

UNIVERSITY OF NORTH CAROLINA – CHARLOTTE
CAMERON APPLIED RESEARCH CENTER
MICROELECTRONICS CLEAN ROOM

- 3000 square feet
- Class 1000 clean room with class 10 or better conditions under individual laminar flow work stations
- 18 megohm deionized water throughout the clean room
- Complete chemical cleaning/etching capability with fume exhaust and laminar air flow
- High temperature operations including gate and field oxides with TCA gettering, n-type, and p-type doping using Corso-Gray, Thermco, and Lindberg furnaces
- Photolithography using a Quintel Q4000-6TL mask aligner for 1 um patterns, a HTG contact mask aligner, Solitec and Headway spin coaters, and Solitec and Laurel spray photoresist developers.
- Nanometer lithography with a Raith 150 e-beam lithography tool.
- Etching with a RIE (reactive ion etch) tool designed by IBM
- Ion Mill etching using a AJA International Ion Milling Tool.
- Plasma operations using a Technics Micro-Plasma 900 plasma deposition tool and a Texas Instruments A-24-D PECVD tool
- Thin film evaporation using a Cooke thermal evaporator, Cooke e-beam evaporator, Varian 3125 4 pocket e-beam evaporator, and a CHA Mark 50 rf induction evaporator.
- Sputtering using a AJA International 3 target sputter tool and CVC AST-601 single target sputtering tool.
- Thin film profiles using an Alpha Step 200 or Dektak IIA
- Thin film thickness measurements using a Nanometrics Nanospec AFT 200 automatic film thickness tool.
- Thin film thickness and refractive index using a Woolham Variable Angle Spectroscopic Ellipsometer.
- Inspections with a Cambridge SEM (scanning electron microscope) and optical microscopes with both video and digital cameras
- 4 MBE (molecular beam epitaxy) systems – 1 Physical Electronics and 3 VG Scientific for the fabrication of III-V and II-VI compound semiconductors
- SiC (silicon carbide) PECVD system
- Electrical measurements including a low temperature (10K) vacuum probe station, a Micromanipulator probe station, Tektronix 576 curve tracer, and Tektronix 370B programmable curve tracer
- Substrate cutting using a Microautomation 1100 diamond dicing saw
- Wire bonding using a K&S 4125 gold wire ball bonder

UNIVERSITY OF NORTH CAROLINA – CHARLOTTE
CAMERON APPLIED RESEARCH CENTER
MICROELECTRONICS CLEAN ROOM

The microelectronics fabrication laboratory has 3000 square feet of class 1000 clean room space. This laboratory includes all of the necessary facilities to fabricate complex devices and integrated circuits. A recirculating deionized water system supplies the lab with high purity water. Purge and process gases are plumbed throughout the lab. Complete chemical cleaning and etching capabilities are included.

The fabrication laboratory includes 8 high temperature furnaces manufactured by Corso-Gray, Thermco, and Lindberg. These furnaces are used for high purity silicon oxidations, n and p type doping and diffusion, and high temperature anneals. The lab has complete photolithography capability including wafer spin coating, direct contact mask exposure with a HTG contact mask aligner, and developing facilities. Etching is accomplished with either wet chemical etching or plasma techniques using a Technics Micro-Plasma series 900 plasma system, Texas Instruments A-24-D PECVD tool, or an IBM designed reactive ion etch tool. Metal thin films can be vacuum deposited with a Cooke thermal evaporator, Cooke e-beam evaporator, Varian 3125 4 pocket e-beam evaporator, a CHA Mark 50 rf induction evaporator, or a CVC AST-601 3 target sputtering tool. The lab includes various inspection microscopes and measurement tools including a Nanometrics Nanopsec AFT 200 automatic thickness tool, Tencor Alpha Step 200 surface profiler, and a Dektak IIA surface profiler. A K&S 4125 gold wire ball bonder is also available. A Micromanipulator probe station with Tektronix 576 curve tracer is available for electrical measurements.

Four MBE (molecular beam epitaxy) systems are used for advanced materials research. The MBE systems are pumped by either cryogenic or turbomolecular high vacuum pumps and have various deposition sources for individual or co-deposition operations. III-V and II-IV materials are currently under investigation.

A SEM (scanning electron microscope), two TEM (transmission electron microscope), an AFM (atomic force microscope), and a Raman spectrometer are available for advanced analysis.

See http://www.ece.uncc.edu/research/clean_room for photos & details.