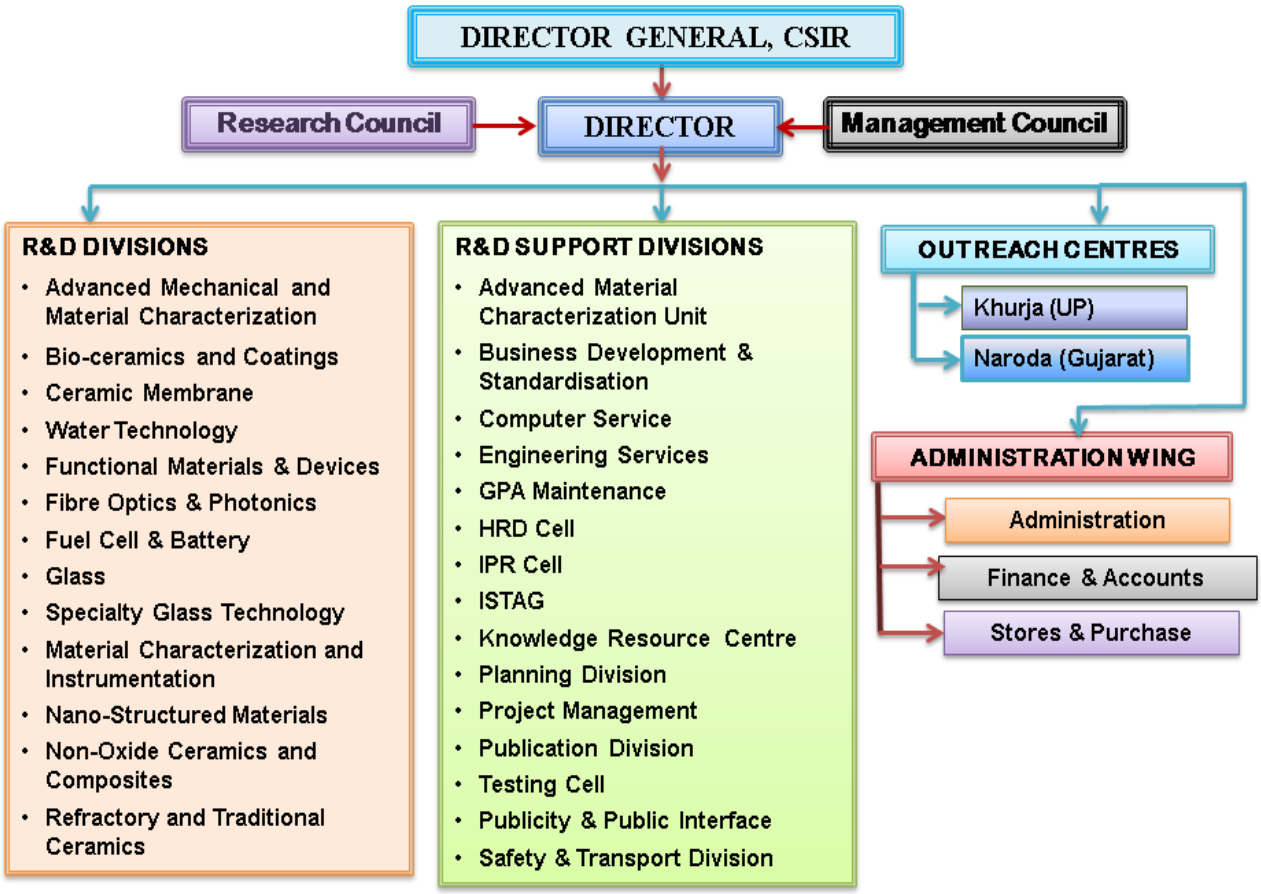
CSIR-Central Glass and Ceramic Research Institute

An ISO 9001:2015 certified Institute

KOLKATA

ORGANIZATIONAL STRUCTURE-CSIR-CGCRI



CSIR−Central Glass and Ceramic Research Institute (CGCRI), is one of the first four laboratories decided to be set up under the Council of Scientific & Industrial Research, the other three being National Chemical Laboratory, Pune; National Physical Laboratory, New Delhi and Central Fuel Research Institute, Dhanbad. Even though it started functioning in a limited way in 1944, the Institute was formally inaugurated on August 26, 1950. with the great vision of its founders, and a network of inspiring as well as dedicated scientists who had a fascination to pursue in-depth research and development in the areas of Ceramics and Glass Sciences and Technology. Research focus of CSIR-CGCRI has been given major emphasis in the three major sectors namely National security or strategic, Industrial development (primarily small & medium scale industries) and societal activities covering some of the well defined problems of national importance such as Energy, Water, Health Care, Communication and Instrumentation.

