3D Snapshot Tomography for Quality Assurance

OTT ID # 1494

APPLICATIONS

Pharmaceuticals, Agriculture, Food Processing, Chemical and Petrochemicals.

TARGET PROBLEMS

- Hyperspectral chemical imaging (HCI) is incapable of measuring depth information or examine a specimen with a complicated internal structure.
- HCI records only 2D absorption maps, cannot detect the impurities buried inside a 3D volume.

KEY FEATURES

- **Real-Time Imaging -** Real time snapshot of individual cells can be obtained.
- **Minimally Invasive & Sensitive -** The restorative algorithm aids with identification of imaging artifacts.
- **Quality Assurance -** Able to detect impurities, leachates, contaminants, and foreign materials.
- **Spectral Range -** 3D Images and spectra can be easily captured under UV, visible and infrared light.

TECHNOLOGY

Inventors at University of Wisconsin, Milwaukee (UWM) have developed snapshot optical tomography technique which can record the 3D tomogram of a micrometer to millimeter sized specimen in a single snapshot. In particular, snapshot holographic optical tomography (SHOT) can instantaneously record the 3D map of complex-valued refractive index (i.e., absorption and refractive index). Furthermore, snapshot projection optical tomography (SPOT) can also instantaneously record the 3D luminescence (e.g., fluorescence, bioluminescence, photoluminescence) when needed.

Chemical identification, including the 3D distribution of active pharmaceutical ingredients, excipient or lyophilizate distributions of tablets can be achieved by combining the tomograms with analysis techniques like FT-IR, Raman, and UV-visible spectroscopy. This technology can provide an opportunity for safe and accurate testing of 100% of tablet or capsule beads.

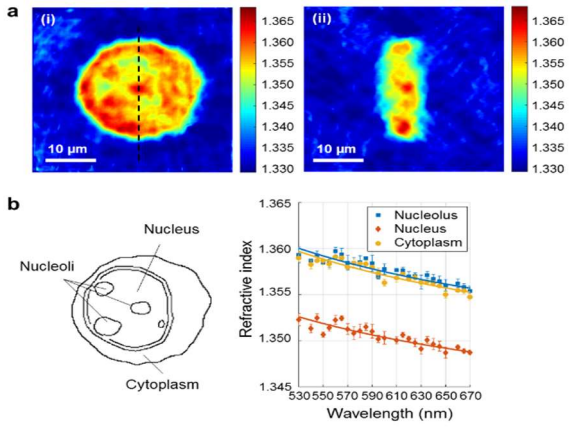

Figure 1. 4-D hyperspectral imaging of a living HeLa cell using snapshot tomography and a wavelength-scan source: (a) horizontal (i) and vertical (ii) cross-section of the 3-D refractive index map; (b) optical dispersion spectrum of cellular organelles.

INTELLECTUAL PROPERTY

U.S Utility Patent 10,845,759 B2

This technology is available for developmental research support and/or licensing under either exclusive or non-exclusive terms.

ABOUT THE INVENTOR

Yongjin Sung, Ph.D., Associate Professor in Biomedical Engineering, Mechanical Engineering

For more information contact: Smruti Patil, Ph.D., IPMM | *Licensing Associate* | Tel: 414-906-4657