CRAIC SOLUTIONS FOR TRACE EVIDENCE

ARNAUD LANGLOIS - OPTOPRIM

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

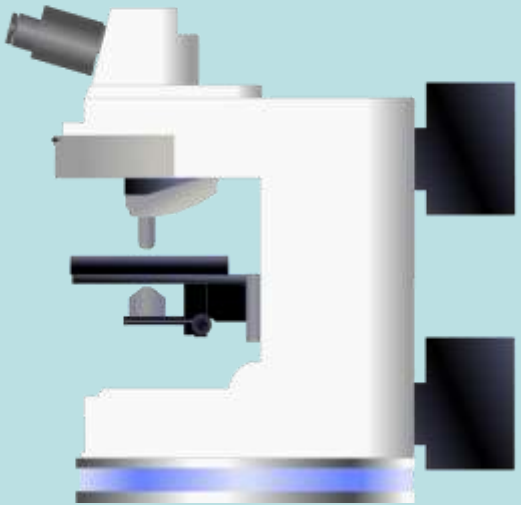
Who is CRAIC Technologies?

CRAIC Technologies is a scientific instrument company based in the United States with a worldwide market, and has been in the business of manufacturing UV-VIS-NIR range micro-scale analysis solutions since 2002.

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

What is a **M**icro**s**pectro**p**hotometer?

Microscope



+

Spectrometer

+

Integration Optics

= **M**icro**S**pectro**P**hotometer

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

Modular Designs for Customized Tools

Microspectrophotometer attaches to microscope via phototube port

Additional photoports possible

Raman modules fits into the infinity space of microscope

Base microscope determines possible spectral techniques

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

CRAIC Solutions

Modular
VIS-NIR MSP's

UV-VIS-NIR
MSP's

Refractive Index
Instruments

VIS-NIR
Raman Microspectrometers

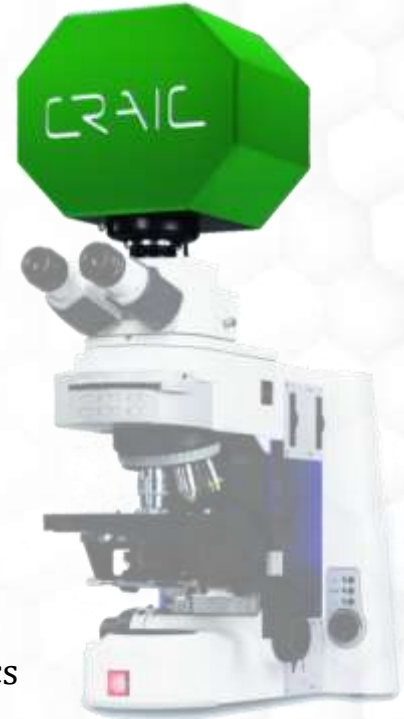
948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

508 PV™ Microspectrophotometer

- Automated and manual operation with 7-position aperture system (100x100 to 1x1 µm)
- Single selectable spectrometer spectral range*

  200 to 950 nm 350 to 950 nm

- Can add to regular microscope or upgrade old microspectrometer systems in your laboratory
- Type of measurements determined by microscope configuration



*Dependent on microscope optics

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

20/30 PV™ Microspectrophotometer

- Automated and manual operation with 7-position aperture system, fully integrated on UVM-1
- Dual selectable spectral range*

UV-VIS-NIR	NIR
– 200 to 950 nm	– 900 to 1700 nm
– 350 to 950 nm	– 900 to 2100 nm

- UV-VIS-NIR Transmittance, Reflectance, Fluorescence, Photoluminescence with Polarization upgrades available

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

Apollo Raman Microspectroscopy

- System for microscale analysis of vibrational spectra via Raman spectroscopy
  - Multiple available excitations of: 532, 632, 785, 830 nm
  - Detection from ~120-3,000 cm^{-1}, dependent on specific excitation
- Dedicated spectrometers that do not require daily calibration

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

Refractive Index Quantification (rIQ

- Complete system to measure refractive index of glass using thermo-optical method with automatic measurements
- Exceeds ASTM standards
  - Includes 3 oils and 12 glass standards for range of 1.48-1.56 RI
  - $<1x10^{-5}$ measurement std dev

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

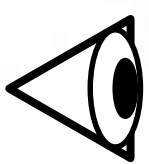
Why use Microspectroscopy?