Testing and Characterization Cell (TCC) is a R & D support cell to act as Single Window Clearing Unit for all testing and characterisation related services to fulfill the research need of R&D divisions in the Institute and also to other Researchers working in various Universities, Research Institutes, Government Organizations and Industries situated in various part of India. Testing of raw materials & products in the field of Glass, Ceramics, Refractory and Composites are being carried out as per National and International standards, wherever applicable.

Major Test Facilities at CSIR-CGCRI

Name of the Equipment: ***Transmission Electron Microscope***

Equipment Name	Transmission Electron Microscope
Approved Abbreviation	TEM
Landmark/Location	Room No. 2A (TEM Laboratory)), Main Building, CGCRI-Kolkata
Make(Manufacturer)	FEI Company, USA
Model	Tecnai G^2 30 ST
Funding Agency Type	CSIR
Equipment Description	Maximum Magnification: 1 million Point resolution: 0.2 nm Line Resolution : 0.14 nm
Sample specifications	3 mm diameter disk of 0.1 mm thickness and 50 nm thin electron transparent area
Types of analysis /Usage	Observation of micro- and nano-structures in materials down to atomic dimensions and space-resolved composition analysis by Energy Dispersive Spectrometry (EDS) at nano-meter scale.
Cost of Instrument	Rs. 4,30,10,131/-
Year of Installation	2008
Present status of Equipment (Up/Down/Under)	UP
% of total time to be made available to the external users	20%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: ***X-ray Photo-electron Spectroscope***

Equipment Name	X-Ray Photo-electron Spectroscope
Approved Abbreviation	XPS
Landmark/Location	Room No – 10 (XPS Laboratory), Main Building, CGCRI-Kolkata
Make(Manufacturer)	M/S. Physical Electronics, USA
Model	PHI 5000 VERSAPROBE - II
Funding Agency Type	CSIR
Equipment Description	Energy Resolution : 0.6 eV Spatial Resolution : 7.5 um Detection limit : 0.1- 0.5 Atomic % Escape depth : 0.5- 7.5 nm Probe size : 10 um
Sample specifications	Maximum sample size is 5 mm (l) x 5 mm (w) x 2 mm (h) or 8 mm (dia) x 2 mm (h), solid, bulk, pellet, thin film
Types of analysis /Usage	Surface analysis, electronic structure, valence and oxidation states of individual chemical elements in compounds and materials.
Cost of Instrument	Rs.4,85,91,216/-
Year of Installation	2012
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	20%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: **X-Ray Diffractometer**

Equipment Name	X-Ray Diffractometer
Approved Abbreviation	XRD
Landmark/Location	Room No-12 (XRD Laboratory), Main building
Make(Manufacturer)	Rigaku, Japan
Model	Ultima IV
Funding Agency Type	CSIR
Equipment Description	Powder Diffractometer Detector: Solid State Detector D/teX Ultra Operating Current:40 mA, Voltage:40Kv Operating software: -PDXL Basic Data Processing Software -PDXL Qualitative Analysis Software
Sample specifications	Min. 5gms. Powder or Solid sample Length x Breadth x Width(cm) 2.5cm x1.5cm x 0.5cm(Min.) 6 5cm x 3 cm x 1cm(Max.)
Types of analysis /Usage	Crystallographic phase identification and Quantification
Cost of Instrument	₹ 73, 00,000/-
Year of Installation	2016
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	30 %
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: **X-Ray Fluorescence Spectrometer**

Equipment Name	X-Ray Fluorescence Spectrometer
Approved Abbreviation	XRF
Landmark/Location	Room No-15 (XRF Laboratory), Main building /CSIR-CGCRI
Make(Manufacturer)	PANalytical, ALMELO, The Netherlands
Model	AXIOS
Funding Agency Type	CSIR
Equipment Description	Sequential cum simultaneous Wavelength Dispersed X-Ray Fluorescence Spectrometer Target: Ceramic insulated Rh tube. Detector: Xe Sealed detector Operating Current:50 -125 mA, Voltage:24Kv-60Kv. Operating software:-Super Q Quantitative/ Qualitative Control software for XRF
Sample specifications	Min. 5gms. Powder
Types of analysis /Usage	Quantitative & Qualitative elemental analysis of F, Na, Mg, Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, As, Se, Br, Rb, Sr, Y, Zr, Nb, Mo, Pd, Ag, Cd, In, Sn, Sb, Te, I, Cs, Ba, Hf, Ta, W, Pt, Hg, Tl, Pb, Bi, La, Ce, Pr, Nd and Yb.
Cost of Instrument	₹ 1,10,59,734 /-
Year of Installation	2008
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	30 %
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Field Emission Scanning Electron Microscope

