COVALENT METROLOGY



COVALENT ACADEMY Q&A

Episode 6: X-ray Computed Tomography – The Superpower System

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01

Q: I found out about this webinar through an email from Rigaku sales rep this morning. Is there a central webpage with upcoming webinars? My coworkers and students would be interested and I would like to spread the word.

A: If you join our Covalent Community you will have access to webinar, slides and Q&A for our whole series and if you co-workers and student sign up they will be on our mailing list for future webinars. We are currently doing 1 per week at this time. You can also visit www.rigaku.com/webinars for Rigaku's upcoming webinars and www.rigaku.com/webinars/x-ray_ct_introduction for the recording of X-ray CT related webinars.

02

Q: Is elemental identification possible?

A: You can do X-ray fluorescence tomography to obtain 3D elemental distribution. Note that this technique requires synchrotron radiation, and the spatial resolution tends to be limited.

03

Q: Can you comment on imaging soft tissue and the use of contrast-enhancing techniques, including iodine staining?

A: We will answer this offline. It will be part of the Q&A session we post.

There are three ways to enhance contrast of soft tissues. (1) Use low energy X-rays (ex. less than 10 keV). (2) Use contrast agent such as iodine. (3) Use phase contrast or phase retrieval technique. See the attached papers for more detail.

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04

Q: What is the minimum energy of the Lab Hx system at CM?

A: The minimum applied voltage is 30 kV, which has a peak around 15-20 keV.

05

Q: Can you use x-ray absorption edges and x-ray diffraction to enhance the imaging?

A: Yes, you can use absorption edges to enhance contrast. Diffraction is used for a different purpose. Diffraction tomography is used to map crystal orientation of each grain/crystallite in 3D. It is a 3D version of EBSD. The calculation for this analysis is complex, and I have seen this work only on a single-phase cubic or hexagonal material. Most of the experiments are done using synchrotron radiation.

06

Q: Is it possible to get analytical data, I have seen this using X-ray diffraction patterns (Cubic structures)?

A: Diffraction tomography can be used to map crystal orientation of each grain/crystallite in 3D. It is a 3D version of EBSD. The calculation for this analysis is complex, and I have seen this work only on a single-phase cubic or hexagonal material. Most of the experiments are done using synchrotron radiation.

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