



Micro-computed tomography (micro-CT) imaging: A non-destructive technique for the evaluation of Cultural Heritage Artifacts

Maria Kosarli, Angelos Ntaflos, Alkiviadis S. Paipetis

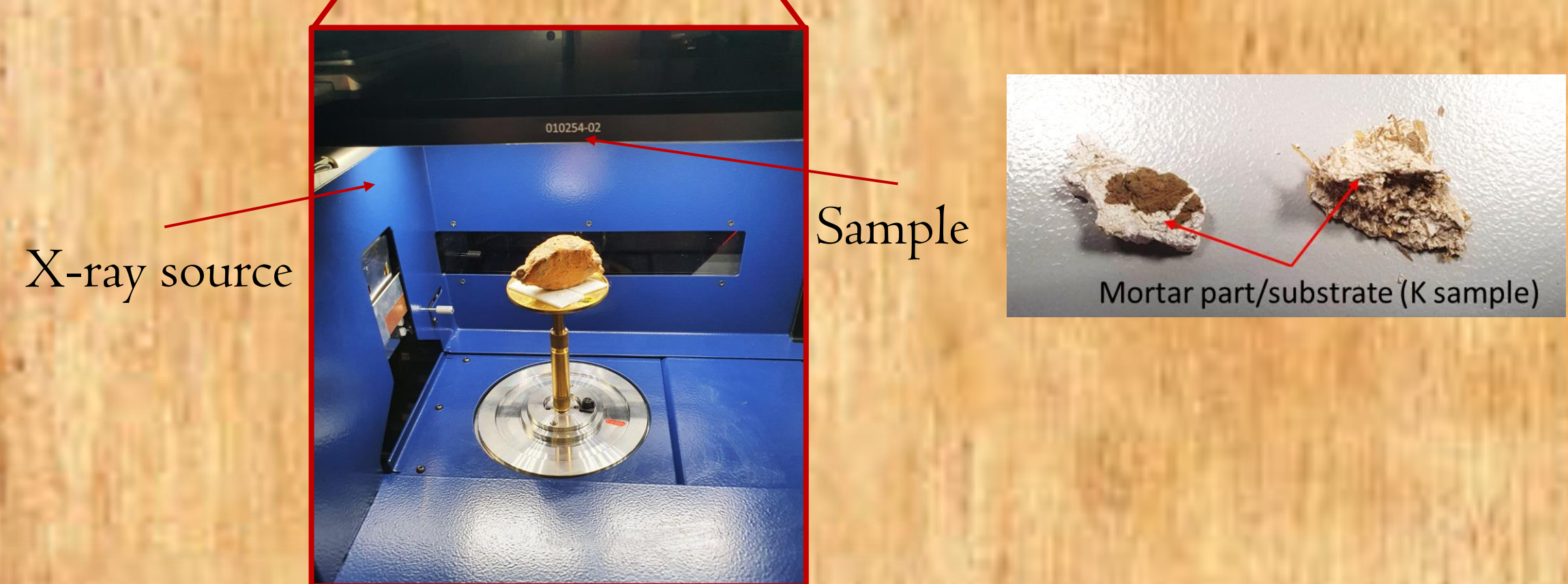
ABSTRACT

X-ray micro-computed tomography (μ CT) has been increasingly used in cultural heritage artifacts since it is a non-destructive evaluation technique, capable of providing information about the internal structure of the studied object (1). This method can offer useful information such as volumetric data, porosity, density fluctuations, and hidden micro-defects (2). One of the most important advantages of μ CT is the potential to allow easier data dissemination as well as reduce the risk of damage to the subject (3).