Size Matters!

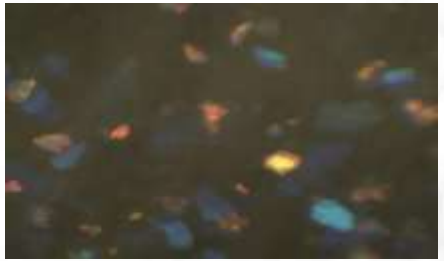
- Trace evidence often mm in scale and smaller
- Macro view ≠ Micro view!

  Macroscale ≥ 1 mm

  1 mm > Microscale > 1 µm
- Electronic detectors add quantitative capabilities



Paint Chip



$10 USD

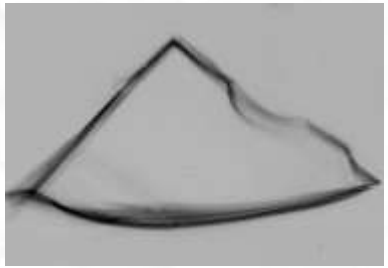
948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

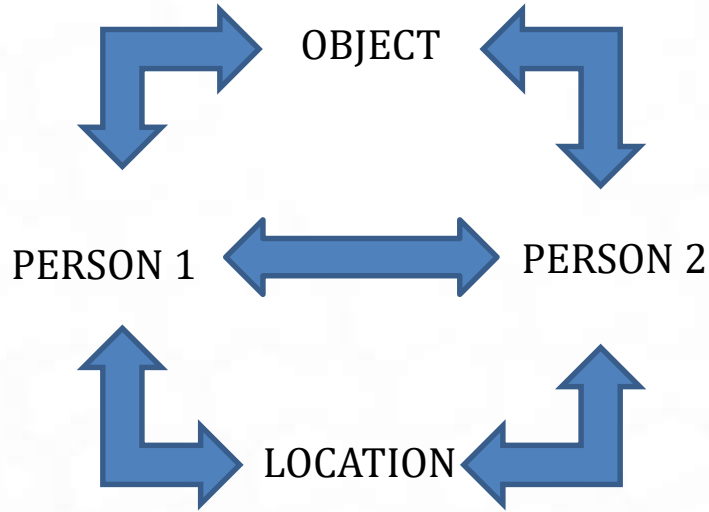
Trace Evidence

Uses a comparison of Known (K) vs. Questioned (Q) samples in order to create associations and understand the case.

Fibers

Glass





Paints

Inks

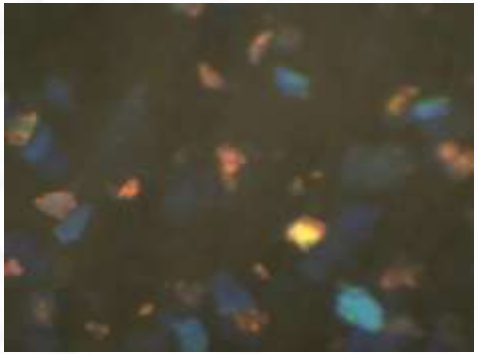
948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

Textile Fiber Analysis

- Textile fibers and hairs range in size from 10 µm to 200 µm
- Use MSP for characterization of the color/dyes of the fiber and chemical characteristics through
  - Transmission microspectra
  - Fluorescence microspectra
- Use Raman for identification/ confirmation of textile fiber material

