inCiTe

micro-CT scanner

AUNION TECH
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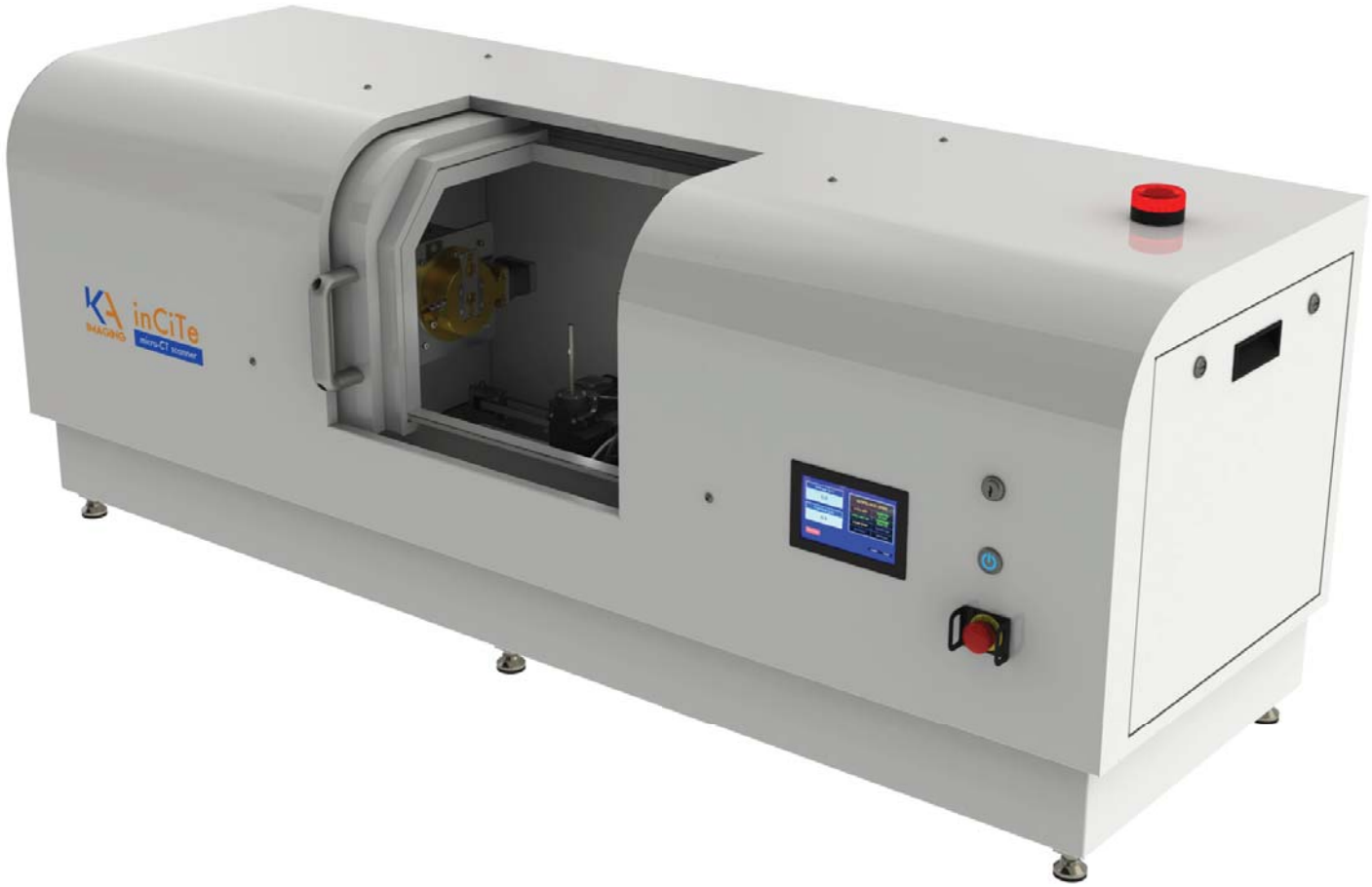


EFFICIENT, HIGH-RESOLUTION X-RAY IMAGING IN A COMPACT BENCHTOP SYSTEM

KA IMAGING'S
inCiTe™ MICRO-CT

The inCiTe™ micro-CT scanner is the first commercial X-ray CT scanner that utilizes BrillianSe™, a patented high spatial resolution amorphous selenium (a-Se) detector technology exclusively developed by KA Imaging Inc. The high spatial resolution and detection efficiency of BrillianSe™ X-ray camera enable rapid phase contrast imaging and conventional micro-CT in a portable benchtop system.