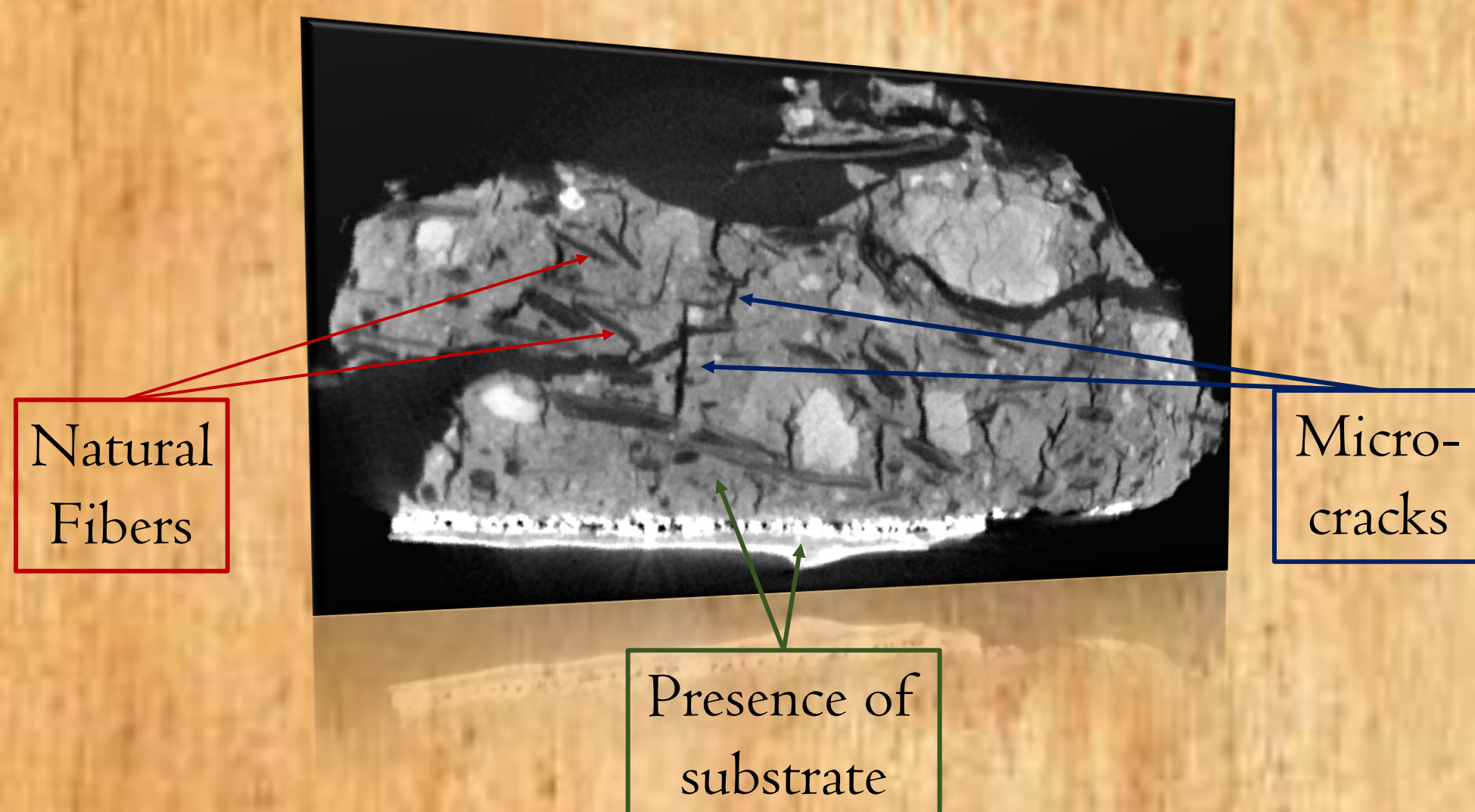
How does micro-CT work?

Micro-computed tomography is an X-ray transmission image technique (4). X-rays are produced from an X-ray source and travel through the sample. The detector is placed on the other side and records the transmitted radiation, producing a radiograph (known as projection image). The sample is rotated by a fraction of a degree and another projection image is taken from this new position. This procedure is continued until the sample has rotated 180 or 360 degrees resulting in a sequence of projection images. The images are processed using special computer software (typically based on a reconstruction algorithm) in order to depict the 3D internal structure of the sample non-destructively.

