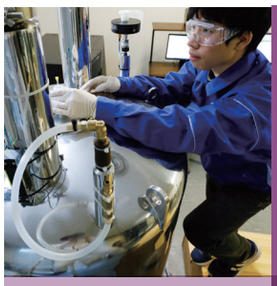


Shared Clean Room

Facilities and Equipment for Experiments and Practical Training

A wide range of applications, from hands-on training to joint industry-academia-government research

A complet facility for semiconductor microfabrication

A “clean room” is a laboratory with filters that remove and reduce the quantity of dust particles 0.5 microns and larger in the air. The clean room at TTI is about 450 m^2 in area and is capable of complete processing of semiconductor materials and devices. While the clean room is used to provide practical training from the first year of undergraduate studies, it is also used to conduct research on cutting-edge devices and materials, including solar cells, graphene, micromachines, magnetic devices, and gallium nitride power transistors. Additionally, the clean room is actively used for joint industry-academia research, including the Nanotechnology Platform project sponsored by the Ministry of Education, Culture, Sports, Science and Technology.

Note on clean room classes: A class 100 clean room has 100 or fewer particles of size 0.5 microns or larger per cubic foot. (This is equivalent to class 5 in the ISO standard.)

Chemical Vapor Deposition Area — Class 10,000

A space where a variety of reactive gases are used to form semiconductor films and to perform fine etching

- Carbon nanotube deposition system
- Chemical vapor deposition system
- Chemical beam epitaxy system
- Atomic layer deposition system
- Chlorine etching system — and more

Wet Etching / Cleaning Area — Class 1,000

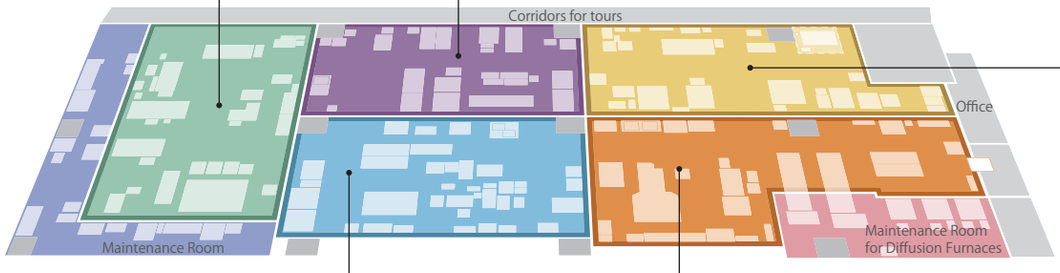
A space where semiconductor crystals and other materials are cleaned with organic solvents or etched with chemicals

- Cleaning/etching draft chamber (Si)
- Cleaning/etching draft chamber (compound semiconductor)

Film Deposition / Etching Area — Class 10,000

A space where metallic films and insulators used for electrodes and wiring are formed and processed using vapor deposition and other methods

- Electron-beam physical vapor deposition system
- Sputter deposition system
- Deep reactive-ion etching
- Lifetime measurement system — and more

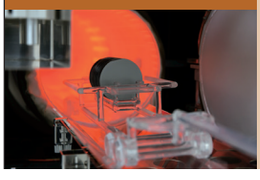


Lithography Area — Class 100

A space for performing lithography (using ultraviolet light or electron beams to create fine patterns) in a pristine environment

- Photoresist coating system
- Electron-beam lithography
- Maskless lithography
- Mask aligner

Oxidation / Diffusion Area — Class 10,000



A space where silicon oxide films are formed on crystals using electric furnaces, with impurities introduced to control electrical characteristics

- Vertical diffusion furnace
- Horizontal diffusion furnace
- Ion implantation system
- Wafer DC measurement system
- Four-terminal impedance meter
- Ellipsometer
- Optical interference film thickness meter
- Surface roughness meter (step measurement)
- High-speed heat treatment system

■ Workshops are also held for participants from industry and academia.

Semiconductor process training and workshop
(fee-based)

A workshop is held every fall to help participants acquire general knowledge about semiconductor technology through lectures about semiconductors and hands-on process training.

- Eligible participants: Company workers, academic staff and students with an interest in semiconductors
- The schedule and other details are available on TTI website.