- Faster scan time
- Large sample size and FOV
- Grating-less phase contrast for better efficiency

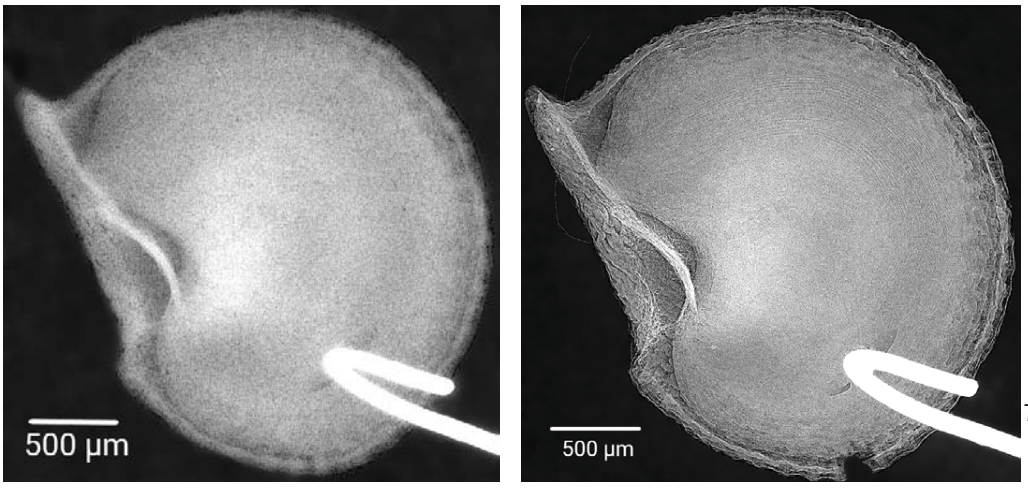
Applications That Can Benefit From inCiTe™:

- Non-destructive testing (NDT)
- Additive manufacturing
- Electronics
- Agriculture
- Geology
- Preclinical imaging
- Specimen radiography

KA Imaging's BrillianSe™ detector.

PHASE CONTRAST TECHNOLOGY FOR **SUPERIOR CONTRAST**

Phase-contrast imaging is complementary to absorption-contrast (conventional) X-ray imaging. Materials with weak X-ray absorption naturally result in low image contrast using conventional X-ray imaging techniques. In such cases, much higher sensitivity is present in X-ray phase changes. inCiTe™ micro-CT achieves phase-contrast directly by free-space propagation of the X-ray beam, transforming X-ray phase changes due to the object into X-ray intensity variation at the detector. Propagation phase-contrast X-ray imaging enables orders of magnitude improvement in detectability of features with weak X-ray absorption.



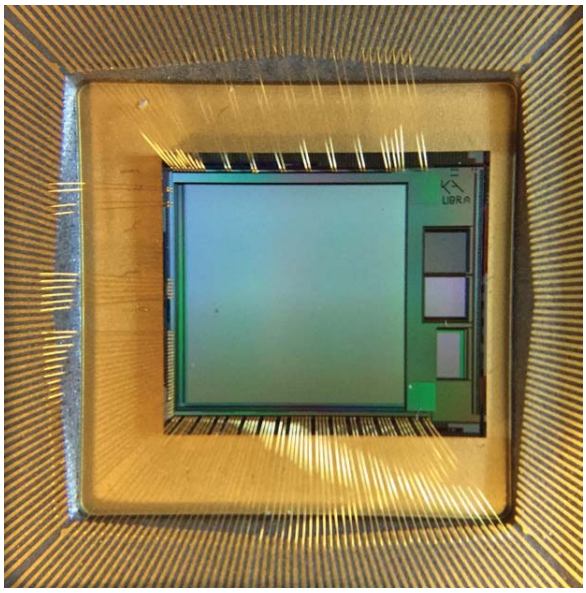
WITHOUT PHASE CONTRAST

WITH PHASE CONTRAST

The phase contrast allows for better visualization of the bell pepper seed.

