McCRONE ASSOCIATES, INC.

INFRARED AND RAMAN MICRO-SPECTROSCOPY

Analytical Datasheet

Used For	• Identification of organic and many inorganic materials. Coupling the spectrometer to a light microscope provides high spatial resolution and visual selection of analysis areas. • Typical applications include contaminants, polymers, coatings and inks, fibers, forensic evidence, and art and archaeology. Raman is relatively insensitive to glass and water and can be used on aqueous samples or samples in glass containers. Chemical imaging via Raman mapping is also available.
Limitations	• Infrared, and sometimes Raman, require sample preparation. Neither technique is capable of trace analysis. Raman spectroscopy is vulnerable to interference from fluorescence and heating effects from the laser.
Analysis Volume	• **Infrared:** Lowest lateral resolution possible is about 20 µm. • **Raman:** Lateral resolution about 1µm with visible laser; depth resolution about 2 µm in confocal mode.
Sample Requirements	• **Infrared:** Samples must be made thin (5-30 µm) and be prepared on an infrared transparent substrate (e.g., KBr crystal) or an infrared reflective substrate. • **Raman:** Samples should not be heat-labile at power densities of several mW. Samples should be flat over an area of several mm across to accommodate a short working distance with the microscope objective.
Information Provided	• Primarily for the identification of materials; quantitative data can be obtained if appropriate calibration samples are prepared. Identification is made by comparison to reference libraries of spectra of known materials and by interpretation of spectra based on group frequencies. Raman spectroscopy can also be used for the study of crystallinity/orientation in polymer films, polymorphs, carbon-based materials and crystal structure in minerals.
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ISO/IEC 17025:2005 A2LA Accredited | cGMP Compliant | FDA Registered | DEA Registered

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Our capabilities include:

ISO Class 5 Cleanroom
- Particle isolation and sample preparation from a wide variety of matrices
- Risk of outside contamination is minimized

Light Microscopy
- Particle identification by optical, morphological, physical and thermal properties
- Imaging and photomicrography
- Particle size measurements
- Analysis and identification of fibers, dust, food, minerals, pigments, glasses and combustion products and more

Scanning Electron Microscope and X-ray Analysis (SEM, EPMA)
- Secondary electron imaging for high resolution imaging
- Backscattered electron imaging for compositional variation and topographic imaging
- EDS and WDS attachments for elemental analysis

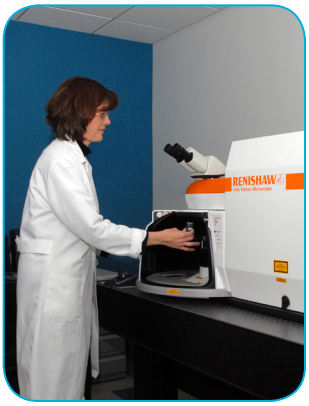
Transmission Electron Microscopy (TEM)
- High resolution imaging and analysis of materials
- Morphological, elemental, crystallographic and electronic state
- Analysis of pure and mixed phases, multiple components, nanocomposites
- Analysis of samples including polymers, minerals, pharmaceuticals, metals and ceramics

Infrared and Raman Micro-Spectroscopy
- Identification of organic and inorganic materials
- Phase identification, polymorphism, crystallinity
- Analysis of samples including contaminants, polymers, coatings and inks, fibers, forensic evidence and art and archaeology

X-ray Diffraction (XRD)
- Phase determination for inorganic and many organic materials
- Revealing mixed compounds in a single sample
- Analysis including compound identification, polymorphism, corrosion identification, asbestos, pigment identification and relative degree of crystallinity

X-ray Photoelectron Spectroscopy (XPS or ESCA)
- Surface analysis of solids for elemental and chemical information
- Effective for very thin (<5nm) surface films; thicker films can be analyzed with depth profiling
- Analysis of samples including thin surface films and contamination on metals, ceramics, glasses, plastics, paper and other materials

Direct Analysis in Real Time – Mass Spectrometry (DART–MS)
- Time-of-flight molecular ion mass spectrometry
- Analysis of samples at atmospheric conditions without sample preparation
- Successfully analyzes materials in liquids, extracts, and solids; and on surfaces
- Identification of organic compounds based on their mass spectra



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