Equipment Name	Field Emission Scanning Electron Microscope
Approved Abbreviation	FESEM
Landmark/Location	Room No. 10A, AMMCD, Ground Floor, Main Building
Make(Manufacturer)	Carl Zeiss, Germany
Model	Zigma
Funding Agency Type	CSIR
Equipment Description	Field Emission Scanning Elctron Microscope with EDX, 30kV, Image Resolution-1.3 nm, Energy Resolution~127 eV, Conductive Coating Deposition on Sample, Microstructure Analysis by FESEM Technique, Elemental Compositional Analysis by Energy Dispersive X-Ray Analysis (EDX), EDX Line Scanning, EDX Dot Mapping
Sample specifications	Bulk: 2 x 2 x 0.5mm(min), 10 x 10 x 5mm (max), Powder: 100 mg.(min), 1 gm.(max) for FESEM; For EDX Analysis Bulk: 2 x 2 x 0.5mm(min) 10 x 10 x 5mm (max) Powder: 100 mg.(min) 1 gm.(max)
Types of analysis /Usage	Microstructure, Fracture and Damageas well as Elemental Composition Evaluation of Bulk Ceramics, Bioceramics, Metals,Composites, Thin films and Coatings etc.
Cost of Instrument	250 Laks (Approx)
Year of Installation	2013
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	30%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Vicker's Hardness Tester

Equipment Name	Vicker's Hardness Tester
Approved Abbreviation	Vicker's Hardness Tester
Landmark/Location	Room No. MPES 7, AMMCD
Make(Manufacturer)	LECO, USA
Model	Vicker's Hardness Tester, LV 700
Funding Agency Type	CSIR
Equipment Description	The machine measures the Vicker'sHardness Indenter: Vicker's Diamond Indenter Measurement Technique: Optical Measurement of Indentation Diagonal Additional material properties: Fracture Toughness etc. can be calculated using measured crack length and dedicated Software. Load Range : 30 gF 300 KgF Length Resolution: 0.1micro-m. Voltage: AC 100-220 V
Sample specifications	Flat parallel optically mirror finished, polished Sample, : parallelopipedof 20x20x5 mm size or 25 mm dia disks
Types of analysis /Usage	Vicker'shardness Evaluation of Bulk Glass, Ceramics, Bioceramics, Metals,Composites
Cost of Instrument	10.95Laks (Approx)
Year of Installation	2009
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	40%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Nanoindenter

Equipment Name	Nanoindenter
Approved Abbreviation	Nanoindenter
Landmark/Location	Room No. MPES 7, AMMCD
Make(Manufacturer)	Helmut FischerGmBH, Germany
Model	Fischerscope, H100X-Yp
Funding Agency Type	CSIR
Equipment Description	The machine measures the Universal Hardness as well as Nanohardness (according to DIN 50359-3) Indenter: Berkovich Diamond Indenter Measurement Technique: Depth Sensitive indentation (DSI) Additional material properties: Young's modulus etc. can be computed from the measured load vs. depth (P-h) plots using dedicated Software. Operating Software: WIN-HCU® Software Load Range : 0.4 mN– 1000 mN, Depth Resolution:1 nm, Load Resolution: 0.2micro-N. Volatage:15V, Current: 3 A
Sample specifications	Flat parallel optically mirror finished, polished Sample of size : 25x25x10 mm
Types of analysis /Usage	Nanohardness and Young's modulus etc. Evaluation of Bulk Glass, Ceramics, Bioceramics, Metals,Composites, Thin Films as well as coatings
Cost of Instrument	27.78Laks (Approx)
Year of Installation	2005
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	40%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Scratch Tester

