

The Analytical Services Unit (ASU) is a service center, with the primary mission of providing a broad range of analytical chemistry support services to the scientific and engineering programs at CPERI. In addition, the ASU works on instrumental and methods development, and provides analytical services for governmental, educational, and industrial organizations. The ASU handles a wide range of analytical problems, from routine standard analyses to unique problems that require significant development of methods and techniques.

The Analytical Services Unit (ASU) is administratively within the horizontal structure of CPERI and its role is to provide technical support for all the research groups of the Institute. The main objectives of the Unit were to bring together all the instrumentation available from the different research groups of CPERI, in order to provide basic characterization and analytical support services to all the research projects and to facilitate its accessibility to private enterprises (e.g. local industry, companies that are situated at the Incubator of the Technology Park etc.). The scientific and technological goals of the Unit are therefore oriented towards the better realization of the above role.

ASU has already developed excellent experimental facilities and acquired high quality modern analytical instrumentation for the detailed physical, chemical and morphological characterization of inorganic materials, catalysts, polymers, membranes and molecular sieves. The most important goal of the unit is to continuously integrate, extend and upgrade the analytical services that it provides. This can be achieved by further improving its infrastructure with the acquisition of new, state-of-the-art instrumentation. Material knowledge at the smallest observable level and exploration of locally appearing effects are considered the most essential needs. The purchase of powerful analytical instruments, of decisive importance for any future developments in material characterization, are continuously in the future strategic plans of ASU.

The Unit has been organized in such a manner as to provide easy access of its analytical services to private enterprises. In our effort to achieve the best organization and also to assure the highest quality of our analytical services, the Unit has been accredited with the ISO 9002 certificate. Our QA/QC program has been established for our customers, to ensure them that their results are accurate and precise. The ASU has a sample receiving system that allows efficient processing of samples, including use of chain-of-custody forms. The ASU also has quality assurance (QA) and quality control (QC) systems in place to produce data packages that meet rigorous reporting requirements.

The Unit is equipped in order to perform physical and chemical characterization of materials, mainly solids, by providing the following types of analyses:

- Morphology, nanoparticles size measurement, structural properties, crystalline phase characterization, identification of chemically different species at magnifications up to 1.200.000 with High Resolution Transmission Electron Microscopy (HRTEM) equipped with X-ray EDS
- Surface morphology observation (magnification 10-300.000) with Scanning Electron

Microscopy (SEM)

- Microanalysis (local elemental analysis) with X-ray EDS
- Surface mapping of elements and linescans with SEM-EDS
- Surface Area (BET) measurement with nitrogen sorption
- Area and Volume of micropores (t-plot method) with nitrogen sorption
- Pore Size Distribution with nitrogen sorption
- Pore Volume, Pore Size distribution and Surface Area with Mercury Porosimetry
- Crystalline compounds identification with X-ray Diffraction (qualitative analysis)
- Unit Cell Size of Zeolites with X-ray Diffraction
- Elemental analysis of aqueous solutions, inorganic solid materials and organic materials with Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES)
- Particle Size Distribution with laser diffraction (wet and dry dispersion methods)
- Thermogravimetric Analysis - Differential Scanning Calorimetry (TGA-DSC)