Photon etc
A spectrum of solutions

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CIMA™
HYPERSPECTRAL CONFOCAL SYSTEM

CIMA is a hyperspectral confocal system sensitive between 400 and 1700 nm. Spectral resolution can be as low as 0.2 nm in the visible range, and 0.6 nm in the infrared. It pairs a galvanometer head and one of the fastest and most sensitive cameras on the market to yield an acquisition rate above 300 spectra per second. CIMA provides three acquisition modes: confocal hyperspectral imaging, multispectral fluorescence imaging, and emission spectroscopy of a sample in a cuvette.

CIMA APPLICATIONS OVERVIEW:

- Simultaneously study the spatial distribution and spectral properties of complex nanomaterials such as upconverting nanoparticles and quantum dots.
- Perform in vitro or in vivo high resolution hyperspectral microscopy.
- Develop new sensors based on environment dependent spectral shifting of their fluorescence signal.

TECHNICAL SPECIFICATIONS		
Spectral range	400 - 1700 nm	
Spectral resolution	VIS < 0.2 nm	IR < 0.6 nm
	Custom resolution upon request	
Spatial resolution	Diffraction limited	
Cameras	Back-illuminated CCD or EMCCD	InGaAs linear array
Excitation wavelength	980 nm *(Other wavelengths available)* 3 laser input ports UHP mercury lamp 130W	
Microscope	Scientific grade, inverted	
Objectives	20X, 40X, 60X	50X, 100X
	Other magnifications available upon request	
Wavelength absolute accuracy	0.25 nm	
Maximum scanning speed	> 300 spectra/s	~ 100 spectra/s
Motorized XYZ stage	120 x 75 x 0.15 mm	
Preprocessing	Spatial filtering, statistical tools, spectrum extraction, data normalization, spectral calibration	
Hyperspectral data format	HDF5, FITS	
Software	PC (Windows10 - 64-bits) with PHySpec™ control and analysis software (computer included)	
Power requirement	120 VAC / 12A / 60Hz 230 VAC / 12A / 50Hz	
CONFOCAL MODE		
Scanning region	300 µm x 300 µm (20x objective) 100 µm x 100 µm (60x objective)	
Pinhole diameter	30 to 200 µm	
CUVETTE MODE		
Cuvette size	Standard 10 mm x 10 mm (3.5 mL)	
FLUORESCENCE MODE		
Camera	Megapixel colour camera for fluorescence and sample visualization	
Illumination lamp	UHP mercury lamp 130W	
Epifluorescence filter cubes	Up to 6 different filter cubes	

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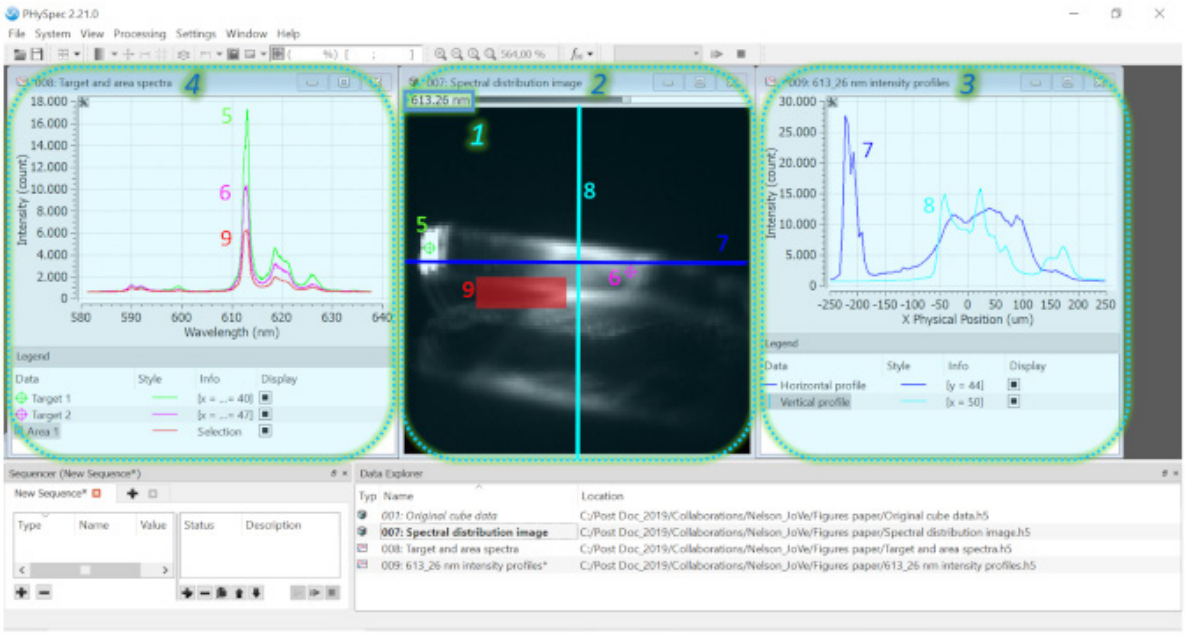
Hyperspectral Imaging as a Tool to Study Optical Anisotropy in Lanthanide-Based Molecular Single Crystals