SKYSCAN I275 3D X-Ray microscope by Bruker SA



Characterization of the internal



Porosity measurements



3D illustration

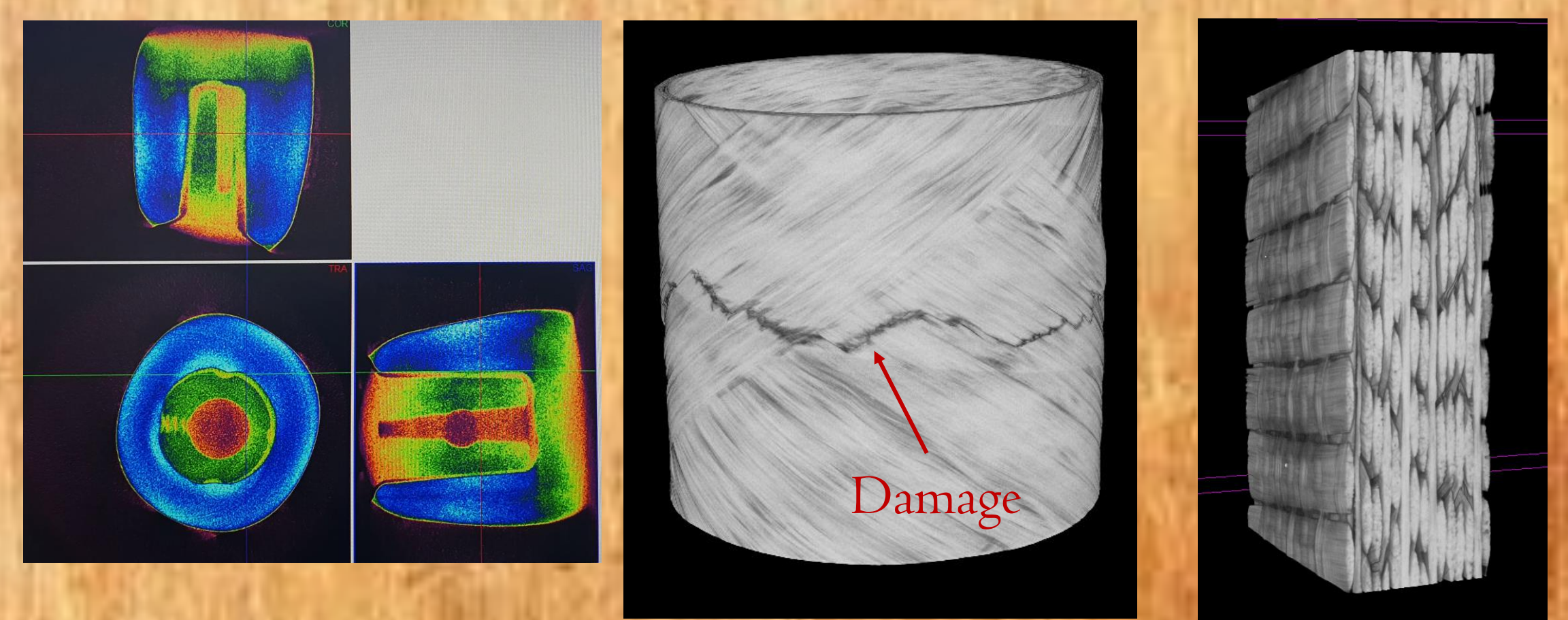
Wall-painting from the 19th century



Other materials

Dental

Composites



REFERENCES

- (1) Baumann R, Porter D, Brent Seales W, The use of micro-CT in the study of archaeological artifacts, 9th International Conference on NDT of Art, Jerusalem Israel, 25-30 May 2008.
- (2) Sodini N, Dreossi D, Chen R, Fioravanti M, Giordano A, Herrestal P, et al. Non-invasive microstructural analysis of bowed stringed instruments with synchrotron radiation X-ray microtomography. J Cult Herit. 2012;13(3 SUPPL.):S44-9.
- (3) X-ray micro computed tomography in cultural heritage. Analytical Methods. 2020;12(36):4496-500.
- (4) <https://www.microphotonics.com/how-does-a-microct-scanner-work/>



