Major Research Facilities in AKR group

AKR and BG group uses a number of facilities for the experimental work. Below a small list is given. These include modern growth facilities for materials, structural characterization facilities as well as electrical, magnetic and optical measurements. The group also uses spatially resolved measurements using ultra high vacuum scanning probe microscope. The details on sample preparation are given in links on Materials grown and Nanolithography activities. The group also uses extensively Synchrotron Radiation (at Photon factory Japan) and Neutron diffraction facility (at Dhruva reactor, BARC,Mumbai and ILL reactor Grenoble, France) for extensive structural studies.

All Common Facilities of the Centre are used by the group for details see the link **http://newweb.bose.res.in/facilities/TechnicalCell**

Special sophisticated experimental facilities used in AKR/BG group

1. Low frequency noise measurement (temperature variable) down to a noise floor of $10^{-21}V^2/Hz$ and with variable temperature facility down to 77K with magnetic field of 0.4T	Assembled around lock-in amplifier can measure resistances down to nano ohm. This has a special soft-ware written by the group. It is very rare facility in the country
2. 1.5K, 10T GM cycle based low temperature system for transport, magnetic, Hall and dielectric measurements.	The measurement system (fully automated) has been assembled around the Variable temperature cryostat by the group along with the necessary software
3. Photo-conductivity measurements	Measurements of Photoconductivity in nanowires and films are done using a monchromator and a Light source (Xenon lamp). The light is focused on the sample by a microscope allowing measurements on small sample. The set-up is calibrated using a Si photo diode
4.Ultra High Vacuum (UHV) temperature variable Scanning probe microscope with magnetic field.	The UHV temperature variable SPM is a combination of Scanning Tunneling Microscope (STM) and Atomic Force Microscope (AFM) which works in a UHV atmosphere of better than 10^{-10} torr and can span a temperature range from 30K to 800K.
5. Potentiostat and Electrochemical deposition unit	This unit is widely used for synthesizing metal nanowires in nanoporous templates using electrochemical deposition

6. Impedance spectroscopy upto 100MHz	AKR group uses temperature variable Impdance spectroscopy measurements upto 100 MHZ using an LCR mater . Impedance spectroscopy between source and drain on TFT /FET structures using a gate bias can be done upto 4MHz using a Lock-in amplifier
7. Nanolithography facility	With funding from Nanomission, DST AKR group has set-up a nanolithography facility housed in a clean room. The facility has electron beam lithography , Focused Ion Beam lithography and Optical Lithography tools along with UHV metallization and Inductively Coupled Plasma- reactive Ione etching facility. These facilities are being further upgraded with support from TRC project.

New facilities under installation in near future

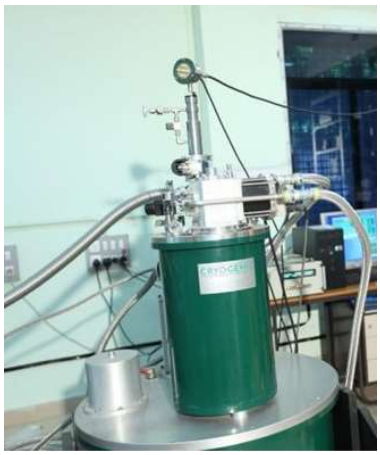
Upgradation of PLD to UHV base pressure and measurements of electrical transport under UHV condition without breaking vacuum.

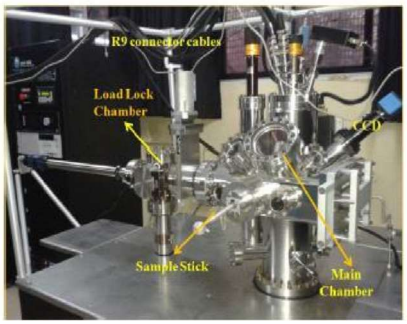
Time domain dielectric measurements with time resolution in sub microsecond region.

Thermoelectric power measurements in single nanowires.

Upgradtion of the low temperature facility to 0.3K

Facilities in AKR group : A gallery





(left) Cryogen free 10T superconducting magnet with 2K variable temperature inserts

(middle) HV temperature variable STM

(right) Home made 1/f noise set-up in a shielded enclosure