

KMUTT

Microfabrication Laboratory

Lab on chip (LoC) and micro total analysis systems (μ TAS) are technologies of increasing interest during the last 20 years, which can be regarded as a subset of microelectromechanical systems (MEMS), and they consist principally in integrating multiple laboratory functions and scale them down to chip-format of only a few millimeters or centimeters of size. This laboratory functions are performed inside a net of very small channels and chambers of just ten to hundreds micrometers width, currently known as microfluidic channels, in which samples and reagents are processed and later delivered to sensors.

In order to fabricate these microfluidic structures for LoCs, a very clean environment is needed to avoid particles, such as dust, from blocking the tiny channels and chambers that make up the chip. These highly clean facilities are known as cleanrooms.

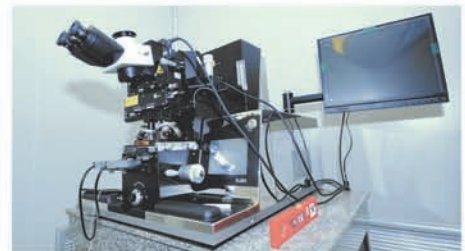
Our university already counts with a cleanroom facility, which is aimed mainly to development, research and educational purposes, concerning fabrication of microfluidic and lab on chip technologies.

The facility has different kinds of rooms, each one equipped with different kinds of machinery and instruments, depending on activities that are being developed there.

Room class 1k. In this facility is performed the patterning of the wafer, task that requires a very specialized equipment called mask aligner, which is in charge of transferring the pattern from a previously designed mask to the wafer used for microfabrication, in a process called photolithography. Also to ensure that the microstructures are correctly built on the wafer, this cleanroom posses also a microscope integrated with a camera for photography and video recording.

Finally, to ensure the cleanliness of the rooms 100k, 10k and 1k, a set of highly efficient different filters are integrated in the ventilation and air conditioning system.

Cleanroom facility



Room class 1k



Room class 10k. It is used mainly for chemical work with wafers, such as cleaning, coating, heating and etching. For this purposes, the cleanroom counts with the following equipment

- oven and hotplates for wafer heating
- spin coater to coat photoresit on the surface of the wafer
- oxygen plasma to clean and modify the surface surfaces
- fume hood to avoid the user's exposure to hazardous or noxious fumes, vapors or dusts, expelled when chemically working with wafers.

Cleanroom Class 10k



Room class 100k. This acts as a sort of corridor between the rooms class 10k and 1k. The pressure in this room is lower than the pressure in the rooms class 10k and 1k, in order to avoid air flows from 100k room entering the 10k or 1k, which can produce contamination. The cleanliness of this room is given by its classification, that is 100k, which means that in $1(\text{ft}^3)$ there are at most 100 000

Changing room. This room is provided with an air shower, whose main purpose is to blow off the excess of dust particles from the personnel, in order to minimize contamination, before entering the cleanroom class 100k.

Airlock. It is provided with a cabinet to store the proper garments to enter the cleanroom. These garments are coverall suits, which help in preventing the cleanroom getting contaminated from all of the particles and hair that human body produces, maintaining by this way a clean environment.

Chemical room. This room counts with cabinets for the storage of chemicals that are going to be used in the different process of microfabrication.



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