A DETECTOR WITH **NOVEL TECHNOLOGY**

Created at the University of Waterloo, the patented detector technology demonstrates a unique combination of high detection for hard x-rays and micron-scale spatial resolution.

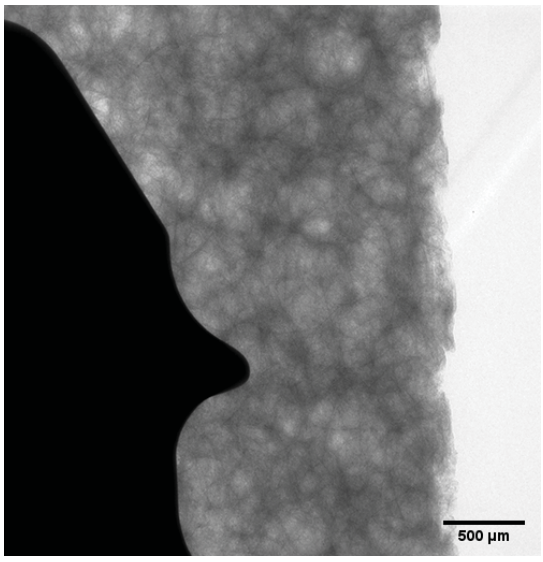


BrillianSe™ sensor at the core of the X-ray detector.

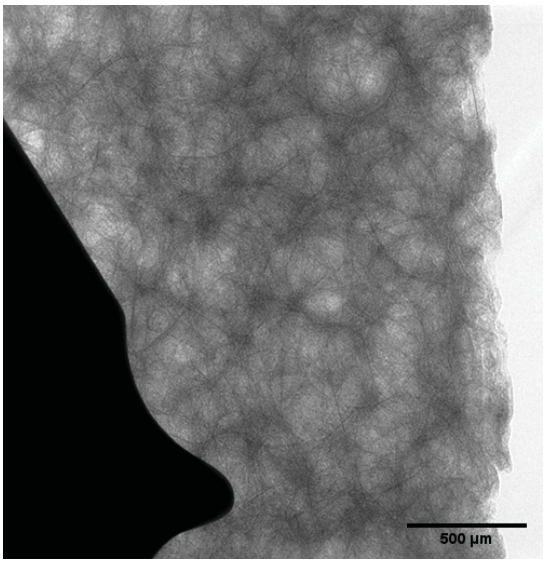
LOW-DENSITY MATERIALS WITH **BETTER VISUALIZATION**

Titanium Implant Sample

The images show an orthopaedic titanium implant and can be used for different applications, i.e. to examine the bone-implant interface. Note that the phase contrast improves the visualization of the bone structures.



