

National Institute for Laser, Plasma and Radiation Physics

409, Atomistilor Street, PO Box MG-36, 077125, Magurele-Bucharest, Ilfov, ROMANIA

Combined 3-D X-Ray microtomograph and microbeam fluorescence system

~Tomo-Analytic~

Overall performances

Microtomography

Spatial Resolution $\cong 20\mu\text{m}$

Density Resolution $> 1\%$

Probe Dimensions:

Diameter $< 40\text{ mm}$, Height $< 200\text{ mm}$

Reconstruction time $\cong 5\text{ min}$

Microfluorescence

Spatial Resolution $\cong 20\mu\text{m}$

Thickness Resolution $\cong 2\%$ of total layer

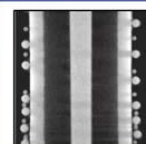
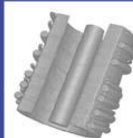
Probe Dimensions: $100 \times 100\text{ mm}^2$



Computer-aided tomography (μCAT) systems are configured to take many views of the object in order to build a 3-D model of its internal structure. 2-D slices through this volume can be viewed as images, or the 3-D volume may be rendered, sliced, and measured directly. For the NDT inspection of miniaturised samples the microtomography analysis is guaranteed for feature recognition down to a few tens of microns. 3-D tomographic reconstructions are obtained by a proprietary highly optimized computer code based on a modified Feldkamp algorithm.

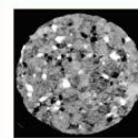
The microbeam fluorescence (μXRF) component is a configurable film thickness and composition measuring tool. It includes mechanical or optical X-ray beam collimation options, Amptek PIN diode X-ray detector and analysis software, motorized micrometric x-y-z stage for accurate sample positioning. A visual image of the sample is synchronized with the μXRF scanning in order to pinpoint measurement location, as well as for historical documentation.

3-D reconstructions & cross sections



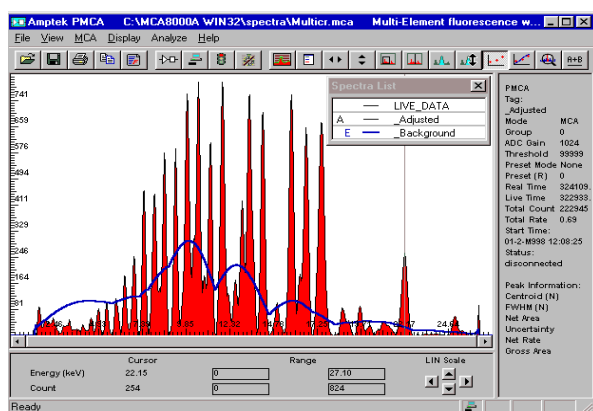
High density materials

Cu tube 2.2 mm diameter, Ag central wire 0.5 mm and coiled Ni 0.18 and 0.08 mm



Low density materials

Porosity characteristics of sand sample (minimum detectable feature 5μ)



The XRF analysis with Fundamental Parameters converts elemental peak intensities to elemental concentrations and/or film thicknesses.

Application area of the product

X-ray-tomography as an NDT tool can provide information on:

- volumetric density variations
- visualization of micro-cracks, voids, inclusions
- pore network connectivity in porous materials
- microstructure integrity of various components
- accurate geometrical measurements in 3-D

The (μXRF) system provides high resolution composition mapping and accurate thickness measurements of multilayer samples. The main area of application are microelectronics, oil industry (sulphur content), geology.

For more information

Contact person: Dr. I. Tisceanu

E-mail: tisceanu@infim.ro

<http://tomography.inflpr.ro>