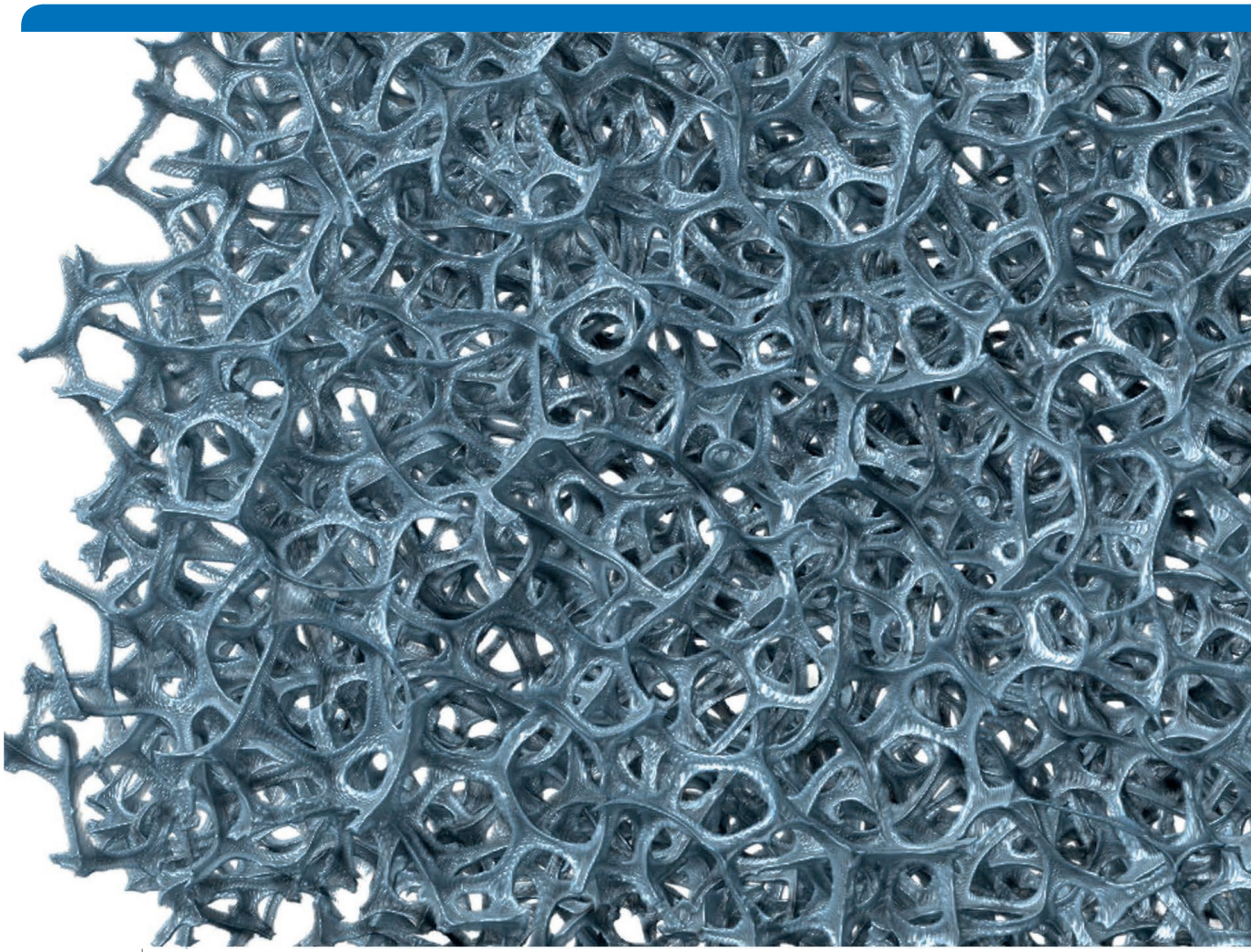
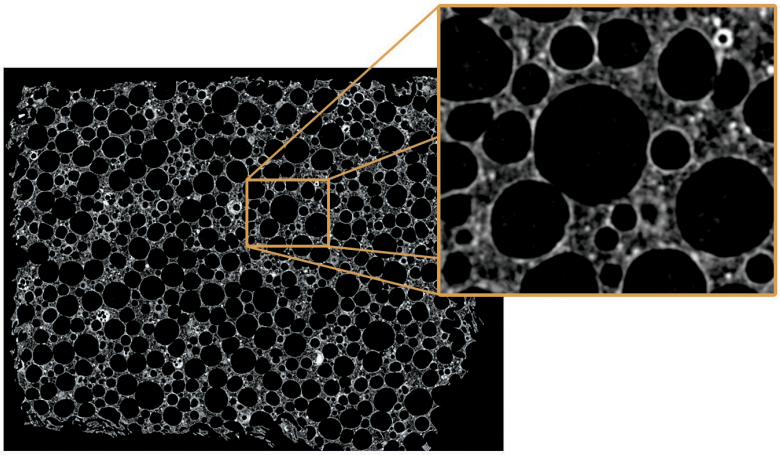