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

Paint Chip Analysis

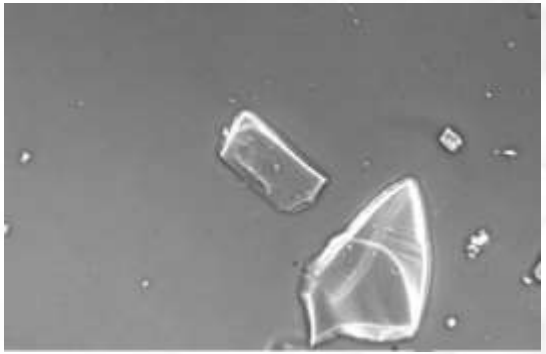


- Whole samples usually mm in scale, but individual layers can be < 50 µm
- Use MSP for characterization of the color/dyes of the fiber and chemical characteristics through
  - Transmission microspectra for microtomed samples
  - Reflection microspectra for not
  - Fluorescence microspectra for both

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

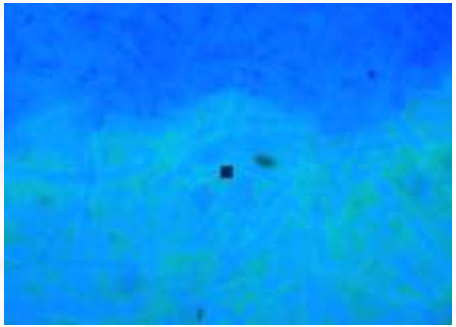
Glass Fragment Analysis

- Samples typically mm in scale, but broken to microscale pieces for analysis
- Refractive index of samples characterized according to
  - thermo-optical method
- MSP can also be used to characterize the dyes/colorants in the glass with
  - Transmission microspectra
  - Reflection microspectra



948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

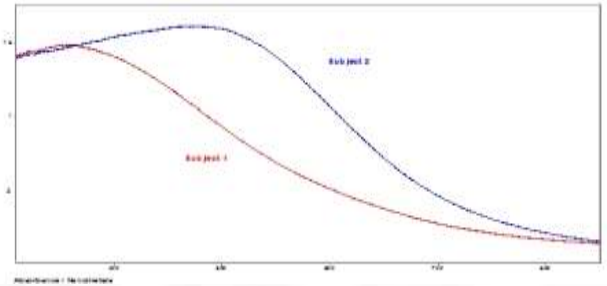
Ink & Document Analysis



- Inks are found in all documents. While document samples can be large, inked areas are often <100 µm
- Use MSP for characterization of the inks and paper through
  - Reflection microspectra
  - Fluorescence microspectra
- Raman is helpful for chemical discrimination for inks with similar UV-VIS spectra

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

Dyed Hair



- Applications in both forensics & cosmetics industries
  - Dyed hair can be found at crime scenes
  - Hair dyes are very popular and under constant development
- Undyed hair varies in color down length of shaft
- Dyes have unique UV and visible absorbance microspectra
- Dyes & additives have unique UV-VIS and fluorescence microspectra

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180
Copyright © 2019 CRAIC Technologies

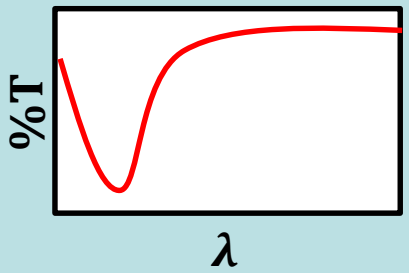
Benefits of CRAIC Products

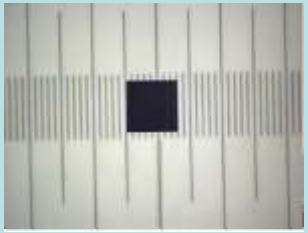
CRAIC has the largest available spectral range systems and microscopes (UV-VIS-NIR)

Can upgrade your existing microscope with modular MSP head units

Educated and experienced team with robust and reliable instrumentation and world class support for any of your needs

CRAIC's unique aperture system allows for the **simultaneous** measurement of images and spectra!





Only producer of NIST traceable microspectroscopy standards for MSP

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180

THANK YOU

948 N. Amelia Ave, San Dimas, CA 91773, USA ■ www.microspectra.com ■ sales@microspectra.com ■ T: +1.310.573.8180