FT-Infrared (FT-IR) Spectroscopic Tomography: Development of a 3D mid-IR Spectral Imaging Technique

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The IRENI beamline at the SRC in Stoughton, Wisconsin has developed a way to rapidly acquire 2D images with full mid-IR spectral information at high spatial resolution by filling a focal plane array detector. Recently, we have extended this to a full spectral-tomography technique which provides not only the rich spectral information, but also this in a full three dimensional field of view. The presented technique greatly enhances the capabilities of FT-IR microscopy, providing a wealth of information for advanced spectral analyses and could spark a new generation of spectral-tomography synchrotron technologies.

The presentation is focused on the introduction of the technical and experimental setup. Furthermore, the results of a variety of samples from biology, plant sciences, natural minerals, polymers and other scientific disciplines will be presented.

Significance of this contribution: Three-dimensional infrared spectroscopic imaging is a quantitative analytical tool for a wide variety of scientific, material and medical applications.