Imaging and Analysis of Foams

- Using Desktop µCT Scanners

Innovation with Integrity

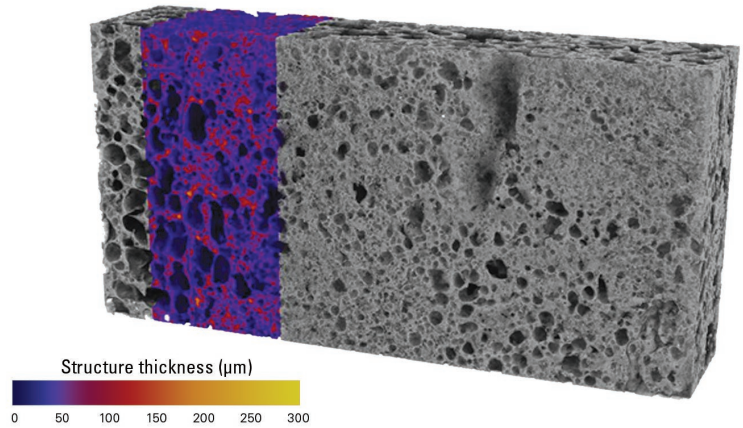
Microtomography



A PU foam with the radiodense differences in the polymer matrix clearly defined and porous thin microstructure accurately resolved.
SKYSCAN 1272 - 0.8 µm voxel size

High-Resolution 3D Imaging

X-ray µCT allows to visualize a foam's 3D internal structure in a non-destructive way. After a scan a virtual volume is reconstructed which reveals all internal details at high precision. You can then scroll through the virtual slices and visualize the foam at different locations along different planes.

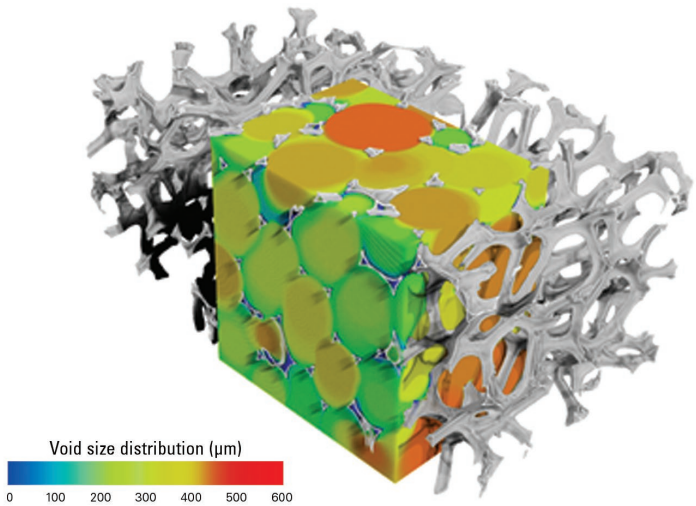


An aluminium foam with color coded thickness information of the local struths.
SKYSCAN 1272 - 5 µm voxel size

Structural Analysis

Analysis software provides image processing tools and allows accurate and detailed study of morphometric parameters of the foam's internal morphometry, such as porosity, average thickness and thickness distributions.

