Science & Technology Facilities Council | UK Research and Innovation

Laboratory equipment & capabilities

Rutherford Appleton Laboratory

Science & Technology Facilities Council | UK Research and Innovation

Science and Technology Facilities Council provides specialist equipped laboratory facilities for start-ups, SME's and R&D teams.

The equipped laboratories offer an affordable mechanism for businesses to access an impressive array of technologies, equipment and technical & business expertise on a flexible basis, reducing the risk associated with research and development.

In addition, companies benefit from locating on a leading science and innovation campus; accessing a world-renowned business address and a large and flourishing network of science and industry.

Lithography

- Mask aligners (Karl Süss *MA6 and MA8*)
- Plasma Asher (TePla 300) System for surface cleaning or preparation
- HMDS oven primer for spin coating
- Spin-Coating (part-piece to 200mm wafers resist spinning)

Deposition

- Thermal oxidation furnace MRL (*wet, dry x 50 wafer batches on sizes up to 6in diameter, or single wafers up to 8in. Thickness up to 4µm*)
- Sputter-Coating (*CVC304, CVC 601 - aluminium, Al/Si, chrome, copper, gold, Ni/V, silver, tantalum, titanium, Ti/W. Up to 150mm wafers*)
- Sputter coater (SVS V2400LL-Aluminium, Chrome, Titanium/Tungsten up to 200 mm wafer size)
- Four pocket E-Gun (*SVS V2000 - Chrome, titanium, gold, platinum, nickel, silver, aluminium and other metal coatings, between 0.5µm and 1.0µm thickness. Wafer size up to 150mm diameter*)
- PECVD *Plasma-enhanced chemical vapour deposition (OPT DP800 - Si dioxide, Si Nitride, Si Oxy-Nitride coatings up to 5µm thickness. Wafer size up to 200mm diameter)*

Etching

- Wet Etching (*wet chemical acid etching in ISO7 clean room environment*)
- Reactive Ion Etching (JLS design *RIE80+, RIE80 Microetch, System 90, MPS2200 Cr Etcher*)
- Deep Reactive Ion Etching (*STS DRIE - Deep etch of silicon, Germanium. Bosch process up to 1 mm deep. Continuous mode for sub-micron -100µm deep. Selectivity on polymer/hard mask of 20:1 – 100:1, 60000:1*). Chlorine etch of group III/V materials.

Science & Technology Facilities Council | UK Research and Innovation

Metrology/Surface analysis

- A suite of classic optical microscope to cover needs in wafer/material inspection and imaging: Reichert Polyvar and MET, Nikon Optiphot.
- Scanning Electron Microscopes (*Bench top TM 3030 Hitachi (with Bruker EDX) & TM 1000 Hitachi, High resolution ZEISS FESEM Sigma 300 (with OI 150 mm Xmax EDX detector)*)
- SEM Sample Preparation coating System (*Bench top sputter coater fitted with Platinum targets , also Gold and chrome target, possibility of carbon deposition*)
- Profilometers (*KLA Tencor P15/P7 - highly sensitive surface profilers for step height, roughness, stress and waviness on sample surface. Resolution: up to 1 Angstroms over short distance. Sequential scanning and Range in z up to 1000µm*)
- Thin-film Measurement (Reflectance system *Filtermetrics 40 - Range of thickness: 100 to 500000 Angstroms. Spot size: 2.5-50mm with statistical data accumulation. Wide range of film types: Reproducibility: +/- 5%*)
- Opto-digital microscopes (*automatic Olympus DSX500: up to X3500 magnification. X,Y,Z measurement*)
- White Light Interferometers (*Zygo system vertical resolution: up to 0.1 nm - lateral resolution dependent on objective (4.72µm for X2.5 and 0.64µm for X50) ~~Max~~. Vertical step height: 100µm in high resolution mode up to 5mm in extended scan mode. Film analysis from 1µm to 50µm*)
- Auto SE Ellipsometer (*film thickness and optical constants for single and multiple layer films. Characterisation from a few angstroms to tens of microns. Reflectivity and Transmission data~~.~~*
- XPark Atomic Force Microscope for nm resolution XYZ surface topography (*up to 100mm wafers*)
- |Energy Dispersive Spectroscopy on SEM sigma 300 (*XMax 150 Oxford Instrument-with Aztec software, used for chemical analysis*)
- Nikon L200 microscope (*reflective and transmitted light, x1 to x150 objectives, stage for 8” wafer, imaging and acquisition software*)
- Jendel Probe Station (*resistivity measurement on wafer*)

Wafer clean

- Chemical/wet wafer clean (*TSE Wet Bench - Piranha and SC1 clean. Megasonic clean. DI clean. Spin rinse dryer up to 200mm*)
- Chemical polishing wafer unit, Logitech (*suitable for most types of aggressive etching agents. Accommodates various sample sizes and geometrics*)

Dicing

- Wafer dicing (*Loadpoint Microace 3 - dicing up to 150mm wafers. Substrates up to 150mm square, silicon, quartz etc.*)

Materials preparation laboratory

- Cutting saw Buehler (*with PCB capability*)
- Hot mounting press Buehler
- Polishing tables (*grinding and polishing*)
- Optical Microscope
- Hardness measurement (*Vickers indentator up to 2kg*)
- Thermal analysis, Mettler DSC/TGA 1 star system, for measuring melting points/phase changes of solids and liquids up to 1100°C.
- Heat treatments, bespoke Furnace with molybdenum hotbox, heating up to 1800°C in vacuum, argon, nitrogen or hydrogen atmospheres.
- Humidity chamber (temperature -40°C to +180°C and RH 10% to 95% within the temperature range +10°C to +95°C)