Equipment Name	Scratch Tester
Approved Abbreviation	Scratch Tester
Landmark/Location	Room No. MPES 7, AMMCD
Make(Manufacturer)	DUCOM, BANGALORE, USA
Model	Scratch Tester, TR-101-M3
Funding Agency Type	CSIR
Equipment Description	The machine measures the Scratch Width and Friction Coefficient as a function of applied normal load and sliding distance; Indenter: Conica Diamond Indenter of Tip Radius 200 Micro-m; Measurement Technique: Optical Measurement of Scratch Width, Tractional force Measurement by Dedicated Load Cell, Friction Coefficient calculated as ratio of Tractional force to Normal Force; Additional material properties: Accoustic Emission measured by dedicated AE Sensor as a function of applied normal load and sliding distance; Load Cells 2-20N, 20-200N, Accuracy ±1%,AE Frequency:100-450 KHz, Peak Frequency:450 kHz, Speed variable:100-1000 micro-m.s-1, Voltage: 7-15V DC (Machine), 230 V, 6A (Controller)
Sample specifications	Flat parallel optically mirror finished, polished Sample, : parallelopipedof 25by25 by10 mm size or 25 mm dia disks
Types of analysis /Usage	Scratch ResistanceEvaluation of Bulk Glass, Ceramics, Bioceramics, Metals,Composites
Cost of Instrument	17.35Laks (Approx)
Year of Installation	2009
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	40%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: UTM 100kN

Equipment Name	Universal testing Machine
Approved Abbreviation	UTM
Landmark/Location	Room No. MPES 9, AMMCD
Make(Manufacturer)	Instron, UK
Model	1185 (Later Upgraded to Model 5500R)
Funding Agency Type	CSIR
Equipment Description	UTM (INSTRON 5500R), Load Cells:100N (For Fibers and Fibrous Material Testing), 1kN, 100kN; Accuracy:±1%, High Temperature Testing Capability:14000C with 4-point Bend Fixture
Sample specifications	Sample to be prepared by party in all cases as per our requirement. For Flexural Strength Glass: Bar Sample T 10x L 250x W 50mm Ceramic: T 5-10 mm x L 130-150mm x W 25mm Cement/plaster: T 25x L 250x W 12.7mm. Porous: T 8 x L 120 x W 10mm Rod Sample: Glass: D 6-8mm x L 120mm Ceramic: D 4mm x L 120mm, For Young's Modulus For Ceramic (5Pcs. set): sample size : 60x6x5 or50x5x4 mm, For Tensile Strength of Laminated Composites : Laminated Sheet of thickness greater than 3 mm but lesser than 10 mm. for Compressive strength Sample Size: 6" x 6"–1no.(Laminated Sheet) Cement/ Plaster Sample: 25mm. Cube – 6No Ceramic Sample: 10mm. Cube – 6No Porous Sample: 15mm. Cube – 6No
Types of analysis /Usage	Tensile Test of Metals: as per E8M-11 & ASTM:E8 at Crosshead speed: 0.5 mm/min, Flexural Test (Cross-breaking) of Glass, Ceramic & Composites (5Pcs. set) as per C1341-06 (advanced ceramics) Glass-ASTM: C158 Ceramic- ASTM: C674 & C689 FRP/Plastics- ASTM: D790, BS: 2782 & IS: 10182.Young's Modulus of Glass, Ceramic; Glass-ASTM: C158 Ceramic- ASTM: C674 & C689 FRP/Plastics- ASTM: D790, BS:2782 & IS: 10182, Tensile Test of Composites, Rubber & Polymers (5pcs.) b) Young's/E-modulus of Composites, Rubber & Plastics (5pcs. set), c) Percent Elongation of Composites, Plastics etc. (5Pcs. set) as per D638- 10, FRP/Plastics-ASTM: D638, BS: 2782 & IS: 10182, Tensile Test of Single Fibre (10pcs.) as per ASTM: D3379. Compressive Strength/ Crushing Load as per C1424-10
Cost of Instrument	5.7Laks (Approx Initial Price before Upgradation)
Year of Installation	1984
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	40%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: 3D CNC Coordinate Measuring Machine

Equipment Name	3D CNC Coordinate Measuring Machine
Approved Abbreviation	CMM
Landmark/Location	Room No: 7 (Main Building)
Make(Manufacturer)	CARL ZEISS, Germany
Model	MICURA VAST XT
Funding Agency Type	CSIR
Equipment Description	CARL ZEISS 3D CNC CMM Measuring Range: 500 mm x 500 mm x 500 mm Probe: ZEISS VAST XT Gold Length Measurement Error: (0.7 + L/400) µm
Sample specifications	Maximum dimension of Part: 500 mm x 500 mm x 500 mm
Types of analysis /Usage	Measurement of dimensions, geometrical parameters and 3D surface scanning
Cost of Instrument	EUR 1,05,500
Year of Installation	2017
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	50%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Measurement

Name of the Equipment: **Galvano Stat & Potentio Stat for Li-ion Battery Characterization**

