



Name of the organization

Università degli Studi di Perugia

Name of the infrastructure / laboratory

MCLab

Address and country of the infrastructure / laboratory

Dipartimento di Fisica dell'Università degli Studi di Perugia, Via Alessandro Pascoli, Perugia, Italy

Person responsible of the access / Contact person

Prof. Francesco Sacchetti

Phone / Fax / Web / Email

+39 0755852721 / +390755852736 / www.fisica.unipg.it / francesco.sacchetti@pg.infn.it

Main field of activity of the infrastructure / laboratory

Material characterization by means of x-ray, neutron, light

Short description of the infrastructure / laboratory

The MCLab can provide the microscopic material analysis in a wide space and energy range, depending on the specific needs. Standard x-ray diffraction on powder and small angle diffraction can be performed. The x-ray diffraction can be performed at low temperature down to 10 K and at high temperature up to 1000 K with a variety of wavelength. In the case of the most demanding environment, highly penetrating 60 keV photons can be employed. Additional information on the chemical status of the material can be gained using the measurement of the Compton profile either at medium energy (22 keV) or with the penetrating 60 keV radiation. Support in different application of neutron scattering and radiography can be provided. Other specific probes like atomic force and scanning microscope are available. All these techniques are well suited to study the performance of the different materials in the case of PEM fuel cell in situ or ex situ.

Main research area(s) of the infrastructure / laboratory

Structure and dynamic characterization of condensed matter

Instruments and tools available for the above mentioned research

Four x-ray sources with monochromatic beams ranging from the Cr K α wavelength up to the W K α wavelength and continuous radiation up to 300 keV photon energy. Wide range of sample temperature from 10 K up to 1000 K for diffraction experiments, including Bragg and diffuse scattering. Appropriate devices to measure the Compton profile at 22 keV and 60 keV photon energy. Neutron analysis, microscopy techniques, light absorption techniques.



Fluorescence and Compton acquisition system



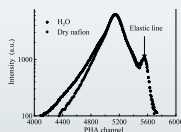
Low temperature wide angle diffractometer



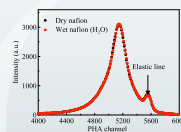
High energy four circle x-ray diffractometer



X-ray fluorescence and Compton scattering spectrometer



Raw Compton profile of liquid water and dry nafion membrane



Raw Compton profile of dry and wet nafion membrane