

Facility Description of AggieFab Nanofabrication Facility for Proposal Purposes

(updated October 1, 2020)

AggieFab Nanofabrication Facility at Texas A&M University is a shared nano/microfabrication facility located in the newly built Frederick E. Giesecke Engineering Research Building at Texas A&M University. The facility has over 6,500 sq. ft. of class 100/1000 cleanroom space with raised access floor and vertical laminar flow, and an additional 4,500 sq. ft. of support space, totaling 11,000 sq. ft. The facility is enabled by a \$12M investment from the Texas A&M Engineering Experiment Station (TEES). The facility has state-of-the-art equipment for full ranges of micro and nano-scale fabrication on diverse materials. In addition, the facility has acquired \$5M worth of new nanopatterning instruments through a donation in Fall 2017 and has received \$1.5M from the Texas A&M University Research Development Fund to purchase several new tools to improve micropatterning and advanced substrate development capabilities

The facility houses state-of-the-art micro and nano fabrication equipment and various analytic equipment. The facility has multiple chemical hoods and laminar hoods and is equipped with in-house de-ionized water, vacuum, and nitrogen. Research equipment include an electron beam lithography system (Tescan Mira 3 EBL), a dual-beam focused ion beam (FIB) nanopatterning tool (FEI Helios DualBeam FIB), a helium ion microscope based nanopatterning tool (Zeiss Orion He Ion Microscope/NanoFab), two mask aligners (Karl Suss Microtech MA6, EVG 610 double-sided mask aligner), three spin coaters, a wafer bonder (EVG 501), Direct Laser Write Lithography (Nanoscribe), five electron beam evaporators (four Lesker PVD75 series, one Temescale Ebeam evaporator), a plasma enhanced chemical vapor deposition (PECVD, Unaxis 790) system, a low-pressure chemical vapor deposition (LPCVD, MTI RTP) system, four dry etching systems (STS Multiplex ICP etch system with Bosch Process, Oxford Plasmalab 100 ICP RIE, Oxford Plasmalab 80 metal etch, Oxford Plasmalab 80 dielectric etch), two polishers, two profilometers (Bruker DektakXT, Veeco NT9100), a thin film analysis tool (Ocean Optics NanoCalc DUV), two dicing saws, a wire bonder (Kulicke & Soffa 4500), 3D Microscope (Clatex), an O₂ plasma asher, four oxidation/diffusion furnaces, multiple hot plates, ovens, and chemical hoods. The facility is also equipped with multiple rapid prototyping tools (Universal System PLS6.120D Laser Engraver, Roland MDX-50 benchtop CNC milling machine, two EnvionTech 3D Printers). The facility has recently acquired and installed an atomic layer deposition (ALD) tool (ASM P8200 pulsar system) and a parylene coater (PDS 2010 Labcoter2).

Equipment List of AggieFab Nanofabrication Facility for Proposal Purposes

Lithography/Patterning

- EVG 610 Double Sided Mask Aligner
- Nanoscribe Photonic Professional GT2
- Suss MA-6 Mask Aligner
- FEI Helios DualBeam Focused Ion Beam (FIB)
- Zeiss Orion Helon Microscope/NanoFab
- TESCAN MIRA3 E-beam Writer

Deposition/Diffusion

- MTI RTP Anneal Furnaces (3 units)
- Edwards E-Beam Evaporator

- Lesker PVD 75 E-Beam Evaporators (2 units)
- Lesker PVD 75 DC Sputter
- Lesker PVD 75 RF Sputter
- Oxford Plasmalab 80 PECVD
- Minibrute Oxidation and Anneal Furnaces
- CLUSTEX 100sp Multi-Target Sputter
- Tystar LPCVD
- ASM P8200/P3000 Atomic Layer Deposition (ALD)
- PDS 2010 Labcoter2 Parylene Coater

Characterization

- Micromanipulator 6100 Probe Station (installation ongoing)
- Veeco NT 9100 Optical Profiler
- Bruker DektakXT Stylus Profiler
- Ocean Optics Thin Film Analyzer
- Veeco FPP5000 Four Point Probe
- Nikon Eclipse LV150N Optical Microscope
- Caltex 3D Microscope

Plasma Etching

- Oxford Plasmalab 80 RIE (installation ongoing)
- Oxford Plasmalab 100 ICP RIE
- Nordson March CS-1701 RIE (installation ongoing)
- STS ICP RIE (installation ongoing)

Bonding/Dicing

- K&S Wire Bonder
- Micro Automation Dicing Saw (2 units)

Rapid Prototyping

- PLS6.120D Laser Engraver
- Roland MDX-50 Benchtop CNC
- EnvisionTech Perfactory 3 Mini/Multi-Lens 3D Printer
- EnvisionTech Ultra 3D Printer