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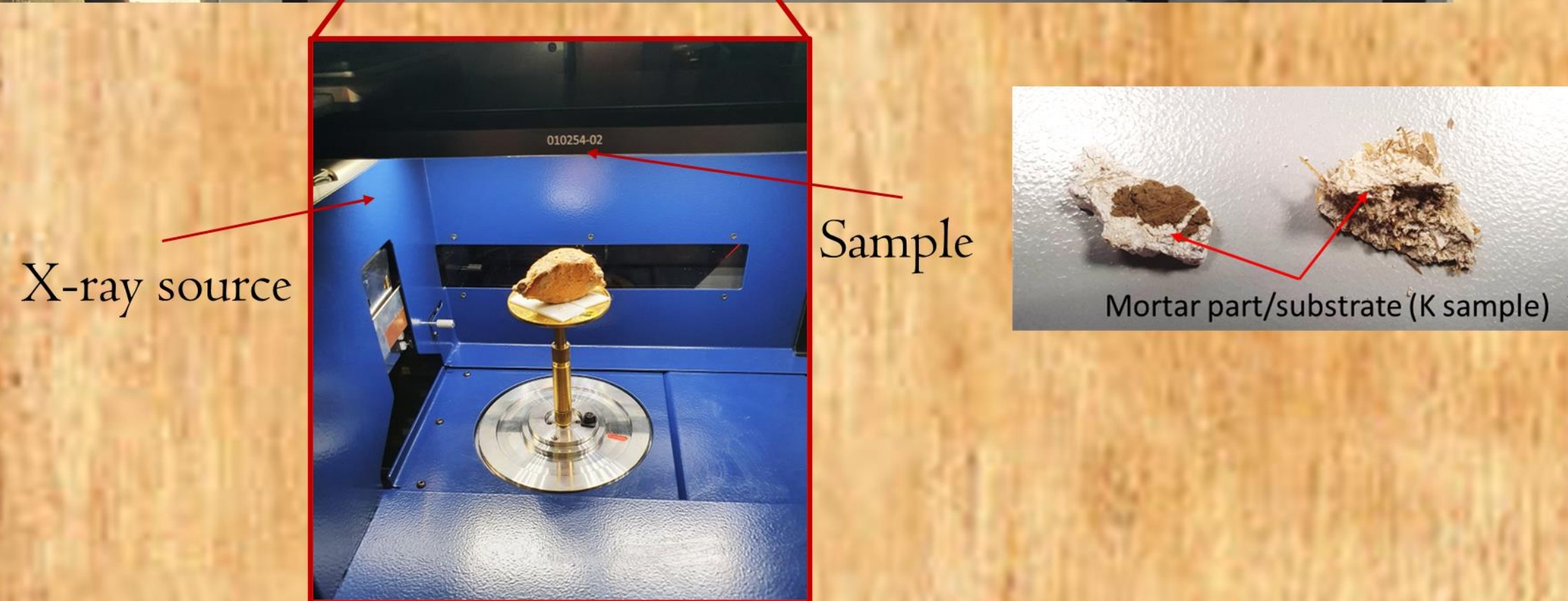
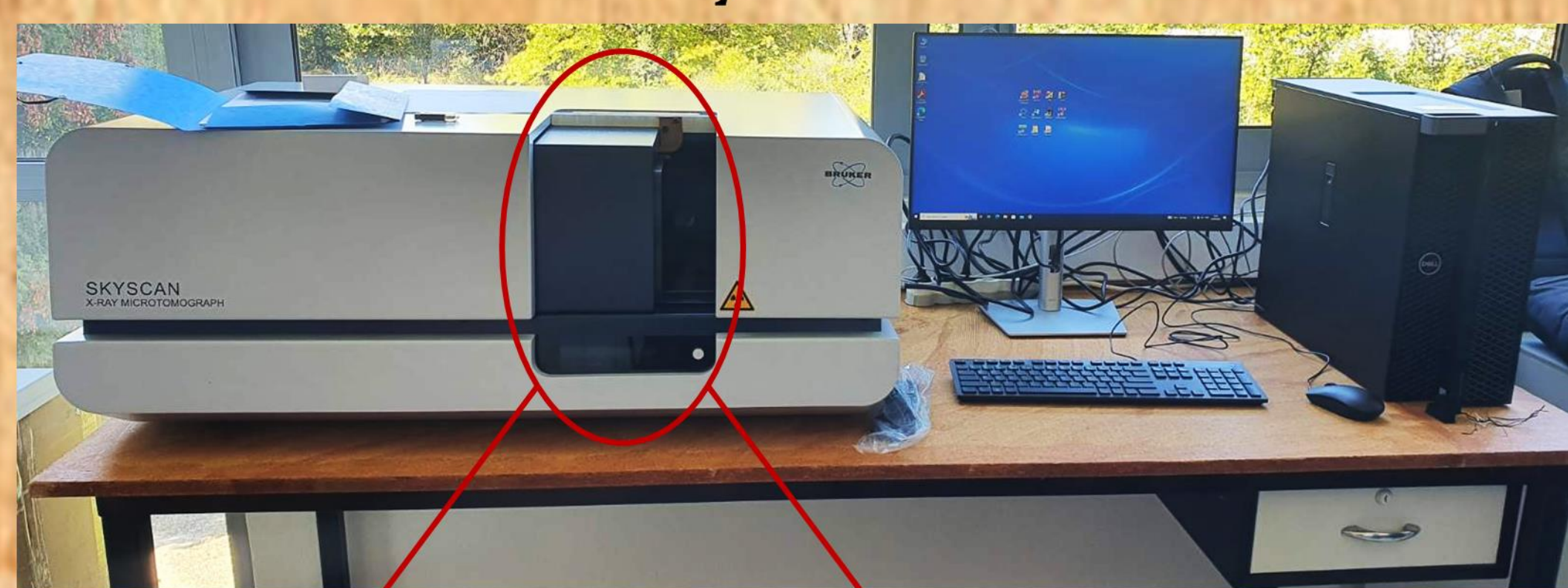
