

Raman Spectroscopy Facility

In-house Raman Spectrograph



Instrument Details

532/473 nm Diode Pumped Solid State Laser
Monochromator 900 m Czerny Turner Single
Monochromator with 600 lines/mm grating.
(Made at BARC) - [Ref]
Peltier cooled CCD Detector
Vertical Sample geometry
Scattering Geometry-Backscattering/90°

Capability

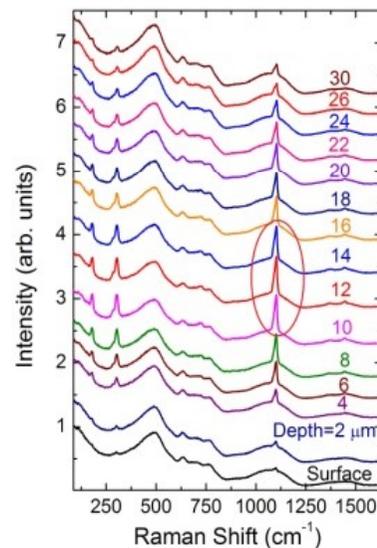
- Raman shift in the range 80-4000 cm^{-1} .
- Spectral resolution of $\sim 3 \text{ cm}^{-1}$ with $50 \mu\text{m}$ slit and capability record $\sim 1600 \text{ cm}^{-1}$ at a time.

Sample Environment for both Raman instruments:

Temperature Range: 77 K – 1000 K
Pressure : upto 40 GPa at temp. 300 – 600 K.
Polarized Raman measurements on single crystals

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Raman Spectra of borosilicate glass showing crystallization at depths due to irradiation with Xe ions



Micro Raman Spectrograph



Instrument Details

JobinYvon Horiba HR-800 Evolution
532 nm DPSS Laser and 633nm He-Ne.
800 mm focal length achromatic flat field
monochromator. Two gratings, 1800
l/mm and 600 l/mm –fully automated
Resolution $0.35 \text{ cm}^{-1}/\text{pixel}$ with 1800
l/mm grating and 633 nm laser
Detector – Peltier cooled Synapse
Sample geometry- horizontal; back
scattering

Capability

- High throughput micro-Raman with optical microscopy.
- Can be also used high resolution luminescence spectroscopy upto 1000 nm.
- Range of Raman shift 10 cm^{-1} onwards.
- Confocal mapping and depth profiling with $1 \mu\text{m}$ step.

Ref:

A.P. Roy, S.K. Deb, M.A. Rekha and A.K. Sinha, Indian J. Pure Appl. Phys. 30 (1992) 724

Some Publications:

1. High Pressure Phases and Amorphization of a Negative Thermal Expansion Compound TaVO_5 *Inorganic Chemistry* **57 (12), 6973 (2018)**
2. SERS based detection of glucose with lower concentration than blood glucose level using plasmonic nanoparticle arrays. *Applied Surface Science* **447, 576 (2018)**
3. Structural Stability and Anharmonicity of $\text{Pr}_2\text{Ti}_2\text{O}_7$: Raman Spectroscopic and XRD Studies *Inorganic Chemistry* **55, 11791 (2016)**
4. Soft modes and anharmonicity in $\text{H}_3[\text{Co}(\text{CN})_6]$: Raman spectroscopy and first- principles calculations. *Phys. Rev B* **92, 134112 (2015)**