Structural thickness or separation is based on the placing of a spherical probe in every point of the object's 3D space with maximum diameter which fills the structure. The measured local information on 3D morphometric parameters can be exported as a map of spatial intensities.



Multivolume image of the reconstructed data and a color-coded structure separation showing both the diameter of the foam cells as well as the hollow character of the struts of an open-cell nickel foam.
SKYSCAN 1272 – 1 µm voxel size.

Realistic Visualization

Using our in-house software package realistic visual models can be created for visualization, virtual travel within the object and creating movies with flying around and inside the foam.

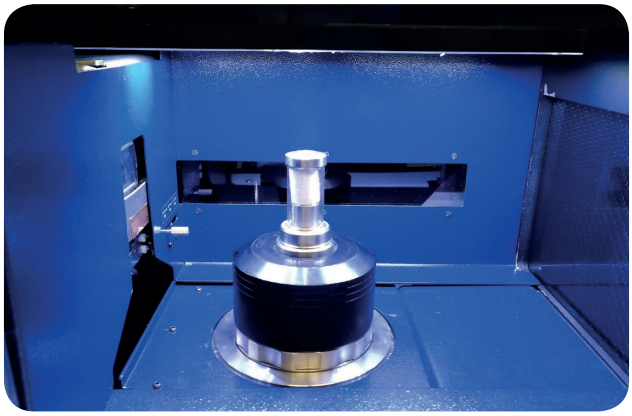
The visualization software can also convert maps with morphometric information to color-coded 3D images which reflect the local distribution of numerical characteristics of the object. Multiple datasets can be displayed simultaneously. The foam and its structure separation measurement reflect the local distribution of the pore network size of the foam intuitively.

Dynamic Experiments

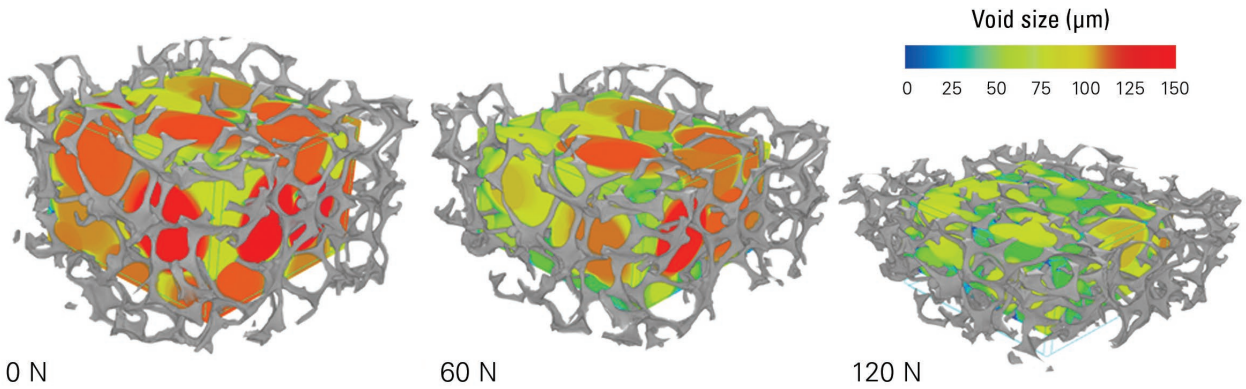
Using in-situ compression, tensile and temperature stages, mechanical experiments can be performed inside the scanner. This way, the correlation between a sample's structure and mechanical properties can be investigated in high detail.

An in-situ compression test of an open-cell aluminium foam was performed in the MTS2 with 440 N load cell. The MTS applied controlled compression to the both ends of the foam while the loading curve is placed on-screen in real time.

Bruker MicroCT offers mechanical testing stages up to 4.4 kN and in situ temperature control from 40degrees Celsius below ambient up to +85 degree Celsius.