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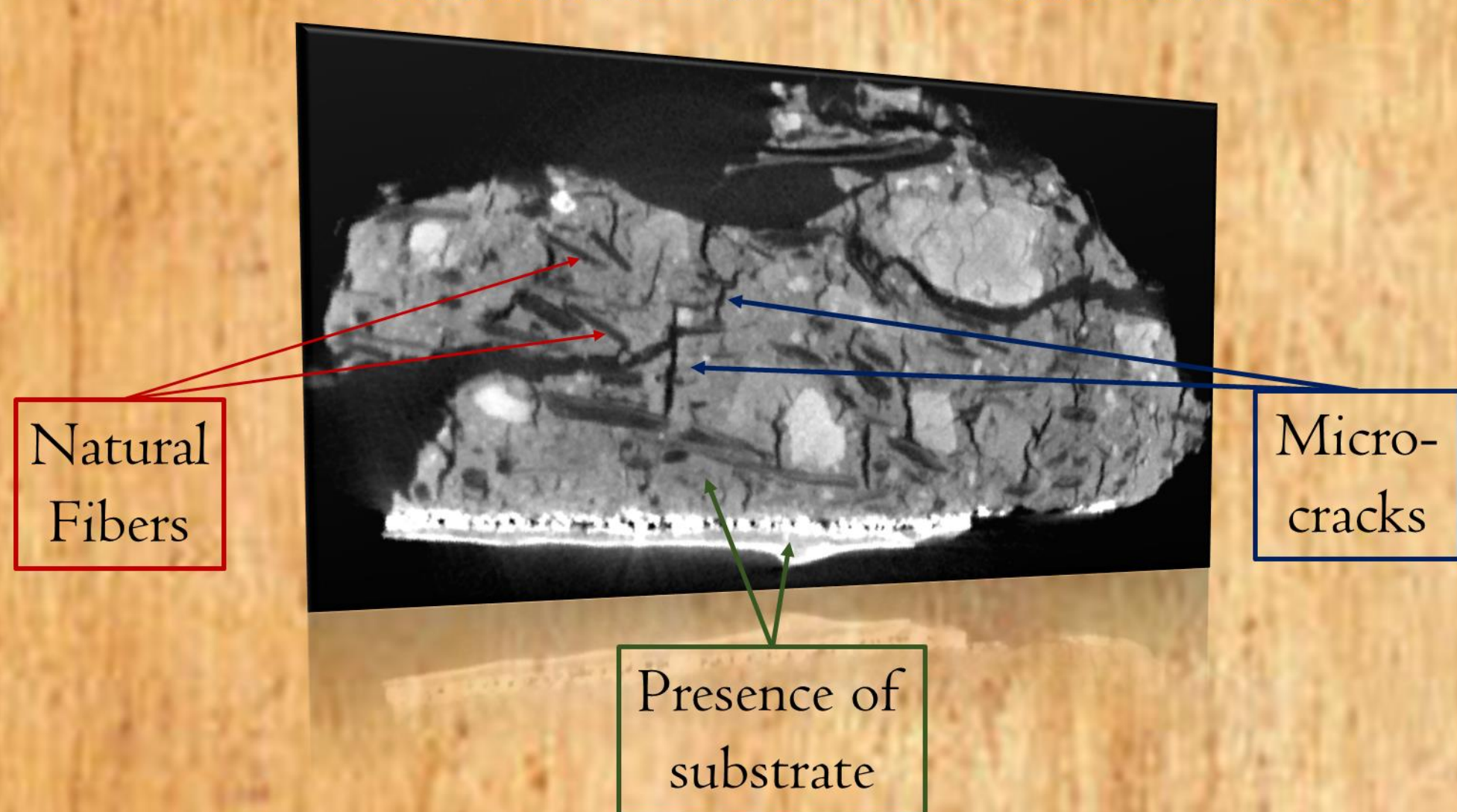
