# XperRam 200™ CONFOCAL RAMAN IMAGING SYSTEM

**NANOBASE** is a market leader in high resolution optical microscopy solutions for scientific and industry applications.

- Excellent Resolution
- Outstanding Repeatability
- High throughput using *Holographic Transmissive Grating*
- Extendable / Customizable
- 200µm x 200µm Image fast Scanning & 2D Mapping (x 40 objective)

Through continuous corporate commitment on innovation, **NANOBASE** has acquired depth of expertise and know-how in optics and spectroscopy system, thus has been achieved number of unique technological excellences such as patented tunable laser and spectrometer for Micro Raman Spectroscopy.

**NANOBASE** has developed the **Confocal Raman Imaging System** combining our laser and spectrometer with our own technology. You can start with the basic **XperRam200**™ system and upgrade later selecting the various optional functions. Extremely simple operation and maintenance will make users who just start Raman spectroscopy very close to it, also extendable and customizable system service will provide the high flexibility to the Raman experts.

## FEATURES

### LASER SCANNER

- ***Excellent resolution & repeatability-***
    resolution < 0.02 um & repeatability < 0.1 µm.
- *Large area Raman imaging*
    scan area exceeding 200 x 200 µm using a 40X, NA=0.75 objective
- *Diffraction limited laser spot* - over the scan area

### LENS BASED VPHG SPECTROMETER

- *High efficiency and small polarization dependence* can be achieved using Holographic Transmissive Grating

### AVERAGE MODE

- *High Speed in averaging mode* – Acquire a single Raman spectrum over the 200 x 200 µm area in just 4 seconds
- *Minimum CCD readout-noise* - CCD acquires one Raman spectrum while the laser scans over the area, thus reducing the CCD readout-noise greatly compared to conventional 2D Raman mapping method.
- *Useful for quick quantitative analysis* of the analytes on thin samples - thin films or nanoparticles on a glass slide

### MODULAR DESIGN - OPTIONS

- Fiber coupled laser port
- Snap-in Raman filter set for different wavelength
- Excitation & collection polarizer
- Low frequency Raman filter set (down to 10 cm⁻¹)
- NIR optic set for laser scanner (700 ~ 1000 nm)

### STANDARD MODEL & BEAM PATH
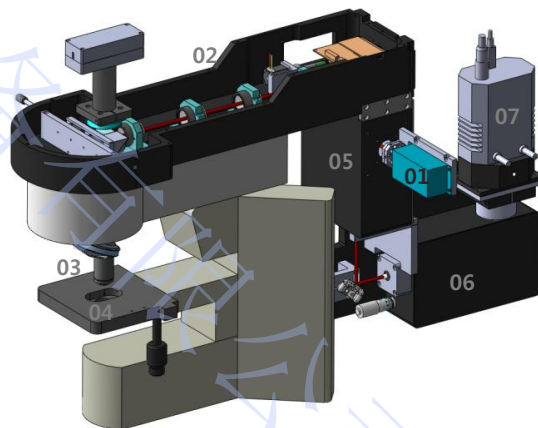


| 01 | Excitation laser |
| 02 | Scanning part |
| 03 | Objectives |
| 04 | Scan table / Z-stage for focusing |
| 05 | Filter set |
| 06 | XPE200 lens based spectrometer |
| 07 | CCD detector |

## SPECIFICATIONS - BASIC

| | |
|---|---|
| **LASER** | • 532nm, up to 100mW DPSS laser (Other laser sources such as 660nm, 785nm are available ) |
| **MICROSCOPE** | • Large-size mechanical stage with right-hand control<br>• Reflected LED illuminator for bright field<br>• Quintuple Revolving Nosepiece<br>• USB 2.0 Full HD camera |
| **STANDARD OBJECTIVE** | • x40 , NA=0.75<br>• >60% transmission from 360 to 1000 nm |
| **SPECTROMETER (XPE200)** | • Input f/5<br>• Focal length 200 mm<br>• 1800 lpmm VPHG grating (for 532 nm excitation)<br>• Micrometer for center wavelength adjustment<br>• FWHM resolution ~ 0.12 nm<br>• Dispersion ~0.038 nm/pixel (16 μm/pixel) |
| **DETECTOR** | • Most Andor and PI cameras can be used |

## SPECIFICATIONS - OPTIONS

### FC/PC port for PM single mode fiber
- Achromatic collimator for 450~680 nm
- No moving parts

### Polarization Control
>> Excitation polarization control
- 0~180° continuous rotation of excitation laser polarization
- Operating wavelength : 532±20 nm
- Utilize a zero order half-wave plate
>>Collection polarizer
- Operating wavelength: 420~700 nm
- Extinction ratio > 200:1
- Transmission > 83%

### Low freq. filter set (OD7)
>>Bandpass filter
- Bandwidth (FWHM) < 0.3 nm
- Diffraction efficiency > 90%
>>Notch filter
- Blocking > 99.9999% (OD3 + OD3)
- Transmission > 50%
- Bandwidth (FWHM) < 0.5 nm

### Laser Scanner
- Optimized for raster scan
- Wavelength range: 450 ~ 700 nm
- FOV: 200 X 200 μm using a 40X objective
- Single Protected silver mirror (450~1000 nm) for XY scan
>> Laser scan controller
- USB 1.1
- Labview example provided

### Power Control
- Variable ND filter (OD 0.04~4)
- Laser power monitor photodiode output (BNC connector)

## APPLICATIONS

- **Biology**
  - Cell research / Disease detection / Stents and implants
  - Cosmetics and in vivo skin analysis
- **Chemical Identification**
- **Forensics**
  - The non-destructive and in-situ identification of controlled drugs and narcotics.
- **Pharmaceutical , Cosmetics and Food Science**
  - Characterization and Mapping of active pharmaceutical ingredients and excipients
- **Semiconductor , Photo voltaics and OLED**
  - Strain measurements of a Si cap layer deposited on a SiGe substrate determination of Ge content
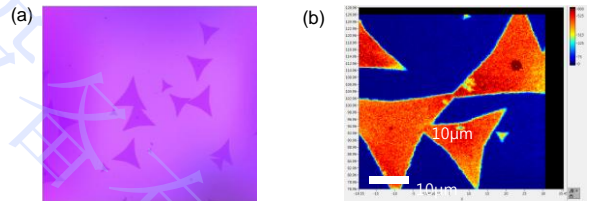  - Defects identification during the manufacturing process
- **Solid State Materials**
  - Analysis of Solid State Chemical Reactions and Composite Materials : Raman Maps Identify and Located Phases.

### It can be adapted to :
- Microscopy, mapping, and imaging
- Real-time reaction monitoring
- Routine quality control/ quality assurance
- On-line process control

## MAPPING IMAGE

(a) $MoS_2$ sample microscope image
(b) 50x50μm size 0.3μm step Intensity mapping image

## SYSTEM IMAGE