OPTOSKY Spectroscopy Solutions

DataSheet

Scientific Confocal Raman Microscope ATR8820

Features

- Fully automated Raman imaging, auto-focus and auto-scan.
- Support up to 3 excitation wavelengths Raman system （405、532、638、785nm,Choose three from four）
- Seal door design fit to different ambient light
- Super sensitivity, SNR > 1000:1.
- Exclusive software for switching optical path.
- Fast positioning and quickly find the focus position.
- 5-mega cameras with clear and accurate images
- USB 3.0 connector to the computer.
- The excitation spot size can be set by software;
- Imaging wavelength can be set;
- Optical resolution: 5nm
- Ultra-high sensitivity refrigeration EMCCD, -90℃ refrigeration
- Ultra-high-speed Raman imaging, <100ms
- Support Raman video;
- Spatial resolution: 640X512
- Confocal optical path design;

Application

- Nanoparticles and new materials
- Research institute research
- Biological sciences, medical immunoassays, forensic identification
- Materials science, two-dimensional materials
- Agriculture and food identification

Description

The ATR8820 series of ultra-high-speed transient wide-field Raman spectroscopic imagers perfectly combines confocal microscopy technology with laser Raman spectroscopy technology. It uses area imaging technology to expand the laser beam and use special optical elements to expand the laser beam. It is shaped into a uniformly distributed plane laser and irradiated on the sample. After filtering out the reflected laser, all the excited Raman light passes through the hyperspectral imaging component based on the adjustable filter and is imaged on the EMCCD, which can be imaged within 100ms. Complete Raman imaging and is the fastest Raman imaging device.

ATR8820 uses a high-sensitivity refrigerated area array EMCCD as a Raman imaging detector, which can quickly perform Raman spectrum imaging at a certain wave number. It can complete at least 10 Raman spectrum imaging pictures per second, so as to perform Raman imaging on the changing process of rapid chemical reactions. Video recording monitoring. ATR8820 can also have a built-in microscope system for micro-area imaging (video recording).

ATR8820 can integrate up to 3 excitation wavelength laser light sources to perform Raman imaging experiments with different excitation wavelengths. ATR8820 can image Raman spectra of different wavelengths (wavenumbers), and the center wavelength (wavenumber) can be set

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1. Parameter

ATR8820 performance parameters	
Excitation wavelength	405、532、638、785nm optional, Supports up to 3 excitation wavelengths
Laser power	405nm：50mW 532nm：100mW 638nm：80mW 785nm：350mW
Imaging speed	100ms
Spectral resolution	5nm
Imaging area	Software setting
Microscope light path	Minimum Raman imaging area: 100X100μm Maximum Raman imaging area: 2mmX2mm
Macro optical path (customized)	Maximum Raman imaging area: 50mmX50mm. Note: The area is too large and the optical power density is too small, which is not conducive to Raman excitation.
Microscope objective	Standard configuration: 4X, 10X, 20X; Optional configuration: 50X, 100X
Microscopic illumination	High brightness long life white LED
lighting method	epi-illumination
Camera system	5 million pixel industrial camera
Focus method	conjugate focus
Laser stability	σ/μ <±0.2%
Interface	USB2.0
X, Y axis two-dimensional platform	
Move method	Electric
Moving range	50 X 50 mm, 100X100mm
Mobile resolution	0.1 μm
Positioning accuracy	1 μm
Scan interval	Software setting, min. 1μm
Scan speed	20 mm/s
Nano stage (optional)	Minimum displacement resolution 2nm, displacement accuracy 10nm
Z axis (auto focus)	
Focus accuracy	≤ ±0.2 μm
Maximum stroke	20 mm
Focus speed	< 10 s
Nano stage (optional)	Minimum displacement resolution 2nm, displacement accuracy 10nm

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Physical parameter	
Dimensions	823(L)×5000(W)×643(H)
Weight	63 Kg
Electrical parameters	
Voltage	100~240 VAC
Peak power	< 200 W
Other motivation	No
Emission	No

Schematic diagram of the optical path of the transient wide-field Raman spectroscopy super-time-resolved scanning imaging subsystem of this project. The wide-field imaging excitation spot needs to form a surface-shaped irradiation laser, which is realized by the OMEMS micromirror array. The different lenses of the OMEMS micromirror array are set to have different pointing angles and arranged in sequence, so that the collimated parallel laser spot can form a surface irradiation Laser spots of different sizes can also be obtained by adjusting the arrangement of the OMEMS micromirror array.