WITHOUT PHASE CONTRAST

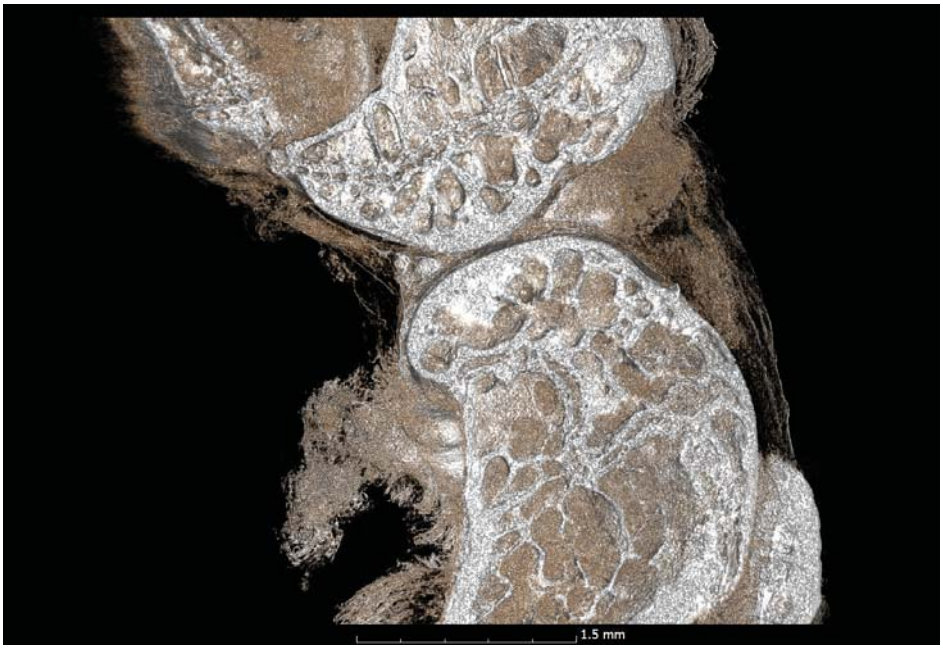


WITH PHASE CONTRAST

LOW-DENSITY MATERIALS WITH **BETTER VISUALIZATION** CONTINUED

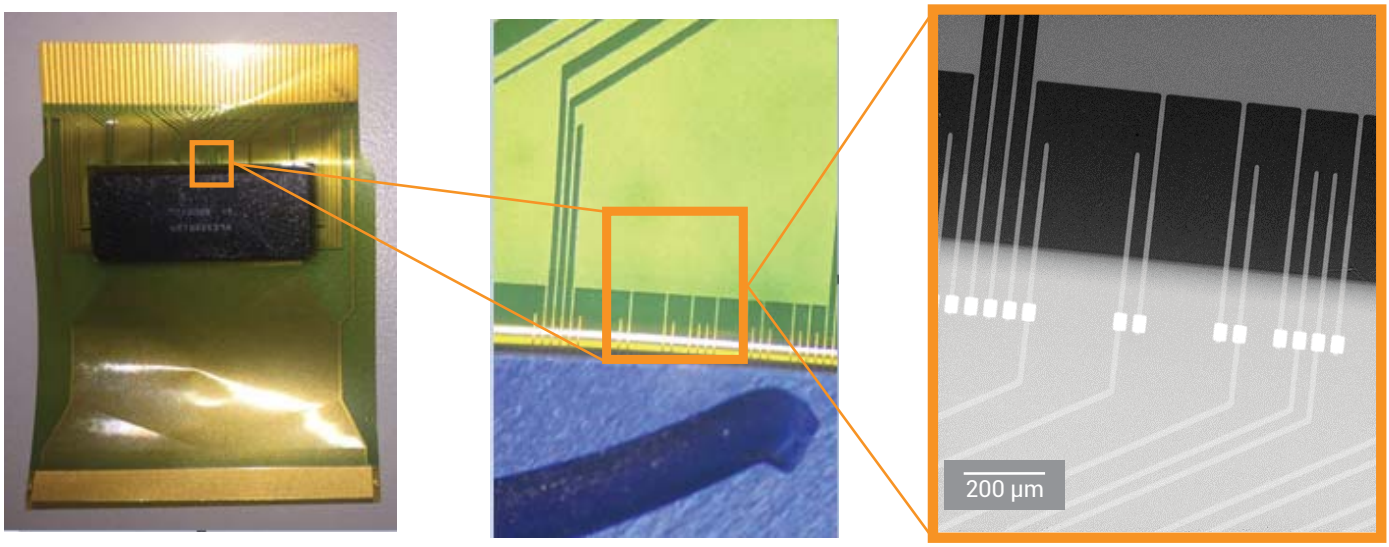
Biological Sample

inCiTe™ micro-CT enables high contrast for tissues.



Mouse stifle joint.

Electronic Sample



Fine pitch trace on flex (1 mm trace, 8 µm thick).

