimed to satisfy the nanotechnology market

## Nanoscale growth processes encompass:

- Nanotubes/nanowires
- Nanoscale thin films

## Nanofab700 and Nanofab800Agile

- Can accommodate variable sample sizes up to 200 mm wafer with excellent temperature uniformity.
- Can provide growth of nanotubes and nanowires with a flexible temperature range up to 700°C and 800°C respectively
- **Nanofab700** is compatible with Oxygen and other process atmospheres
- **Nanofab800Agile** can give agile heating and cooling for rapid turn round with its exceptional electrode features.



*Vertically aligned ZnO nanowires on GaN-coated sapphire.  
Courtesy of the Nanoscience Centre, University of Cambridge.*

**Nanofab800Agile**

# Hydride Vapour Phase Epitaxy

A world leader in the development of Hydride Vapour Phase Epitaxy (HVPE) processes and techniques for the production of novel compound semiconductors, such as GaN, AlN, AlGaIn, InN and InGaIn

**CrystalFlex®**  
**A multi-wafer HVPE reactor providing superb epitaxial growth control**

Oxford Instruments' leading **CrystalFlex** HVPE tool allows long lasting, high growth rate processes for high quality GaN, AlGaIn and AlN single crystal materials.



**CrystalFlex Key Features:**

- Wide range of growth rates from 1 to 100 microns/hour
- Flexible wafer size configuration from 50 to 150 mm
- High quality, crack free epitaxial films with excellent thickness uniformity
- Customized source configurations to allow material growth of Group III nitrides for different applications
- Low operating cost and excellent uptime



# High Brightness LED (HBLED)

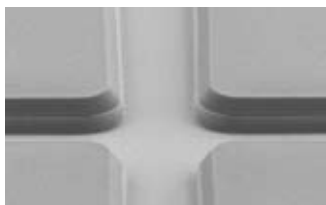
Production processes and tools for HBLED manufacture offering exceptional Batch and Single Wafer capability

- Family of batch production solutions
  - PECVD Batch Deposition
  - ICP Batch Etch
- Single wafer processes and systems
  - ICP Etch
  - ICPCVD and PECVD
- Highest possible throughput
- Proven e-chuck clamping capability

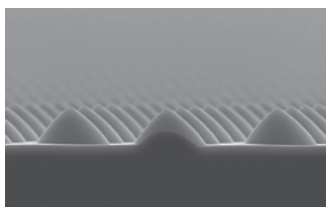
Proven Cassette to Cassette handling technology with full wafer tracking is available for both single wafer and multi-wafer platen configurations



*AlGaInP Etching up to 24 x 2" and 6 x 4" batch or single wafer*



*GaN Etching up to 27 x 2" and 7 x 4" batch or single wafer*



*Sapphire Etching up to 20 x 2" and 5 x 4" batch or single wafer*



**PlasmaPro**  
System800 Plus



**PlasmaPro**  
System133 ICP380

# Market Sectors

Oxford Instruments Plasma Technology's high technology tools are used in a wide range of applications and markets

**Key market sectors are:**

Display & Lighting

Semiconductor Electronics

Energy

MEMS

Niche & Emerging Technologies





## Worldwide Service and Support

Oxford Instruments is committed to supporting our customers' success. We recognise that this requires world class products complemented by world class support. Our global service force is backed by regional offices, offering rapid support wherever you are in the world.



<b>Upgrades</b>	Process improvements offering greater productivity, cost reduction or scientific advancement
<b>Support contracts</b>	Tailored to meet customers individual needs
<b>Help desk support</b>	Highly experienced team with wide and varied product knowledge
<b>Training</b>	Operator & Process training courses at OIPT or on-site
<b>Preventative maintenance</b>	Carried out by highly skilled OIPT engineers
<b>Remedial site visits</b>	Range of options depending on level of service required
<b>Spares and repairs</b>	Worldwide access to spares means fast turnaround
<b>Specialist support</b>	Experienced and highly qualified team of software and process engineers

### We can provide:

- Tailored service agreements to meet your needs
- Comprehensive range of structured training courses
- Immediate access to genuine spare parts and accessories
- System upgrades and refurbishments

visit [www.oxford-instruments.com](http://www.oxford-instruments.com)

**Email:** [plasma@oxinst.com](mailto:plasma@oxinst.com)

**Tel:** +44 (0) 1934 837000  
(Head Office)

For worldwide office information please visit our website

As part of Oxford Instruments' environmental policy this brochure has been printed on FSC paper



*The Business of Science®*

**Ref:** OIPT/General/2010/01