Equipment Name	Galvano Stat & Potentio Stat for Li-ion Battery Characterization
Approved Abbreviation	Galvano Stat & Potentio Stat
Landmark/Location	Room No-150B (FCB Division) Main building (1st Floor)
Make(Manufacturer)	M/S Metrohom Autolab B.V, Netherland
Model	PGSTAT302N
Funding Agency Type	CSIR
Equipment Description	Maximum Compliance Voltage:± 30V Maximum Output Voltage: ± 10V Maximum Voltage resolution: 30µV Maximum Output Current: ± 2A Measured Current resolution at 10 nA range: 30 fA Potentiostat bandwidth (At 1 Kohm, 1Ma): 1MHz NOVA based Software
Sample specifications	2032 type Coin Cell test
Types of analysis /Usage	Electrochemical test (Impedance, CV) of Coin cell 2032
Cost of Instrument	Euro 26410.00
Year of Installation	2012
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	30%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization & Measurement

Name of the Equipment: Battery Tester for Li-ion Battery Characterization

Equipment Name	Battery Tester for Li-ion Battery Characterization
Approved Abbreviation	Battery Tester
Landmark/Location	Room No-150B (FCB Division) Main building (1st Floor)
Make(Manufacturer)	M/S Arbin Instruments, USA
Model	BT2143
Funding Agency Type	CSIR
Equipment Description	Maximum Voltage Range(-10V) to 10V Maximum Current Range: 500mA/ 10mA/100 µA Maximum Total Channels 32 PC preloaded with MITS Pro and Data Watcher Software for writing test schedules, monitoring real-time data, and reviewing and plotting test result.
Sample specifications	2032 type Coin Cells test
Types of analysis /Usage	Electrochemical test(Charge Discharge) of Coin cell 2032
Cost of Instrument	USD 29750.00
Year of Installation	2015
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	30%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization & Measurement

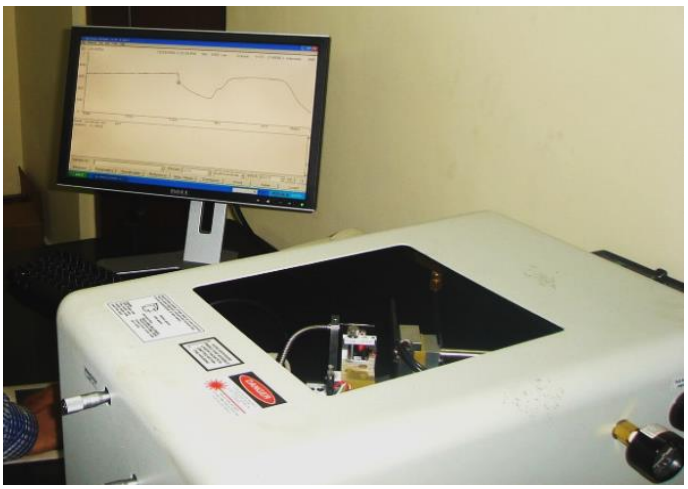
Name of the equipment: **RAMAN Spectrometer**

Equipment Name	Confocal Micro RAMAN Spectrometer
Approved Abbreviation	N. A
Land Mark/Location	Glass Division, CSIR-CGCRI
Make (Manufacturer)	HORIBA Jobin Yvon, France
Model	Lab Ram HR 800 EV
Funding agency type	CSIR
Equipment Description	**Measurement Range:** 50 – 3000 cm^{-1} **Laser Sources:** Air cooled CW 488 nm Argon ion laser with variable power upto 20mW and air cooled CW 785nm diode laser with fixed power of 100mW. Further source laser power can be varied using density filters as low as 0.1% through 'Labspec6' software used for running the instrument **Detector:** The instrument equipped with TE cooled CCD detector (Model: Synapse CCD). **Additional:** Equipped with LINKAM temperature controller (-150 °C to 600 °C)
Sample description	Solids, Powders and Films
Type of analysis/usage	Structural information based on vibrational, rotational modes of a molecular system
Cost of Equipment	Rs. 90 lakh
Year of Installation	2014
Present status of equipment (up/down/under)	Up
% of total time to be made available to the external users	25
Category of the equipment (Fabrication/Characterization/ Measurements etc.)	Characterization

