



APPLICATION

RAMAN SPECTROSCOPY

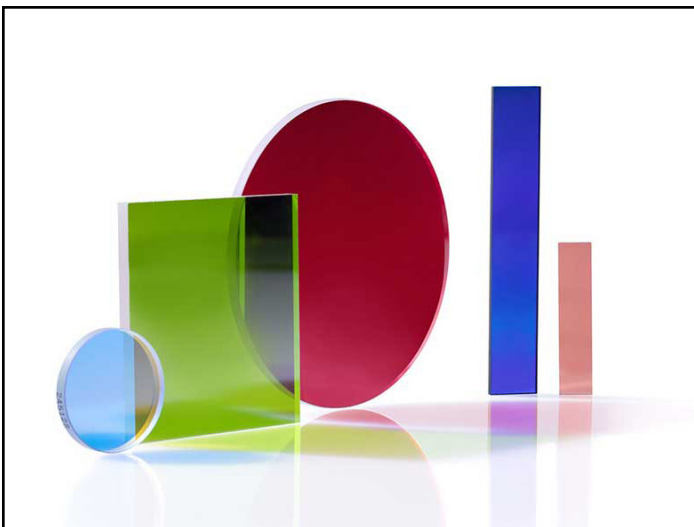
Raman Spectroscopy is a powerful analytical technique used to study vibrational, rotational, and other low-frequency modes in a system. It relies on inelastic scattering of photons, known as Raman scattering, to provide detailed information about molecular composition, structure, and interactions. The performance of Raman systems is significantly enhanced by the use of high-quality optical components such as optical filters and coated fiber tips.

Omega Optical offers advanced solutions designed to meet the stringent requirements of Raman spectroscopy applications.

THE IMPORTANCE OF OPTICAL FILTERS IN RAMAN SPECTROSCOPY

Optical filters are critical in Raman spectroscopy for their role in managing and controlling the specific wavelengths of light used in the analysis. The key features of these filters include:

- **STEEP EDGE TRANSITIONS:** Our unique capability to pattern fiber bundles with bandpass, notch, and laser line filters enables for the miniaturization of Raman probes, enabling measurement of hard-to-access samples.
- **DEEP BLOCKING:** Our filters provide deep blocking of unwanted wavelengths, significantly reducing background noise and improving the signal-to-noise ratio. This deep blocking is essential for detecting weak Raman signals against a strong background of scattered light.



COATED FIBER TIPS FOR RAMAN SPECTROSCOPY

- **MINIATURIZATION:** Our unique capability to pattern fiber bundles with bandpass, notch, and laser line filters enables for the miniaturization of Raman probes, enabling measurement of hard-to-access samples.
- **HIGH TRANSMISSION EFFICIENCY:** Coated fiber tips ensure that the maximum amount of Raman scattered light is transmitted to the detector, improving the overall sensitivity of the system.
- **DURABILITY AND STABILITY:** Our fiber tip coatings are designed and manufactured to withstand harsh environmental conditions, ensuring long-term performance and reliability.

TYPES OF FILTERS USED IN RAMAN SPECTROSCOPY

LASER LINE FILTERS	Used to clean up the laser source, ensuring that only the desired wavelength reaches the sample. They are crucial for reducing the background noise and enhancing the sensitivity of the Raman system.
NOTCH FILTERS	Designed to block the Rayleigh scattered light while allowing the Raman scattered light to pass through. They are essential for isolating the Raman signal from the intense laser line.
LONGPASS EDGE FILTERS	Block the laser wavelength and transmit the Raman scattered light, ensuring that the lower energy (Stokes) Raman signals are effectively captured.
BANDPASS FILTERS	Used to select specific Raman bands of interest, these filters help in focusing on particular molecular vibrations and enhancing the specificity of the analysis.