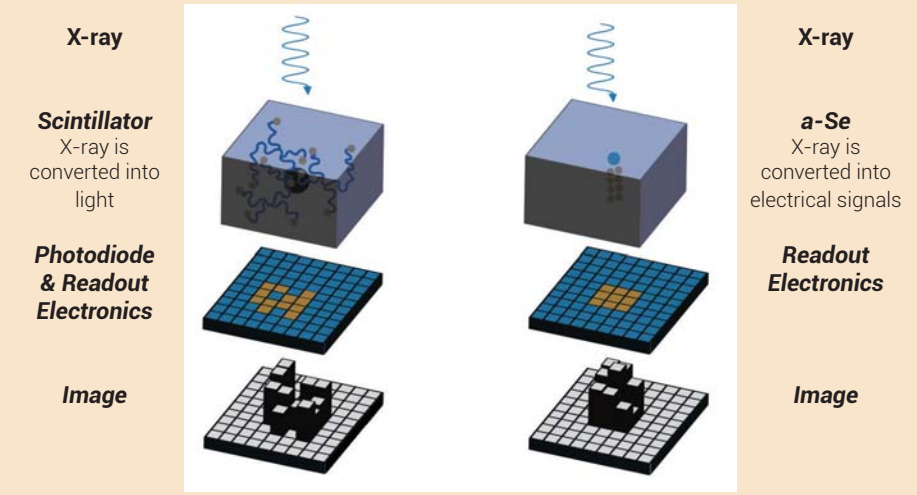
LOW-DENSITY MATERIALS WITH **BETTER VISUALIZATION** CONTINUED

Reconstruction of LED

inCiTe™ micro-CT can be used for inspection and failure analysis. KA Imaging's micro-CT enables high contrast for cracks, imperfections, boundaries as well as failure identification even without reconstruction and higher acquisition speed due to direct conversion.

1.5 mm LED reconstructed using KA Imaging's inCiTe™ micro-CT.

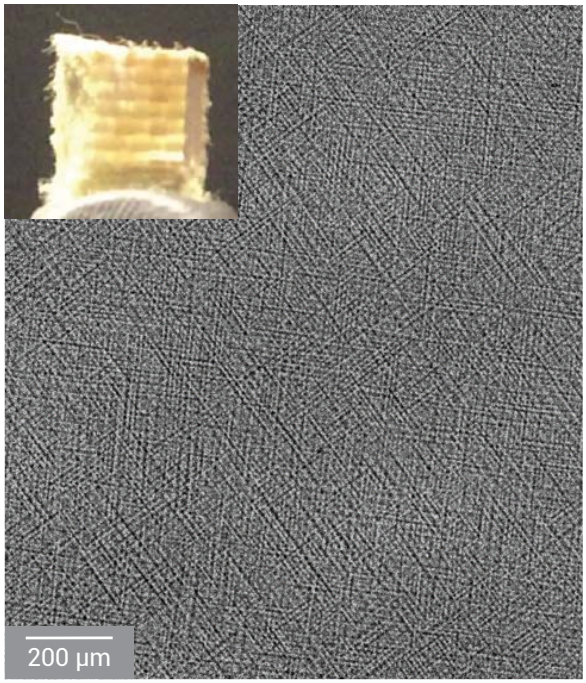
X-RAY DETECTION TECHNIQUE: DIRECT VS INDIRECT

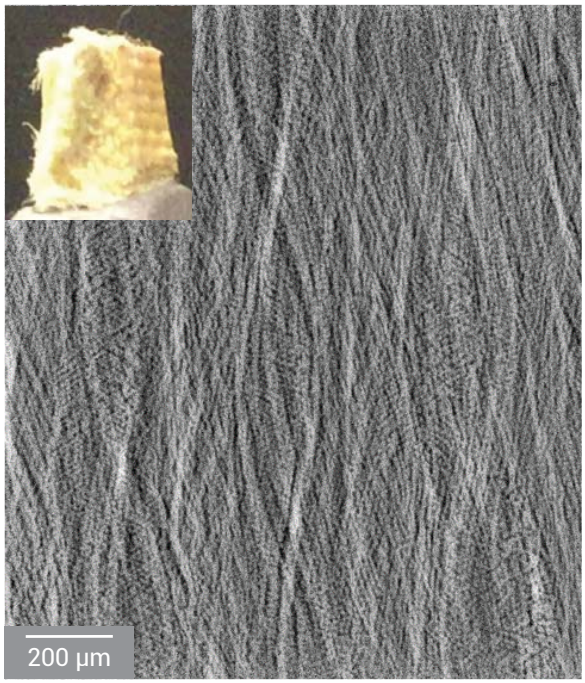


Indirect (L.) and direct (R.) X-ray detection. Note that indirect conversion requires a scintillator to convert X-ray.