Name of the equipment: **UV-Vis-NIR Spectrometer**

Equipment Name	UV-Vis-NIR spectrometer
Approved Abbreviation	N. A
Land Mark/Location	Glass Division, CSIR-CGCRI
Make (Manufacturer)	Perkin Elmer, USA
Model	LAMDA 950
Funding agency type	CSIR
Equipment Description	**Wavelength range:** 190 – 3200 nm **Source:** Deuterium Lamp for UV region, Tungsten lamp for Vis and NIR region **Spectral Mode:** Absorbance, Transmittance and Reflectance (Specular and Diffuse) **Detector:** PMT for UV-Vis region, InGaS for NIR region **Additional:** Equipped with 150 mm Integrating Sphere for diffuse Reflectance (250 to 2500 nm)
Sample description	Solids, Powders, Films and Liquids
Type of analysis/usage	Absorbance, Transmittance and Reflectance (Specular and Diffuse) measurements of samples
Cost of Equipment	Rs. 40 lakh
Year of Installation	2012
Present status of equipment (up/down/under)	Up
% of total time to be made available to the external users	20
Category of the equipment (Fabrication/Characterization/ Measurements etc.)	Characterization/Measurement

Name of the equipment: **Refractometer**



Equipment Name	Refractometer (Prism Coupler)
Approved Abbreviation	N. A
Land Mark/Location	Glass Division, CSIR-CGCRI
Make (Manufacturer)	Metricon Corporation, USA
Model	2010/M
Funding agency type	CSIR
Equipment Description	• Measurement of Refractive index at 473, 532, 633, 1064 and 1552 nm wavelengths (from laser sources). • Determination of Dispersion and Abbe number form fitted dispersion curve adopting Cauchy or Sellmeier fitting • Waveguide loss measurement
Sample description	Bulk glasses (15-20 mm × 15-20 mm×3-5 mm)
Type of analysis/usage	Refractive index, Abbe number, Dispersion, Waveguide loss
Cost of Equipment	Rs. 49 lakh
Year of Installation	2008
Present status of equipment (up/down/under)	Up
% of total time to be made available to the external users	30
Category of the equipment (Fabrication/Characterization/ Measurements etc)	Characterization/Measurements

Name of the equipment: **Viscometer**

Equipment Name	Viscometer
Approved Abbreviation	N. A
Land Mark/Location	Glass Division, CSIR-CGCRI
Make (Manufacturer)	Anton Paar, Austria
Model	FRS 1800
Funding agency type	CSIR
Equipment Description	The instrument combines a rheometer and a high temperature furnace (Maximum Temperature 1700 ^{0}C) integrated in a safely housing for analyzing rheological measurements of melts, Cup and bob system, Rotation and Oscillation mode, Minimum torque (rotation)= 10 nNm Minimum torque (oscillation) = 2 nNm, Viscosity range= 0.001-10^7 Pa.s
Sample description	Glass and Ceramics
Type of analysis/usage	Measurement of viscosity of molten glass or ceramics or slags at high temperature, Identification of glass transition temperature, softening temperature, working temperature, melting temperature from viscosity –temperature curve for glasses.
Cost of Equipment	Rs. 110 lakhs
Year of Installation	2018
Present status of equipment (up/down/under)	Up
% of total time to be made available to the external users	30
Category of the equipment)	Characterization/Measurements

Name of the Equipment: **Atomic Absorption Spectrometer**

Equipment Name	Atomic Absorption Spectrometer
Approved Abbreviation	AAS
Landmark/Location	Room No-210 (Analytical Chemistry Group), Main building
Make(Manufacturer)	Perkin Elmer, USA
Model	AANALYST 400
Funding Agency Type	CSIR
Equipment Description	• PC control of AAnalyst 400 using Winlab 32 software. • Double beam echelle monochromator with focal length 300 mm. • Wavelength range: 189 nm to 900 nm. • Spectral band pass: 0.15 nm at 200 nm. • Segmented solid-state detector. • Light source: Hollow Cathode Lamps or Electrodeless Discharge Lamps.
Sample specifications	Min. 100gms(-200 mesh) Powder or Solid sample Length x Breadth x Width(cm) 1.5cm x1.0cm x 0.5cm(Min.) 2.0cm x 1.5 cm x 1cm(Max.) Or clear, organic free, acidic aqueous sample
Types of analysis /Usage	Elemental analysis
Cost of Instrument	Rs. 12.5 L
Year of Installation	2009
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	30 %
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: High speed gas sorption analyzer

Equipment Name	High speed gas sorption analyzer
Approved Abbreviation	SAA
Landmark/Location	CMCF Lab-1, MCID
Make(Manufacturer)	Quantachrome Instruments, USA
Model	Quantachrome Instruments, USA/ AUTOSORB iQ
Funding Agency Type	CSIR
Equipment Description	Surface area and porosity of powders and other porous solids can be conveniently characterized by gas adsorption studies. Two common techniques for describing porosity are the determination of total pore volume and pore size distribution. For the evaluation of porosity of most solid materials, nitrogen at 77 K is used as the adsorbate. **Specification:** The instruments are capable of measuring • Pores with diameter between 20-500 Å, called “mesopores” • Pores with diameters not exceeding 20 Å, called “micropores”
Sample specifications	10 g of powdered sample is to be provided
Types of analysis /Usage	Pore size distribution and total pore volume analysis of powders and porous solid samples can be done
Cost of Instrument	30 lakhs
Year of Installation	2016
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	40%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Inductively Coupled Plasma Atomic Emission Spectrometer

