

# T07 Computed X-Ray Microtomography - CERTH

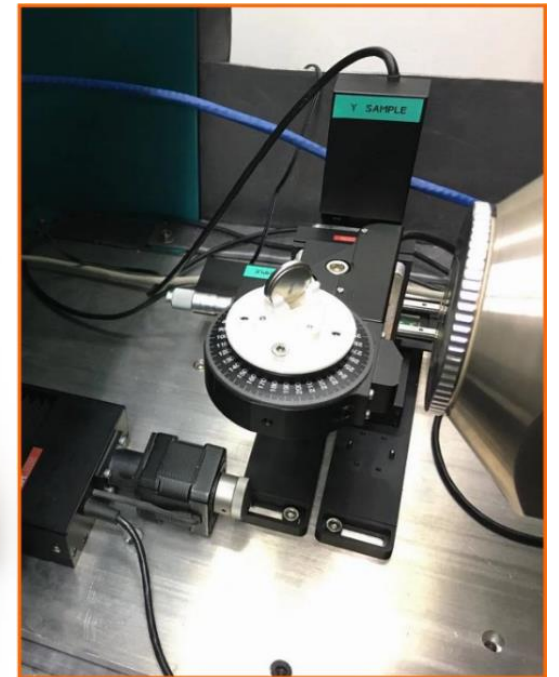
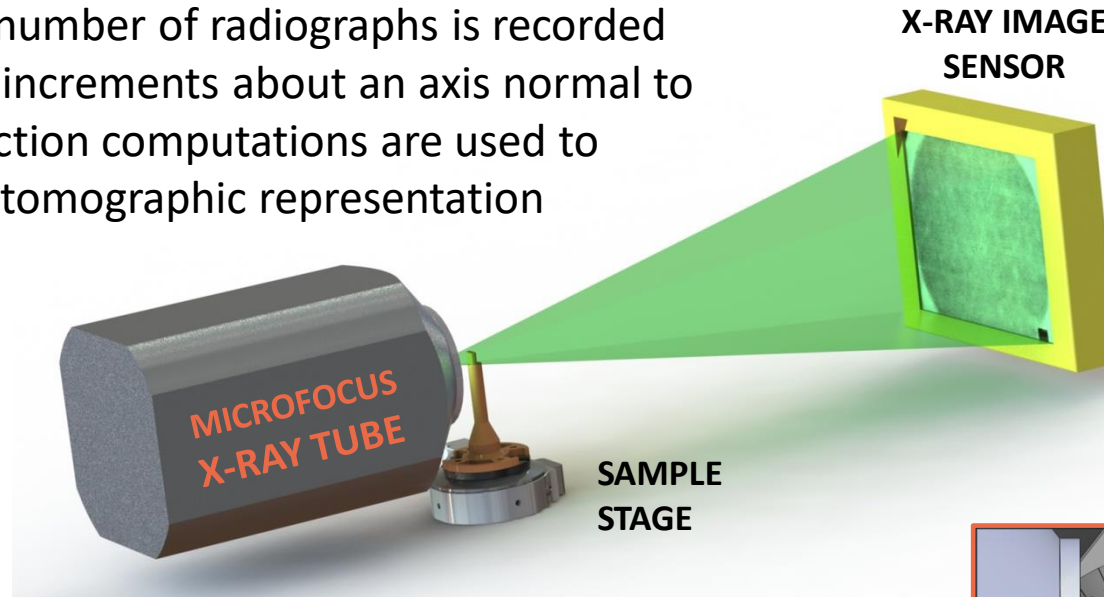


