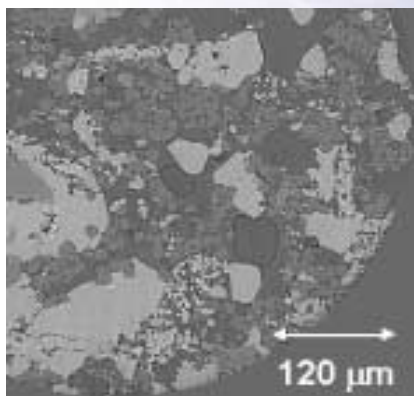


APPLICATIONS

The outstanding 3D imaging capabilities of the ESRF promotes innovative materials research, development and process control, in fields like:

- ❖ **Metallurgy:** homogeneity of alloys, crack formation, response to mechanical stress.
- ❖ **Polymers:** structure of fibres, polyurethane, polystyrene foams (opened/closed cells).
- ❖ **Mining, oil:** permeability and determination of microstructure of rocks, hardening of cement.
- ❖ **Cosmetics:** lipsticks, structure of hair, shaving foams.
- ❖ **Food:** cooking conditions of bread, structure of chocolate mousse, seed, sugar, salt, fruit.
- ❖ **Processing:** structural and process validation, quality control support.
- ❖ **Environment:** structure of snow, soil analysis.
- ❖ **Cultural heritage, paleontology:** composition of rocks from castles, study of masterpieces (Rembrant, Monnet, van Gogh) and fossils.



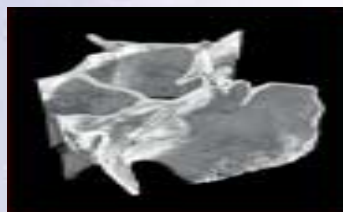
0.28µm pixel size
reconstructed slice of a piece of Tuffeau (rock from Chambord castle in France)



courtesy of O. Rozenbaum

SOME OF OUR INDUSTRIAL PARTNERS

- ❖ CEA
- ❖ Areva NP
- ❖ Lafarge
- ❖ L'Oréal
- ❖ Météo France
- ❖ Rhodia
- ❖ Schneider
- ❖ Statoil
- ❖ Arkema
- ❖ Unilever



3D "holotomographic" image of polystyrene



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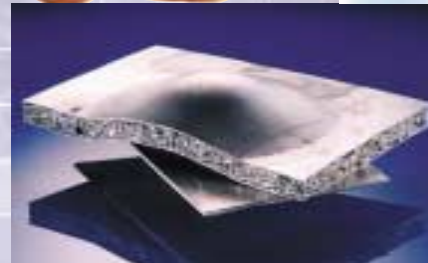
Scientific contact

Please contact our scientific expert for more detailed information

Ms Elodie Boller
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Email : oller@esrf.fr

3D IMAGING OF MATERIALS

IMPROVE YOUR RESEARCH ON INNOVATIVE MATERIALS



INDUSTRIAL AND COMMERCIAL UNIT

WHEN OTHER TECHNIQUES REACH THEIR LIMITS

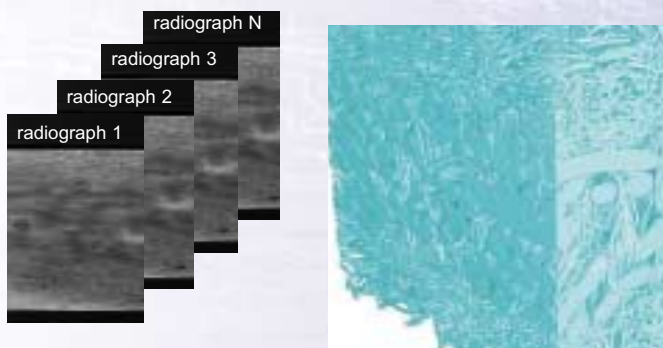
X-Ray Microtomography

About the ESRF

The ESRF is a European research institute that provides the most brilliant and intense X-ray beams in Europe. Benefit from our advanced technologies for investigation of the internal structure of applied materials at the micrometre scale.

The Technique

The microtomography technique is an extension of X-ray radiography: from several radiographs and with an appropriate algorithm, we obtain a 3D image of the sample.



From about 1500 radiographs, a 3D image is obtained using a backprojection algorithm. Example on felt used in the paper-making process

REVEALING INTERNAL STRUCTURE OF YOUR MATERIAL

Our quality

fast acquisition and high resolution

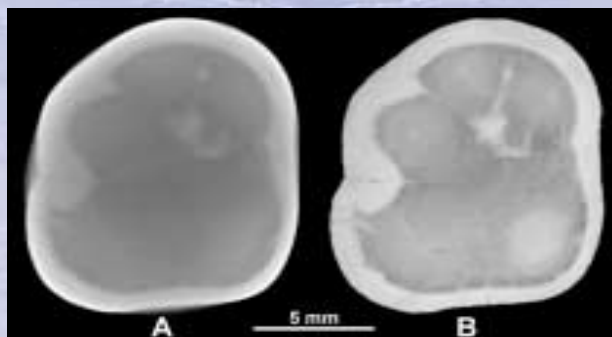
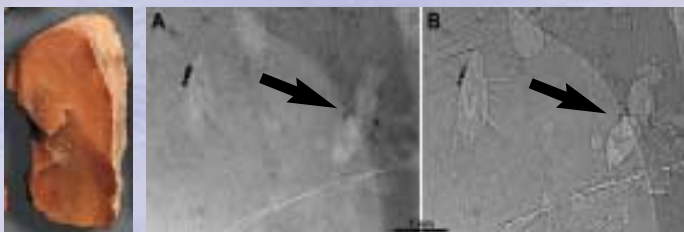


Image obtained with a conventional source (A) after 12 hours of acquisition at 20µm pixel size and at the ESRF (B) after 45 min of acquisition at 30µm pixel size

Our specificity

Using **phase contrast imaging**, extraction of insects embedded in opaque amber is possible



*Amber block
100 million
years old*

Radiography in absorption Radiography in phase contrast

*courtesy of Paul Tafforeau
and Malvina Lak*



3D reconstructed fossil insect

OUR SERVICES

Send your samples, we analyse them for you
OR

Perform your experiment with the help of our dedicated experts

We guarantee

- ❖ **Fast access** to our facilities.
- ❖ **Complete confidentiality**
- ❖ **Outstanding measurements**
 - From 0.28µm to 30µm pixel size → from 0.6mm to 45mm sample size.
 - Absorption / phase contrast mode.
 - Time resolved experiments: minimum of 16s time scan at 2.8µm pixel size.
 - Quantitative experiment by using ESRF monochromatic beam specificity.
- ❖ **Fully dedicated scientists** to get the best from your samples.
- ❖ **Unique sample environment**
 - Temperature range from -60°C to 1600°C.
 - Tension, compression, fatigue devices.
- ❖ **Full service** offered from technical expertise and data acquisition, to 3D image reconstruction. Post-experiment image-processing available on request.