Kevlar Composite Sample

We used the detector to rapidly acquire phase contrast images of a Kevlar composite in seconds. We can see individual fibers on the left, and the layering on the right.





The sample is at 4X magnification.

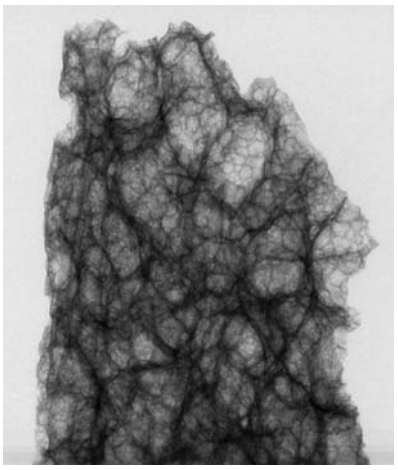
LOW-DENSITY MATERIALS WITH **BETTER VISUALIZATION** CONTINUED

Kevlar Composite 3D Rendering

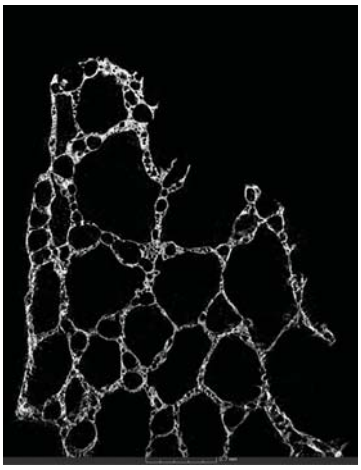
Approximate Sample Size: 1.5 mm x 2.5 mm x 7.5 mm.

Lightweight Aggregate Concrete Sample

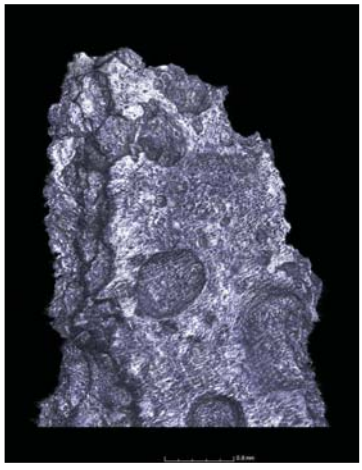
PHOTO



PROJECTION



EXAMPLE SLICE



3D RENDERING

Approximate Sample Size: 3.5 mm x 3.5 mm x 13mm.

TECHNICAL
SPECIFICATIONS

Detector	KA Imaging inCiTe™ micro-CT
Detector format	16 MP (4k x 4k pixels)
Pixel Pitch	8 µm
MTF at 60 kVp	80% at 10 cycles/mm 50% at 45 cycles/mm 30% at 64 cycles/mm
DQE at 60 kVp (2mm Al filtration)	36% at 10 cycles/mm 22% at 45 cycles/mm 10% at 64 cycles/mm

Source	KA Imaging inCiTe™ micro-CT
5 µm focal spot size at 4W	40-100 kV, 20W
2 µm focal spot size at 4W	40-110 kV, 16W

Reconstruction	KA Imaging inCiTe™ micro-CT
Object Size (4K x 4K pixels)	32 mm Ø, height 32 mm (4K x 4K)

General	KA Imaging inCiTe™ micro-CT
Dimensions (W x H x D)	1500 mm x 580 mm x 500 mm
Weight	610 lb
Radiation Safety	<1 µSv/h at 100 mm distance from any accessible surface
Installation Requirements	100-240V AC, 10-30°C, <85% humidity

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