Services Offered

Pricing Information
Information on the hourly rates for SMFL tools and mask prices

SMFL Services and Capabilities

The capabilities of the SMFL include:

- Wafer cleaning, ion implantation and diffusion, and high temperature processing both with conventional tube furnaces and RTP systems.

- CVD / PECVD deposition capabilities are available for oxides, nitrides, and polysilicon. A variety of vacuum systems are available for sputtering and thermal evaporation of metals and dielectrics.

- Lithography, including automated coating and development systems combined with a set of two 5:1 steppers with capabilities down to 0.40 microns, as well as 1:1 contact lithography and an electron beam exposure system for photo mask production.

- Plasma etch capabilities for silicon, oxides, nitrides, and metals and provision for a broad variety of wet chemical etch processes as well as copper electroplating and CMP.

- Complete prototyping of devices and systems with help from the electrical and surface analytical characterization labs, microelectronics layout and computer simulation facilities, and in-house industry-standard electronics packaging capability.

The SMFL offers a wide range of services from single process up to foundry services. It is by no means a complete list, please contact us so that we can discuss your needs.

Foundry Services
The SMFL has a 2µm CMOS process with an effective L of 1.5µm.

- We have run this process for customers using their design and incorporating our test structure for test verification.
- Aluminum and Tungsten gate metals have been processed - others are possible.
- Our Vt's are well matched but implant splits are possible.
- Typical run time is ~8 weeks

**Details about the SMFL CMOS Process, Performance, Specifications, and Options**

If you require this information or a quote on your process, please contact T. Grimsley
Single Process Services

Metrology

**Scanning Electron Microscopy**
There are several SEMs available for imaging a variety of samples.
- Amray 1830 LaB6 system
- LEO EVO 50 LaB6 system. Contact Sean Rommel of RIT's Electrical and Microelectronic engineering Department about this tool.

![SEM Image]

**Film Thickness - Ellipsometry**
- Woollam VASE with Autoretarder operating at wavelengths from 240-1700nm and variable angle of incidence.
- Rudolph Auto EL IV operating at three wavelengths

**Film Thickness - Profilometry**
- Tencor P2 is a long length scanning profilometer useful for measuring step heights.

**Film Thickness - Optical**
- Prometrix SpectraMap SM300 and two Nanometrics Spectrophotometers that provide noncontact optical film thickness measurement mapping - Resist, oxide, nitride.

**Resistivity Measurements**
- CDE Res Map provides sheet resistance and resistivity mapping of silicon wafers and films.

Thin Film Deposition

**Sputter Deposition**
- The SMDL has a variety of DC and RF deposition tools. The PE 4410 is loadlocked and has sputter etch capability.
- A wide variety of targets exist in bonded 8" form and unbonded 4" targets for the sputter head on the CVC 601 Sputter.
  - Al/Si, Ti, Cr, W/Ti, Cu, Mo, Ta - 8" bonded, water cooled targets
  - Cu, Ti, Ni, Cr, Ge, InSn, Mo, NiCr - 4" target for sputter head

**Thermal Evaporation**
- The SMFL has two thermal evaporators - one is a basket style for various metals and the other is a flash evaporator for deposition of aluminum.

**Electron Beam Evaporation**
- The SMFL has a CHA Ebeam Evaporator with a 3KV electron beam gun with an eight pocket carousel.

**Plasma Enhanced Chemical Vapor Deposition (PECVD)**
- The SMFL has an Applied Materials P5000 systems equipped with two deposition chambers
  - TEOS Oxide from a few nanometers to many microns can be deposited
  - PECVD nitride and amorphous silicon can also be deposited.
Low Pressure Chemical Vapor (LPCVD)

- Our ASM LPCVD system is capable of depositing Nitride, Poly and Low Temp Oxide.
- We also have a Parylene deposition system

Short Courses

The SMFL has run hands on courses in Cleanroom Etiquette, MEMS Processing, and Thin Films.

We can custom tailor a course to suit the needs of your organization. Please contact us and we can discuss your requirements.

A complete listing of all of the Tools in the SMFL can be found here