Substrates

There are restrictions within certain cleanrooms but the following substrates types have been used in the P&PD laboratories:

- Silicon
- SOI – Silicon On Insulator
- SiC – Silicon Carbide
- SiGe – Silicon Germanium
- Ge – Germanium
- Glass
- InP – Indium Phosphide
- GaAs – Gallium arsenide and ternary alloys
- GaN – Gallium Nitride
- Sapphire
- Plastic

Resizing of some substrates is also offered through our Laser Dicing service

**Lithography**

The P&PD laboratories offer a range of lithography exposure tools including ebeam and nanoimprint lithography capability and associated resist processes, the exposure tools which are currently available are:

- Karl-Suss MA6 mask aligner
- Suss MicroTEC MA6 Double Sided Mask Aligner c/w SiCIL attachment [Nano-Emboss]
- Karl-Suss MA1006
- EV 420 mask aligner
- Canon PLA 600F mask aligner
- Ultratech 1500 1X stepper
- JEOL JBX 6000FS E-Beam system
- Raith eLINE Plus E-Beam writer

There is a suite of resist processes to suit different applications ranging from wet/plasma etch to patterning by lift off. A range of resist application systems area available to suit different applications and substrate types:

- DNS Resist/Develop Tracks
- EV101 Spray Coater
- SSE OPTICOAT 20+ spinner
- SSE OPTIcoat spinners
- Laurell spinners

**Material Deposition**

We offer a wide range of material deposition systems and associated materials:

Low Pressure Chemical Vapour Deposition (LPCVD) of polysilicon and silicon nitride in Thermco 9000 furnaces

Plasma Enhanced Chemical Vapour Deposition (PECVD) of silicon oxides, silicon oxides doped with phosphorous, boron and Germanium and of silicon nitrides and oxynitrides in Electrotech Delta 201, STS 310 and STS Multiplex systems

Atomic Layer Deposition (ALD) of various metals, oxides and barrier layers in a Cambridge Nanotech Fiji 200 system

Physical Vapour Deposition (PVD) of metals and dielectrics in batch systems like the Nordiko 2550
Sputterer and the Oxford Instruments Plasmalab 400 and in the LESKAR CMS-18 single wafer confocal system

- Thermal Evaporation of metals and alloys in Temescal Evaporators, typical metals include Au, Ag, Pt, Pd, Ti and Cr.
- Ebeam evaporation of dielectrics with tight control on layer thickness and stoichiometry using the Leybold ProSyrus coating system, material systems include 2D material such as MoS2 and tailored optical coatings.

**Material Etch**

We offer different plasma etch systems across the cleanrooms to meet our customer requirements, etching of dielectrics, metals and polymers are available. The etch systems we have are as follows:

- Trikon Omega 201 MORI
- Trikon Omega 201 PERIE
- Trikon Omega 201 ICP
- STS ASE Bosch™ etcher
- Oxford Instrument Plasmapro - Cobra
- STS ICP Multiplex etch system
- Oxford Instruments ICP Plasmalab 100

**Thermal Treatments**

During the course of any device fabrication there is a need to thermal treatment be it for silicon oxidation, implant activation, silicide formation, metal contact annealing or polymer curing. We have systems suitable for all of these processes:

Thermco 9000 Furnaces – wet/dry oxidation, nitrogen annealing, forming gas alloy, silicon doping

- AST SHS 1000 Rapid Thermal anneal system (RTA/RTP)
- JiPLEC Rapid Thermal anneal system (RTA/RTP)
- Annealing furnaces
- Polymer cure ovens

**Ion Implantation**

Primarily used in silicon device fabrication we have a medium current system for implant of phosphorus, arsenic and boron species:

- Eaton NV6200 AV Ion Implanter

**Contact** enquiry (at) tyndall (dot) ie for all Business Development enquiries
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