

Following equipment have been purchased with the financial assistance of Department of Biotechnology, Ministry of Science & Technology, Government of India in the Project titled “*Reduced graphene oxide nanosheets decorated with metallic/bimetallic nanoparticles: A Multifunctional materials for photothermal therapy of cancer cells*” and implemented by **Dr. Manash R Das, PI** from CSIR-NEIST during the period of **July 09, 2017 to July 08, 2020**.

**Name of Equipment:** Laser Raman spectrometer

**Make:** Thermo-Scientific, UK

**Model:** DXR2 SmartRaman



**Specification:**

1. Excitation wave length: 532 nm and 785 nm
2. Spectral range:  $50\text{ cm}^{-1}$  to  $3250\text{ cm}^{-1}$
3. DXR2 smart Raman having CCD detector
4. System has spectral resolution of  $5\text{ cm}^{-1}$  for full range
5. Laser power output: 100 mW for 532 nm and 100 mw for 785 nm
6. Auto align and optimization of input laser port. Self-validation using built-in internal references. Built-in self-calibration and intensity correction using neon and white light sources.
7. The system with powerful LabSpec 6 software to collect Raman spectrum over defined spectral range Routine analysis operations is able to automate using macro programming

**Working Principle:** The Thermo Fisher DXR SmartRaman series spectrometer utilizes dispersive Raman spectroscopy to non-destructively probe the molecular structure of samples. In this system, a laser source irradiates the sample and induces inelastic scattering (Raman scattering) from molecular vibrational modes; the energy shifts in the scattered light provide a unique vibrational fingerprint of the material. The scattered photons are collected and dispersed by an internal monochromator onto a sensitive detector, producing a Raman

spectrum that reflects the molecular composition and structural information of the sample. The DXR SmartRaman platform is designed for ease of use in routine and quality control laboratories, featuring automated alignment, calibration, and accessory recognition to ensure reproducible results. It supports multiple user-interchangeable laser excitation wavelengths and advanced software for spectral acquisition and analysis, allowing rapid, high-confidence identification of organic and inorganic materials directly through glass or plastic containers with minimal sample preparation.

**Application:**

The Thermo Scientific DXR SmartRaman spectrometer is widely used for rapid, non-destructive chemical analysis across academic, industrial, and quality control laboratories. It is suitable for analyzing a wide range of sample types, including powders, liquids, tablets, polymers. The instrument is commonly applied in pharmaceutical quality control, food and packaging analysis, polymer and chemical identification, forensic investigations, and academic research. Owing to its automated calibration, alignment, and fluorescence correction features, the DXR SmartRaman provides reproducible and reliable results, making it ideal for routine analysis as well as research and method development. Its compatibility with multiple sampling accessories and automated sample handling further enables high-throughput analysis and characterization of heterogeneous samples in busy multi-purpose laboratories.