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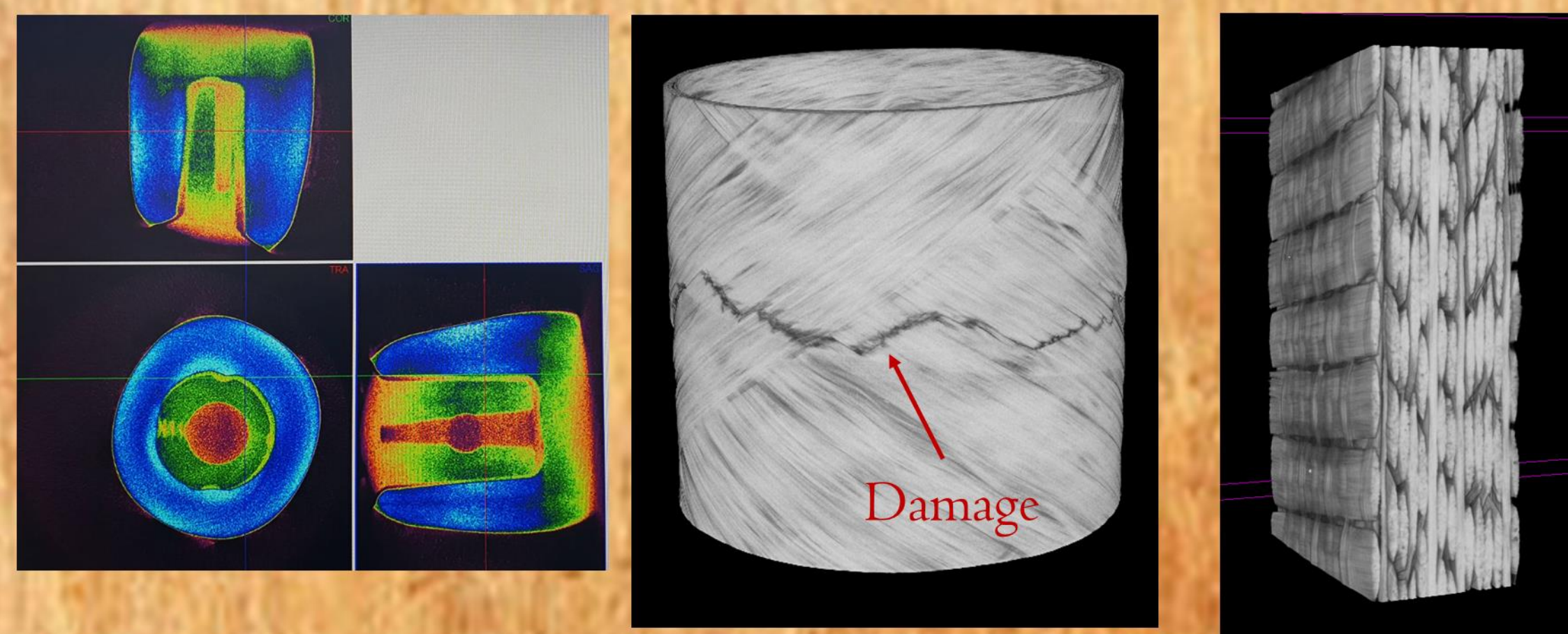
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