**TEESMAT**

Open Innovation Test Bed for Electrochemical Energy Storage Materials

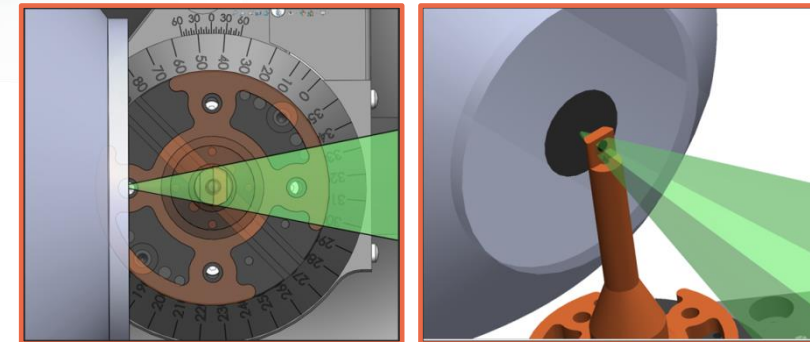
## How it works

A very small x-ray source (diameter  $\approx 1 \mu\text{m}$ ) projects a beam through the sample onto a high resolution image sensor which records digital radiographs on a computer. A large number of radiographs is recorded while the sample is rotated in small increments about an axis normal to the projection direction. Back-projection computations are used to combine the radiographs into a 3-D tomographic representation of the sample.



## What kind of sample ?

- **Coin cells** (max.  $\varnothing 25\text{mm}$ , approx. 80% sample imaged)
- **Electrode material** (circular coupons  $\approx \varnothing 2.5\text{mm}$ ,  $3 \mu\text{m}$  resolution possible)
- **Cylindrical cells** (up to  $\approx \varnothing 18 \text{ mm}$ ,  $\approx 10 \mu\text{m}$  resolution attainable)



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## What can be seen ?

- Sections (tomographs) through the sample.
- Internal geometric features / alignment
- Voids, delamination, homogeneity of coatings.

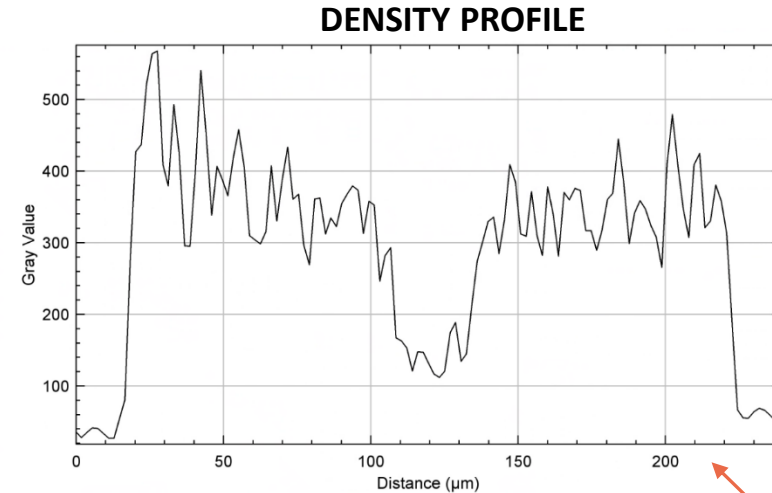
## Why is it useful ?

- Production control (verify internal geometric features, characterise electrode homogeneity)
- Non-destructive volumetric inspection
- Understanding failure mechanisms (delamination, swelling)
- Complementary to nano-tomography and SEM (larger volumes accessible)

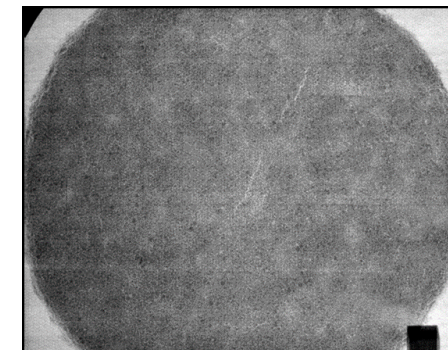
## Maturity level

- Workflow fully developed for electrode samples and coin cells.
- Methodology for in situ study requires development.

**Investigation time** : days / 1 week



**RADIOGRAPH**  
(electrode sample)



**SECTION**

