# ANA (Surface Analysis)

**Objectives**
The NPs are finally collected in the ANA module. In this module electron spectroscopy techniques can be *in-situ* performed.

**Environmental conditions**

- Sample temperature range: from 300K to 1500K in sample holder computer controlled. The temperature ramps are controlled with an in-house developed LabVIEW code that has an interface to synchronize with the Pfeiffer h6T software. Samples are heated using a Pyrolytic graphite / pyrolytic boron nitride composite heater installed in a home-build sample stage. Temperature is measured using a k-type thermocouple, and has been calibrated with an infra-red pyrometer. Finally, this module is equipped with an UHV parking for five sample holders.
- ANA module pressures near to $10^{-11}$mbar. To achieve this, ANA is pumped by the combination of a primary scroll pump of 6 $m^3$/h, followed by an 80 l/s turbo. This set makes the primary pump a turbo of 500 l/s. In addition, to improve the pump speed, ANA has a 600 l/s ion pump in the same pumping channel along with a titanium sublimation pump inside. A gauge Bayard-Alpert measures the pressure in ANA module.

**Analytical Techniques**

- **TPD/TDS** (Thermal Programmed Desorption, thermal desorption spectroscopy), in real time with QMS 512uma.
- **XPS** (X-Ray photoemission spectroscopy).
- **UPS** (Ultraviolet photoemission spectroscopy).
- **AES** (Auger electron spectroscopy).
- **LEIS** (Low-energy electron spectroscopy).