New dimensions to micro-CT imaging

Fast dynamic CT imaging and spectral CT on TESCAN micro-CT systems

Venue: Rm 236, Madsen Building (F09), The University of Sydney

Date: 27th October 2022

Time: 2:00 pm to 3:30 pm

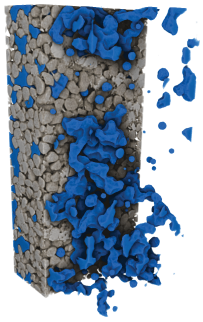

Figure 3: Animated gif of CO2 dissolution inside a rock

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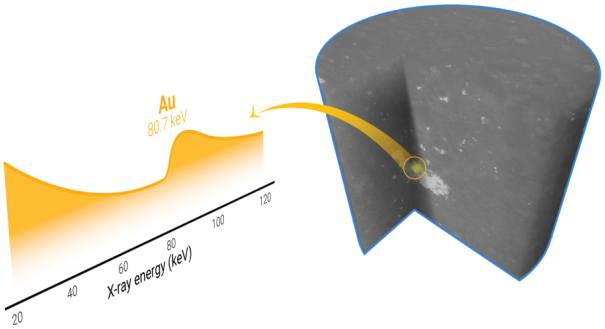

Figure 1: detection of gold inside an unprocessed rock core

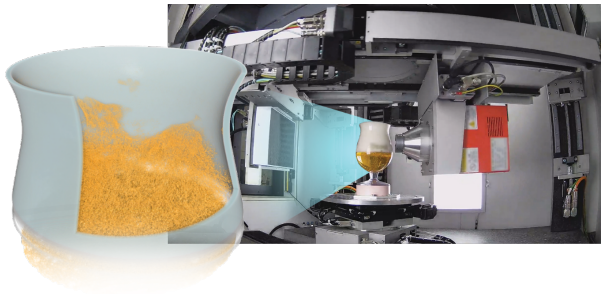

Figure 2: Fast, in-situ dynamic imaging of beer foam collapse

Micro-CT is an invaluable technique for non-destructive 3D characterization of materials. Its ability to measure samples from a few millimeters up to one meter in size, and the lack of any sample preparation make it a unique method for the inspection of both raw materials and finished products. Although these qualities are undisputed, two persistent prejudices about micro-CT exist: micro-CT scans take many hours to complete, and micro-CT does not provide any chemical or compositional information.

Over the last years, TESCAN micro-CT has proven that fast, laboratory-based dynamic micro-CT is able to visualize and analyze processes with temporal resolutions of just a few seconds. This development enabled experiments that used to be possible only at synchrotron facilities, such as in-situ flow experiments in porous materials, mechanical tests of metals and additively manufactured components or studying the behavior of liquid foams. This talk will focus on some real examples on how fast CT scanning using complex setups can be used to understand the behavior of materials.

With the release of TESCAN SPECTRAL CT, also the second prejudice can be tackled. Spectral CT scanning has the unique capability of revealing the composition of materials in 3D, at any point inside a sample, nondestructively. Using an energy-sensitive, photon counting detector, complete spectral information can be used to reveal contrast where traditional CT cannot or use k-edge detection to identify precious elements such as gold and platinum.

Frederik Coppens, Application Development Scientist,
TESCAN micro-CT excellence centre in Ghent, Belgium

The past four years at TESCAN, Frederik's focus lied mostly on multi-scale, high resolution and dynamic imaging. With over ten years of experience with micro-CT technology, he has covered a wide range of application fields, including additive manufacturing, energy materials, food science, geology and life sciences. He holds a physics degree from Ghent University and previously worked in R&D for industrial material development.