

# Services and equipment of the nano-RX platform

## Services and areas of expertise

### Polycrystalline samples

- Qualitative analysis of samples under conventional conditions
- Quantitative analysis by Rietveld refinement
- High-temperature measurements (up to 1200°C).
- Measurements in aggressive atmospheres (H<sub>2</sub>, CO, etc.)
- Local strain and texture measurements (100µm spatial resolution)

### Thin films

- Layer thickness measurements
- Determination of epitaxy conditions
- Strain measurements
- Reciprocal space mapping

### Amorphous and nanomaterials

- Wide-angle X-ray scattering (WAXS) for the local study of crystalline structures or nanomaterials/amorphous materials by analysis of their pair distribution function.

## Equipment

The platform's equipment is distributed across the various partner sites as follows:

### CIRIMAT

Contact: Cédric Charvillat ([cedric.charvillat@ensiacet.fr](mailto:cedric.charvillat@ensiacet.fr))

- Bruker D8 ADVANCE: XRD - GIXRD
  - grazing incidence geometry
  - Cu anode tube (wavelength: "K"  $\alpha_{1+2}$  = 1.5419 Å )
  - LynxEye XE-T 1D linear detector
  - Göbel mirror
  - compact euler cradle
  - goniometer radius = 280 mm
- Bruker D8 ADVANCE: D8 -HT
  - Bragg Brentano geometry
  - Cu anode tube (wavelength: "K"  $\alpha_{1+2}$  = 1.5419 Å )
  - 1D linear detector (VANTEC)
  - chamber for temperature measurements (MRI, T<sub>max</sub> 1400°C, air, Ar, vacuum)
  - goniometer radius= 250mm

## LPCNO

Contact: Nicolas Ratel-Ramond ([nicolas.ratel-ramond@insa-toulouse.fr](mailto:nicolas.ratel-ramond@insa-toulouse.fr))  
Simon Cayez ([simon.cayez@insa-toulouse.fr](mailto:simon.cayez@insa-toulouse.fr))

- Panalytical Empyrean diffractometer

Source: Co anticathode, programmable divergence slits, Bragg-Brentano geometry, Xcelerator point or fast linear detector, temperature measurement capabilities (up to 1200°C), air-sensitive samples, rotating sample holder.

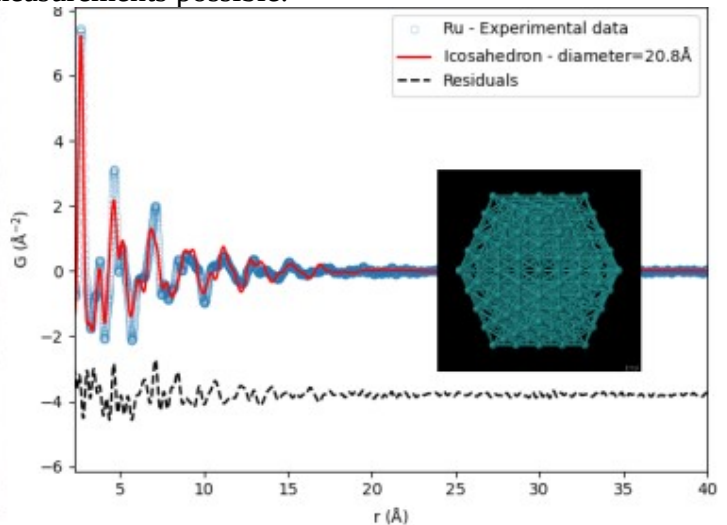
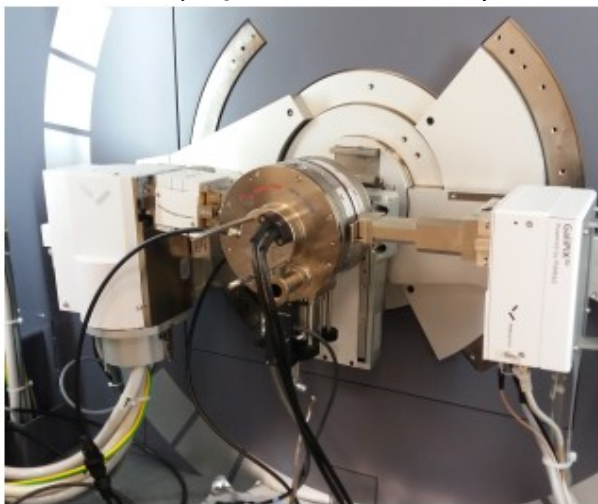
For thin-film applications, hybrid front optics (mirror + channel-cut Ge 220 monochromator), chi-phi-z cradle

- Panalytical Empyrean diffractometer

Source: Co anticathode, Bragg Brentano HD optics, 1D PiXcel detector, ability to perform temperature measurements under reducing atmosphere (H<sub>2</sub>, CO).

- Panalytical Empyrean Diffractometer - WAXS

Source: Mo anticathode, focusing mirror optics, GaliPix3D detector, transmission setup (capillary measurements).  $Q_{\max}=16.6\text{\AA}^{-1}$ . Temperature measurements possible.



## CEMES

Contact: Christophe Deshayes ([christophe.deshayes@cemes.fr](mailto:christophe.deshayes@cemes.fr))

- Bruker D8 Advance diffractometer

Source: Cu anticathode, monocap front optics to define a spot beam of approx. 100 $\mu$ m, XYZ sample positioning stage, Lynxeye fast linear detector,

- Bruker D8 Discover diffractometer for measuring deformations and textures

Source: Co microsource, set of collimators to define beam sizes from 50 to 500 $\mu$ m, Chi-phi-XYZ cradle for sample positioning, Vantec 500 2D detector

