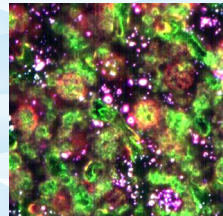
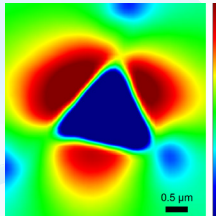
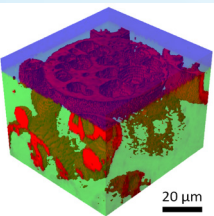


Integrated Raman and Hyperspectral Microscopy

Combined spectral imaging technologies

ELEMENTAL ANALYSIS
FLUORESCENCE
GRATINGS & OEM SPECTROMETERS
OPTICAL COMPONENTS
FORENSICS
PARTICLE CHARACTERIZATION
RAMAN
SPECTROSCOPIC ELLIPSOmetry
SPR IMAGING



XploRA[®] PLUS integrates hyperspectral microscopy with confocal Raman microscopy for multimodal hyperspectral imaging on a single platform

HORIBA Scientific is happy to announce the integration of the enhanced darkfield (EDF) and optical hyperspectral imaging (HSI) technologies from CytoViva[®] with HORIBA's renowned confocal Raman microscopy, XploRA PLUS. The integrated system offers versatile modes of imaging and hyperspectral imaging that are very important for nanomaterial and life science studies.

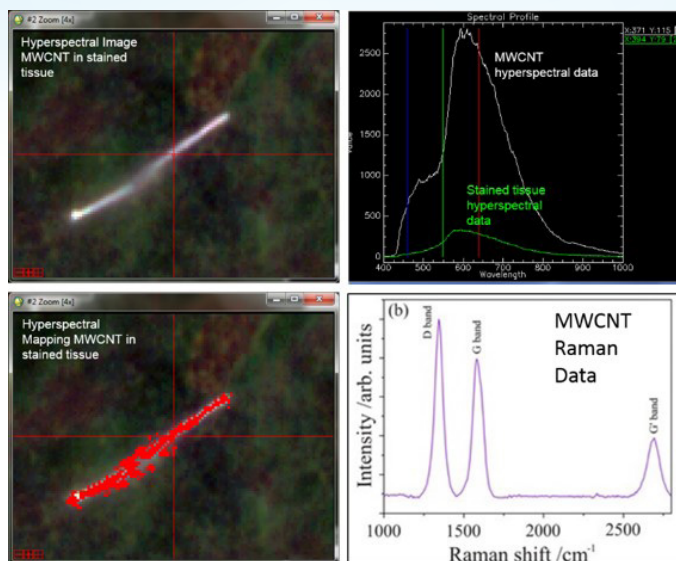
This integrated microscope platform provides both widefield imaging (reflection, transmission, brightfield, darkfield, polarized light and epi-fluorescence), and hyperspectral imaging (Raman, fluorescence,

photoluminescence, transmittance and reflectance) modes. Switching between imaging modes requires no sample movement whatsoever, ensuring all of these multimodal images are truly of the same area.

XploRA PLUS houses four gratings for optimized spectral resolution, and up to three lasers (select from blue to NIR+) for performing Raman, PL and/or FL hyperspectral imaging. EMCCD (electron multiplying CCD) is available for enhanced sensitivity as an upgrade from the CCD as a detector. Operations, including switching lasers and gratings, are fully automated via LabSpec 6 Spectroscopy Suite. LabSpec 6 Spectroscopy Suite is comprehensive software, dedicated for spectroscopy and universal for all HORIBA Raman systems, that performs data acquisition, processing, visualization and reporting, including multivariate analysis (developed together with Eigenvector Research, Inc.), 3D imaging visualization, and Raman library search (powered by KnowItAll[®] from BioRAD).

The patented enhanced darkfield (EDF) imaging from CytoViva[®] enjoys much higher signal-to-noise than standard darkfield imaging, which results in much cleaner, crisper and accurate images, optimizing darkfield detection capability for non-fluorescing nanoscale samples. Optical hyperspectral imaging (HSI) is specifically designed to provide quantitative spectral analysis (from visible to NIR†) of both biological and materials-based nanoscale samples (e.g. nano-particles embedded in cells or tissues).

+785 nm
†CCD (400 nm to 1000 nm) or InGaAs (900 nm to 1700 nm)



Optical hyperspectral image of a multiwell carbon nanotube embedded in stained tissue, and its Raman spectrum

XploRA PLUS Confocal Raman Microscope

Confocal Raman Hyperspectral Imaging

Excitation lasers	Select up to three from 405 nm, 473 nm, 532 nm, 638 nm or 785 nm
Spectral Resolution	Dispersion better than 1 cm ⁻¹ /pixel achievable
Detector	CCD or EMCCD
High speed imaging	SWIFT (with CCD) or SWIFT XS (with EMCCD)
Spatial resolution	Optically, diffraction limited; Mechanically, 10 nm minimum step size
Objectives	Compatible with regular (air), immersion (oil or water), long working distance, and cover-slip corrected objectives
Software	LabSpec 6 Spectroscopy Suite for 2D and 3D imaging visualization, multivariate analysis, extended focus + topography (EasyNav [®]), and particle analysis (ParticleFinder [®])

Widefield Microscopy Imaging

Reflected light widefield imaging	Brightfield, darkfield, polarized light and epi-fluorescence
Transmitted light widefield imaging	Brightfield and polarized light (darkfield is replaced with enhanced darkfield by CytoViva)

Enhanced Darkfield and Optical Hyperspectral Imaging Microscopy

Enhanced Darkfield Imaging

Detectability	Noble metals and metal oxide nanoparticles: 10 nm Soft nanoparticles (liposomes, polymers, etc.): 75 nm
Objectives	60x and 100x oil immersion with cover-slip correction
Light source	Halogen Mercury by Solac [®]
Condenser	Patented, focuses fixed-geometry, highly collimated light at oblique angles to the sample

Hyperspectral Imaging Microscopy

Spectral range	420 nm – 1000 nm with CCD 900 nm – 1700 nm with InGaAS
Spectral resolution	2 nm (with 30 μm slit)
Imaging speed	Exposure time, 5 μs to 60 s; Frame rate 13.5 fps at 2x2 binning
Light source	Halogen Mercury by Solac when configured with EDF, Quartz Halogen Reflector when not
Software	ENVI by Harris Corp.



CytoViva Optical Illumination System



20 nm AgNPs in Solution



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