EMCCD is a high-speed, high-gain CCD that uses electron multiplication technology. The EMCCD model used in this system is an independently developed and produced ultra-low-temperature refrigeration EMCCD with 640x512 pixels. The sensitivity can reach the single photon level. The gain effect of this CCD on weak signals is very significant.

The single-wavelength spectral signal passing through the tunable filter acts on the EMCCD, and a single-wavelength image of the sample area to be measured can be obtained.

Transient spectral imaging data: By sending instructions through the computer and continuously adjusting the wavelength of the tunable filter, a sequence of single-wavelength images in a certain wavelength range (i.e., a time-dimensional scanning imaging sequence) can be obtained. The exposure time of EMCCD can reach the ms level, which means that the single-wavelength wide-field imaging speed in this system can theoretically reach the ms level, so it is suitable for dynamic monitoring of electrochemical reactions.

Wavelength (wavenumber) scanning imaging mode: Set the transient single wavenumber imaging scanning mode, set different wavelengths at different times, and obtain wavenumber scanning imaging data similar to scanning imaging.

Raman video recording mode: By setting the wavelength value of the tunable filter, observe the changes in the wavelength signal as time changes (i.e., time scan).

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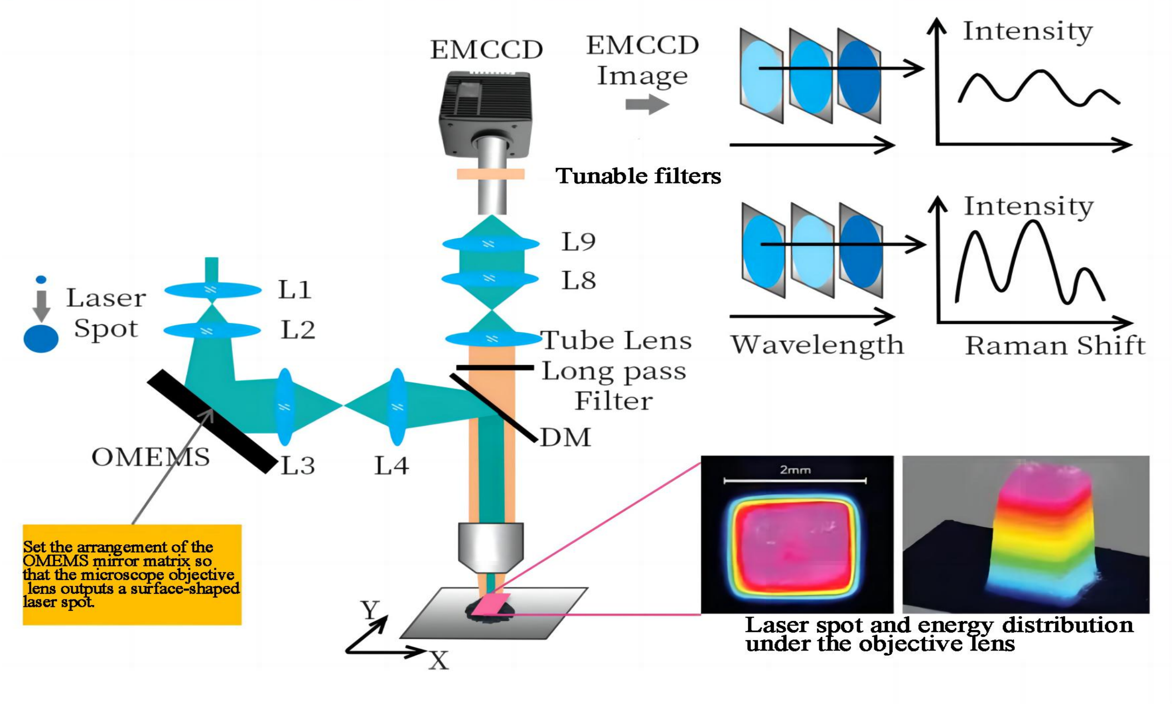

Figure 1 ATR8820 internal optical path diagram (patent applied)

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