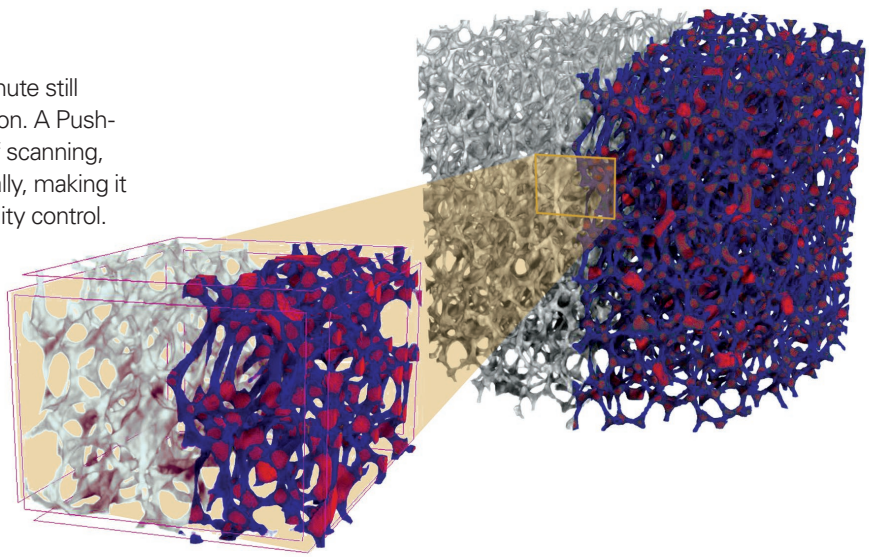
Material Testing Stage (MTS) 2 inside the chamber of the SKYSCAN 1275



Volume rendering of the foam at different compression points are shown with the structure separation data added in color coding.
SKYSCAN 1275 – 15 µm voxel size.

Fast Scanning

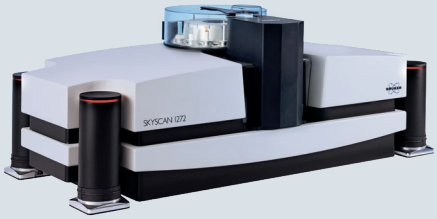
Data can be acquired in less than 1 minute still providing sufficient structural information. A Push-Button-CT allows to start a full cycle of scanning, reconstruction and analysis automatically, making it suitable for implementation in e.g. quality control.



57 second scan of an aluminium foam.
Foam nodes are highlighted in red, connections in blue
SKYSCAN 1275 - 30 µm voxel size

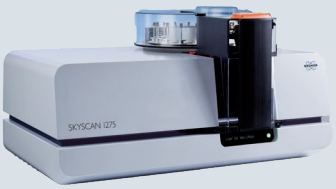
Specifications

SKYSCAN 1272 - High-resolution desktop µCT



11 or 16 Mpx large area CCD camera
Down to 0.35 µm pixel size
Up to 200 Mpx in every slice
InstaRecon - the world's fastest reconstruction algorithm
16 position sample changer

SKYSCAN 1275 - Fast, automated desktop µCT

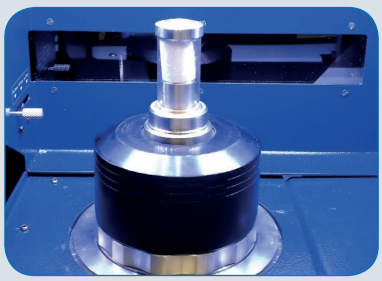


Down to 4 µm pixel size
Automated operation with push-button control
96 mm (diameter) x 200 mm (height) sample size
Licensed exact spiral reconstruction
16 position sample changer

SKYSCAN Software suite

Full software package for visualization and analysis
World's fastest reconstruction algorithm
Lifetime support and updates
User-friendly and intuitive user interface
Automatic reconstruction and analysis

SKYSCAN in situ testing stages



Compression up to 4400 N
Tensile up to 440 N
Cooling down to 40 °C below ambient
Heating up to 85 °C

Bruker microCT is continually improving its products and reserves the right to change specifications without notice.
Order No. DOC-B76-EXS010 © 2018 Bruker AXS.

Bruker microCT
info.bmct@bruker.com

www.bruker.com

Worldwide offices
bruker.com/about-us/offices/bruker-axs/micro-ct-offices.html

Online information
bruker.com/microCT