

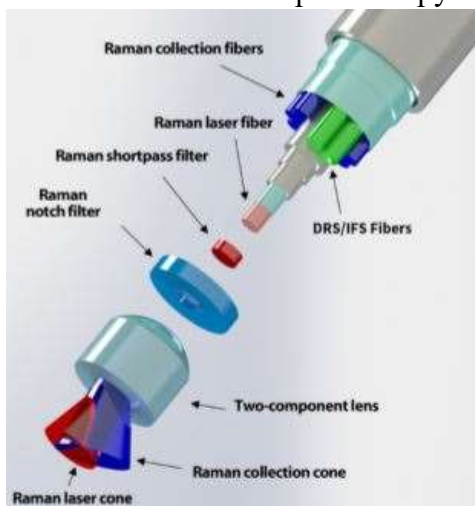
Multi-spectroscopy Probe

Offers Raman Spectroscopy, Diffuse Reflectance Spectroscopy (DRS) and Intrinsic Fluorescence Spectroscopy (IFS) in One Probe



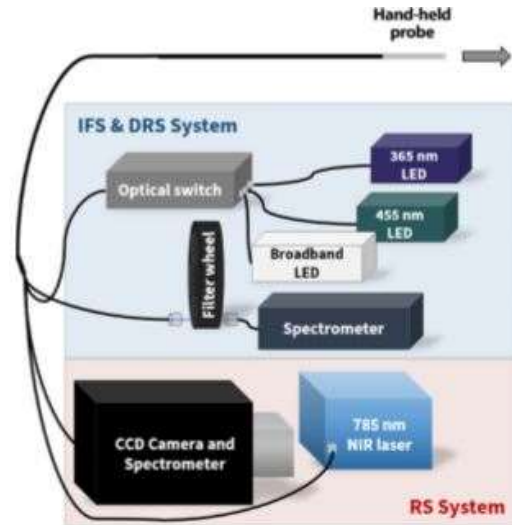
Multi-spectroscopy Probe Description

The EmVision Multi-spectroscopy Probe offers Raman spectroscopy, diffuse reflectance spectroscopy (DRS) and intrinsic fluorescence spectroscopy (IFS) in a single probe. Raman is in the near IR region, and DRS and IRS are in the UV / visible light wavelength region. The finished probe tip diameter is 2.1 mm and the probe tip length is 10 cm. The approximate diameter of the surface of the region sample is 0.5 mm. The overall length of the probe is 1.5 meters. The laser connection can be FC-PC or SMA, and the spectrometer connection can be EmVision's patented multi-fiber connector, SMA connector, or ferrule connector.



Multi-spectroscopy Probe Design

The probe has a single 300 μm excitation fiber at its center and is surrounded by seven 300 μm collection fibers; five of the fibers being used for Raman and two of the fibers being used for DRS and IFS. All the fibers are low hydroxyl 0.22 NA fibers. The laser delivery fiber has a small band-pass filter positioned in front of it, and the collection fibers have a long-pass notched donut filter positioned at their ends. Beyond the filters is a two-component lens. The inner lens can be either sapphire or fused silica. The tips outer contact surface can be either fused silica or magnesium fluoride and all housed in a stainless steel needle tube. The optical elements in this design are permanently fixed in alignment, with no possibility of movement due to normal use or vibrations. The probe can be used for immersion or direct contact measurements. The probe design is described in US patent number 8,175,423 and US patent number 8,702,321.



Multi-spectroscopy Probe Accessories

To address optimal integration and repeatable measurements, the probe can incorporate EmVision's patented keyed multi-fiber connector system. When coupled with EmVision's *HT*



or CS Raman Spectrometer, optimal $f/2.2$ integration is achieved, high signal-to-noise ratios, short acquisition times and repeatable optical coupling is ensured. The keyed multi-fiber connector can only plug-in one-way and “snaps-in” to ensure consistent fiber positioning between the probe and spectrometer. Finally, the Multi-spectroscopy Probe can be outfitted with a removable wand having a 0.25” OD allowing for

easier handling and manipulation of the probe.

Multi-spectroscopy Probe Specifications:

<p>Multi-spectroscopy Probe Dimensions</p>	<p>Rigid 304 stainless steel tip: Outside diameter: 2.1 mm (0.083 in.) Note: < 1 mm OD probes are possible Length: 10 cm (4 in.) standard Overall length: 1.5 m (5 ft.) standard Removable 6.35 mm (0.25 in.) OD wand available</p>
<p>Probe Tip Care</p>	<p>Fully immersible in most powders and aqueous solutions</p> <p>Chemicals and solvents to avoid due to epoxy used in assembly of probe tip: methylene chloride, acids, bases, acetone, methanol, methyl ethyl ketone</p> <p>Window material: fused silica or MgF2</p> <p>Probe tip cleaning: Dampen delicate task wiper (Kimwipes) with water or isopropanol and wipe probe tip using finger to apply pressure to probe tip. Inspect with loop or microscope to ensure tip is clean.</p> <p>For use in temperatures up to 15° - 70° C (59° - 158° F)</p>
<p>Spectral Range</p>	<p>350-3900 cm⁻¹ (Stokes). Depending upon spectrograph (detector) limits</p>
<p>Excitation Wavelength / Power</p>	<p>785 nm, 830 nm; other wavelengths available</p> <p>Maximum power input to probe: 100 mW</p>
<p>Working Distance</p>	<p>Direct sample contact or close proximity</p>
<p>Multi-spectroscopy Fiber Configuration</p>	<p>Collection: (7) 300 micron core fibers - 5 fibers for Raman and 2 fibers for DRS and IFS Excitation: (1) 300 micron core fiber</p>

	Illumination spot size: 500 microns
Filter Specifications	Excitation path: band pass filter at probe tip Collection path: long pass filter at probe tip
Probe Connectors	Collection path: Keyed snap-in linear connector (patented), fibers in line (other probe interfaces such as SMA and ferrules are available) Excitation path: FC connector, SMA 905
Notes	<ol style="list-style-type: none"> 1. To ensure optimum performance, eliminate all light sources in testing area. 2. Inquire about custom designs.

Specifications are subject to change without notice