Equipment Name	Inductively Coupled Plasma Atomic Emission Spectrometer
Approved Abbreviation	ICP-AES
Landmark/Location	Room No-208 (Analytical Chemistry Group), Main building
Make(Manufacturer)	Spectro Analytical Instrument, Germany
Model	ARCOS 130 MV
Funding Agency Type	CSIR
Equipment Description	Simultaneous measuring optical system for 130 nm to 770 nm 32 linear CCD detector chips. Optical resolution: 0.008 from 130 – 340 nm. Power output 500 to 2000 watts with automatic plasma ignition. Window based SPECTRO SMART ANALYSER VISION software.
Sample specifications	Min. 100gms(-200 mesh) Powder or Solid sample Length x Breadth x Width(cm) 1.5cm x1.0cm x 0.5cm(Min.) 2.0cm x 1.5 cm x 1cm(Max.) Or clear, organic free, acidic aqueous sample
Types of analysis /Usage	Elemental analysis
Cost of Instrument	84,600.00$ (US)
Year of Installation	2017
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	25 %
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Microparticle size analyzer

Equipment Name	Microparticle size analyzer
Approved Abbreviation	
Landmark/Location	CMCF Lab-1, MCID
Make(Manufacturer)	Microtrac, USA
Model	S3500
Funding Agency Type	CSIR
Equipment Description	The S3500 uses the phenomenon of scattered light from multiple laser beams projected through a stream of particles. The amount and direction of light scattered by the particles is measured by an optical detector array and then analyzed by the Microtrac software. Specification: Size measuring range: 0.09-1400 µm
Sample specifications	20 mg. of powdered samples
Types of analysis /Usage	Wet analysis of dispersed samples
Cost of Instrument	24 lakhs
Year of Installation	2009
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	50%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

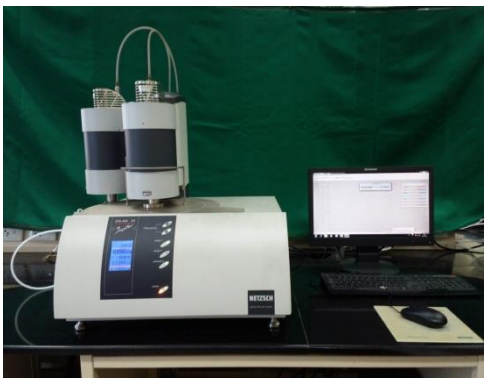
Name of the Equipment: Mercury Intrusion Porosimeter

Equipment Name	Mercury Intrusion Porosimeter
Approved Abbreviation	MIP
Landmark/Location	CMCF Lab-1, MCID
Make(Manufacturer)	Quantachrome Instruments, USA
Model	Poremaster 60
Funding Agency Type	CSIR
Equipment Description	The QuantachromePoremaster 60 is designed to measure pore volumes in the range of about 1000 to 0.0035 µm diameter. Mercury intrusion porosimetry provides rapid and reliable information regarding pore size for R&D, process control and quality assurance in all fields of ceramics. **Specification: L**ow pressure range: 0.2-50 psi High pressure range: 20-60000 psi
Sample specifications	Dried bulk/powder samples are to be provided 20 to 25 pieces of 6 mm x 3 mm x 4 mm of bulk samples or 15 cc of powder sample is required
Types of analysis /Usage	Pore size distribution analysis of both bulk and powder samples can be done
Cost of Instrument	35 lakhs
Year of Installation	2009
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	40%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Zetasizer Nano ZS

