

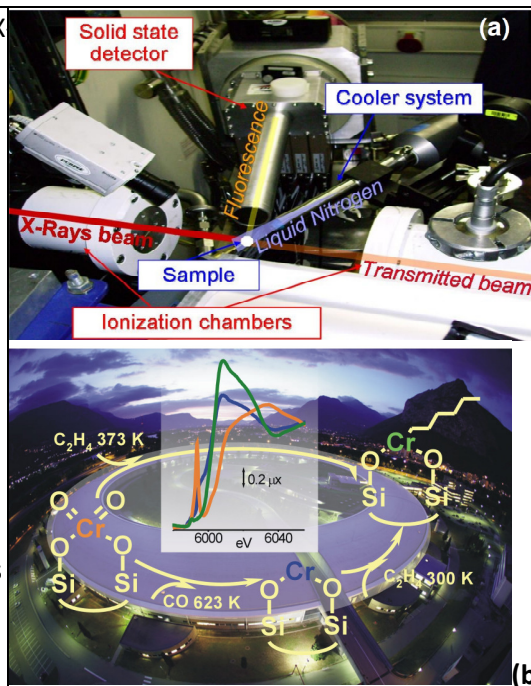
Characterization of Nanostructured Materials with Large Scale Facilities

Research Group Surfin

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Research Activity

- X-ray adsorption spectroscopies (XANES and EXAFS), X-ray emission (resonant and non resonant XES, RIXS) spectroscopy and X-ray scattering techniques (XRPD and SAXS) performed in situ under controlled environmental (temperature, pressure conditions). Time resolved experiments are also possible in the minutes/seconds time scale. Application: Catalysis
- Structure determination at the different scales of order: local (EXAFS), medium (total scattering) long (XRPD). Determination of meso-structures (SAXS). Application: Catalysis, materials science
- Use of μm and sub μm resolved X-ray beams to perform (XAS, fluorescence and XRD) on working catalysts, superconductors wickers materials and devices for electronic and optoelectronics
- Determination of the electronic structure of materials for both unoccupied (XANES) and occupied (XES) states.
- Single crystal and powder neutron diffraction scattering to better locate low Z elements and to discriminate among elements with similar Z.
- Inelastic neutron scattering for the determination of the vibrational structure of molecules and of the phononic structure in solids.
- Laser pump & X-ray probe to investigate excited states of molecules and materials



Part(a): experimental set-up allowing in situ cryogenic XANES/EXAFS data collection on capillary-sealed catalysts under controlled atmosphere. Part (b) top view of the ESRF synchrotron. Superimposed the scheme of the activation/reaction of the Cr/SiO₂ catalyst investigated in situ at the ESRF.

Projects

- MaMaSELF (master founded by EU <http://www.mamaself.eu/>)
- Progetto di Ateneo2011-A1:Advances in nanostructured materials and interfaces for key technologies
- Contracts with Haldor Topsoe (2009-present); with CHIMET (2003-present) companies

References

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