



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai - 400076

Technical Specifications :

Eligibility criteria for bidders for Confocal Laser Raman-Photoluminescence Spectrometer Instrument :

1. The bidder should have supplied at least three confocal laser Raman spectrometer instruments to government organisations in India (academic institutions or research laboratories) in the last five years. Copies of installation reports and purchase orders for these instruments should be submitted along with the technical bid.
2. Warranty: 3 years warranty on the instrument except for lasers, and 2 years warranty on the lasers.
3. After sales service: The bidder should have a team of qualified technicians posted in India for quick after sales service. The address and contact details of the service team should be provided along with the technical bid.

Technical Specifications for Confocal Laser Raman-Photoluminescence Spectrometer Instrument

The bidder should enclose documents/literature with the technical bid to support the claim of compliance with the specifications.

1. Raman and Photoluminescence (PL) Spectrometer:

- 1.1. Spectrograph equipped with research grade microscope capable of recording Raman spectra in the overall range of 50 cm^{-1} to 4000 cm^{-1} ;
- 1.2. Spectral Range: 220 nm – 2200 nm;
- 1.3. Spectral resolution (FWHM): Less than 1 cm^{-1} obtained with 532 nm laser and 1800 grooves/mm grating;
- 1.4. Spatial resolution (min): 1 micron or better lateral and 2 micron axial;
- 1.5. Scan to Scan repeatability 0.1 cm^{-1} or better;
- 1.6. Three Gratings: 2400 grooves/mm, 1800 grooves/mm and 600 grooves/mm;
- 1.7. Total scan range should be displayed without any discontinuity, at all the signal to noise ratio levels;
- 1.8. Set of Edge Filters for Raman & PL;
- 1.9. Low cut off: 50 cm^{-1} for 532 nm for Raman and 150 cm^{-1} for PL;
- 1.10. The spectrometer should be fitted with a filter wheel with neutral density filters offering at least 9 different power levels from 0.01% (or lower) to 100% and should be software controlled.

2. Lasers:

- 2.1. Lasers should be directly coupled using mirrors to the spectrometer (no fibre coupling);
- 2.2. Laser switching should be software controlled. Laser power should be controlled through the software as specified above;
- 2.3. He-Ne laser kit 633 nm, minimum 15 mW, bandpass filter and edge filter;
- 2.4. Air cooled, diode or frequency doubled Nd:YAG laser 532nm, power 100 mW, bandpass filter and edge filter;
- 2.5. He-Cd laser, 325 nm minimum 25mW, bandpass filter and edge filter.

3. Microscope:

- 3.1. A high stability research grade microscope;
- 3.2. Open space microscope, offering a large open space below the objective turret. It should be possible to use large samples, or sample holders like mechanical loading cells, high temperature cells, high pressure cells, or cryostats;
- 3.3. The sample stage should be coupled to the instrument;
- 3.4. Focusing should be obtained by changing the height of the microscope objectives and not the sample stage;
- 3.5. Microscope should be branded research grade with colour camera for viewing. Microscope to include;
- 3.6. Reflected light illumination;
- 3.7. Video camera attached to the microscope for viewing the specimen;
- 3.8. Objectives – 10x, 50x, 100x, and Long Working Distance 50x objective;
- 3.9. 15x NUV objective and 40x NUV objective;
- 3.10. XYZ motorized stage with minimum travel range of 50 mm range in both, X and Y;
- 3.11. Step size 100 nm (or better, i.e. smaller) in XY and 20 nm (or better, i.e. smaller) in Z direction;
- 3.12. Stage control with joystick as well as computer-control.

4. Detector

- 4.1. Charge coupled device (CCD) detector;
- 4.2. High efficiency thermoelectrically cooled CCD: A fully automated multichannel detectors suitable for Raman and PL measurements;
- 4.3. Pixel Size – 1024 x 256;
- 4.4. Peltier cooled to: -60°C or lower;
- 4.5. Range: 250 – 1050 nm.

5. Computer and software:

- 5.1. The state-of-the-art computer control system compatible with and optimized for the application software to perform the various Raman and PL measurement options automatically;
- 5.2. Software supplied should include standard spectra library;
- 5.3. Multivariate image analysis software;
- 5.4. Desktop computer with Microsoft Windows 10 OS and appropriate hardware with at least 500 Gb storage capacity, and standard ports for data transfer;
- 5.5. Software licence for 2 additional offline work stations.

6. Other Requirements:

6.1. Power-meter working from 300 nm to 1.1 micron.

6.2. Uninterrupted power supply battery back-up: 4 kVA pure sine wave online UPS with 15 minute back-up.

6.3. Table: Appropriate table for mounting the complete system.