Application Note

Pharmaceutical Manufacturing
Hyperspectral & Raman Imaging

Hyperspectral imaging expedites not only the drug discovery process, but also holds clear and distinct advantages for pharmaceutical makers as they move novel compounds and drugs from laboratory to manufacturing.

One clear advantage of Hyperspec® imaging is the ability to simultaneously scan multiple batches of tablets as they move across a process line. The technology is well-suited for conveyorized environments governed by the FDA's Process Analytical Technology (PAT) initiative.

Raman imaging, a related analytical spectral technique, has also proven to be an invaluable research tool for the drug discovery process. Different from hyperspectral imaging in that the sample is non-destructively excited with a laser, the results of Raman analysis yield spectral information highly specific and identifiable to known substances. Both of these imaging techniques demand exceptional spectral and spatial resolution.

Key advantages of hyperspectral imaging for pharmaceutical manufacturers include:

- Derive the spectral signature for every point within the field of view for material classification
- Color render the image within the field of view based on an established library of spectral signatures
- For high-throughput screening and high volume manufacturing, generate wavelength-specific criteria for high speed quality control over the production process and pharmaceutical manufacturing line.

Hyperspectral datacubes represent a data set that includes all of the spatial and spectral information within the field of view. This valuable information enables researchers to more thoroughly evaluate the distribution of polymorphs throughout the samples and greatly enhance process knowledge relating to the spectral composition of these tablet compounds.

Blending Quality Control

Drug Discovery

Manufacturing to Volume

Polymorph Analysis

Spray Dry Dispersion

Headwall Photonics offers the broadest range of spectral imaging instrumentation for demanding applications.

Hyperspectral Sensors	Spectral Range
Hyperspec® VIS	380 - 825 nm
Hyperspec® VNIR	400 - 1000 nm
Hyperspec® Extended VNIR	600 - 1600 nm
Hyperspec® NIR	900 - 1700 nm
Hyperspec® SWIR	1000 - 2500 nm
Micro-Hyperspec™ VNIR	400 - 1000 nm
Micro-Hyperspec™ NIR	900 - 1700 nm
High Efficiency Hyperspec® NIR	900 - 1700 nm
High Efficiency Hyperspec® SWIR	1000 - 2500 nm

Information on UV, MWIR, and LWIR Hyperspec® sensors are available upon request.

Raman Imaging Instruments

Raman Explorer™ 248 nm

Raman Explorer™ 532 nm

Raman Explorer™ 532/685 nm dual excitation

Raman Explorer™ 632.8 nm

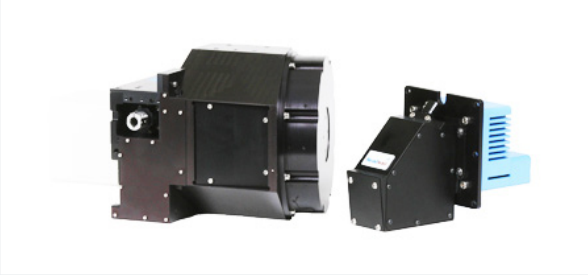
Raman Explorer™ 785 nm

Raman Explorer™ 830 nm

Raman Explorer™ 1064 nm

Raman Discovery™ 532 nm

Raman Discovery™ 785 nm



About Headwall Photonics:

Headwall Photonics is the leading designer and manufacturer of imaging spectrometers and spectral instrumentation for industrial, commercial, and government markets. Headwall's high performance spectrometers, spectral engines, and holographic diffraction gratings have been selected by OEM and end-user customers around the world for use in critical application environments. As a pioneer in the development of innovative spectrographs and imaging spectrometers based on optical technologies, Headwall enjoys a market leadership position through the design and manufacture of patented spectral instrumentation that is customized for application-specific performance. Headwall Photonics was formed in 2003 as the result of a management buy-out from Agilent Technologies. **For more information please call 978.353.4100 or email us at information@headwallphotonics.com.**

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