jove JOURNAL OF VISUALIZED EXPERIMENTS

Emille M. Rodrigues, Nelson Rutajoga, David Rioux, Jacob Yvon-Leroux, Eva Hemmer. DOI: 10.3791/60826

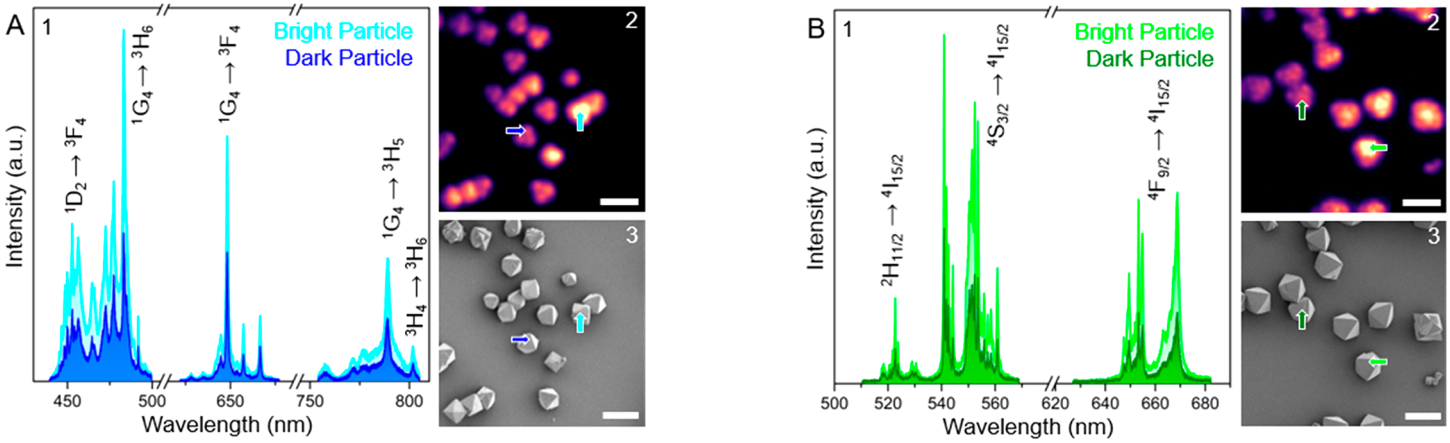


Screenshot of the PHySpec software showing the hyperspectral cube data (lanthanide (Ln^{3+})-based molecular single crystal) analysis process. Diverse spectral analysis methods can be applied on the acquired hyperspectral cube: 1 shows the wavelength which was chosen for the spectral image distribution shown in 2; 3 shows the 613.26 nm horizontal (7) and vertical (8) intensity profiles; 4 shows the emission spectra extracted from the targets 5 and 6 as well as from the area highlighted in 9.

Microwave-Assisted Solvothermal Synthesis of Upconverting and Downshifting Rare-Earth-Doped LiYF4 Microparticles

Inorganic Chemistry

Nikita Panov, Riccardo Marin, and Eva Hemmer. DOI: 10.1021/acs.inorgchem.8b02697



Single-particle photoluminescence studies on (A) Yb^{3+}/Tm^{3+}- and (B) Yb^{3+}/Er^{3+}-codoped $LiYF_4$ microparticles: (1) upconversion emission spectra extracted from hyperspectral cubes (corresponding images are shown in (2)) at two selected regions of interest (ROIs) exhibiting brighter or dimmer emission from RE^{3+}- doped $LiYF_4$ microparticles (selected ROIs are marked with bright and dark blue and green arrows, respectively, in (2) and (3)); (2) false-color hyperspectral images of the characteristic blue Tm^{3+} (440-500 nm) and green Er^{3+} (510-570 nm) emissions (color code: dark colors indicate low emission intensity, bright colors indicate high emission intensity); (3) SEM micrographs of the same microparticles subjected to optical investigation. Scale bars: 5 μm.