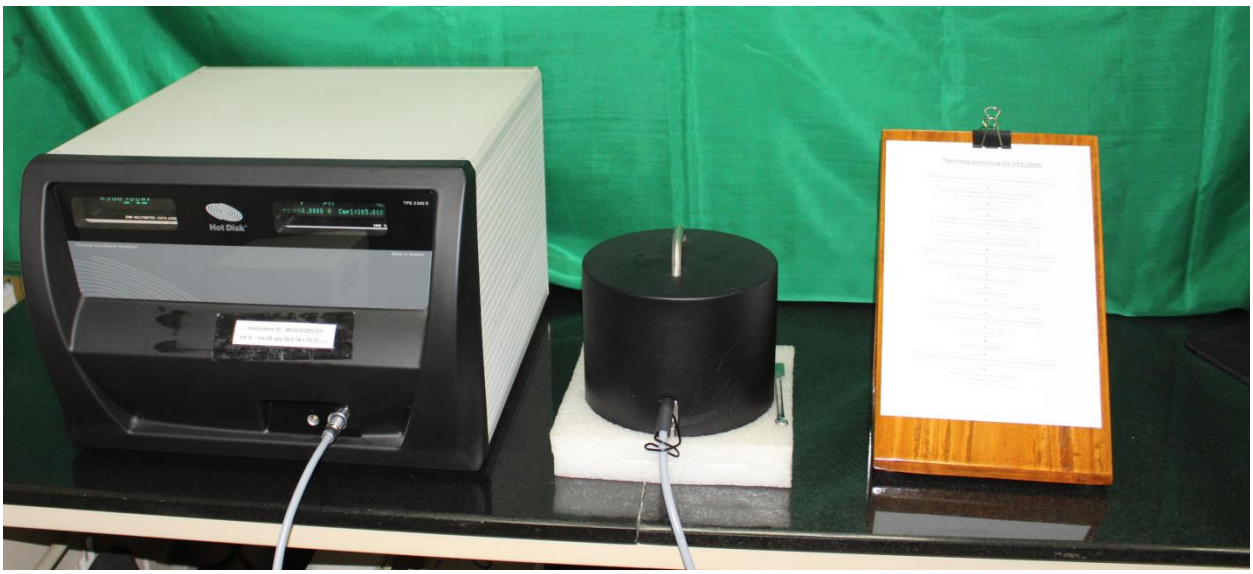
Equipment Name	Zetasizer Nano ZS
Approved Abbreviation	
Landmark/Location	CMCF Lab-1, MCID
Make(Manufacturer)	Malvern Instruments, USA
Model	ZEN3600
Funding Agency Type	CSIR
Equipment Description	The Zetasizer provides the ability to measure the particle size and zeta potential of particles or molecules in a liquid medium. Knowledge regarding particle size and zeta potential are extremely useful in developing stable formulation of products across several industries, such as paint, ink, toners, emulsions and ceramics, etc. **Specification:** • Laser wavelength: 633 nm • Size measuring range: 0.6 nm-6 µm
Sample specifications	20 ml. of dispersed samples
Types of analysis /Usage	Wet analysis of dispersed samples
Cost of Instrument	34 lakhs
Year of Installation	2008
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	50%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Simultaneous Thermal Analyzer



Equipment Name	Simultaneous Thermal Analyzer
Approved Abbreviation	STA
Landmark/Location	CMCF Lab-1, MCID
Make(Manufacturer)	Netzsch-Geratebau, GmbH
Model	STA 449F1 Jupiter
Funding Agency Type	CSIR
Equipment Description	Simultaneous Thermal Analysis is ideal for investigating issues such as the glass transition temperature of glass, the binder burnout of a polymer binder, the dehydration of ceramic materials and the decomposition behavior of inorganic building materials, etc. It is suitable for applications in research and academia, material development and quality control. Specification: • Room temperature to 1500°C
Sample specifications	Dried bulk/powder samples are to be provided. 200 mg of powdered sample is required for DTA/DSC-TGA tests and 200 mg powdered sample or solid disks of size 5.2 mm diameter and 0.25-0.5 mm thickness for specific heat measurement
Types of analysis /Usage	Thermal analysis of glass and ceramics powdered samples
Cost of Instrument	67 lakhs
Year of Installation	2011
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	25%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Thermal Constants Analyzer



Equipment Name	Thermal Constants Analyzer
Approved Abbreviation	TCA
Landmark/Location	CMCF Lab-1, MCID
Make(Manufacturer)	Hot Disk, Sweden
Model	Thermal Constants Analyzer TPS 2500S
Funding Agency Type	CSIR
Equipment Description	One of the most precise and convenient techniques for studying thermal transport properties is the Transient Plane Source (TPS) method. **Specification:** • Solids and powdered samples can be tested at room temperature • Pastes and liquid samples can be testedbetween 10-80°C
Sample specifications	• **Bulk samples:** Two nos. of identical samples measuring diameter: 100 mm, Height 20.5 mm • **Liquid/ paste samples:** 80 c.c • **Powder samples:** 25 c.c
Types of analysis /Usage	The Thermal Constants Analyzer can be used for studying a host of materials such as metals, alloys, ceramics, glasses, powders, pastes, liquids, plastics, building materials, etc.
Cost of Instrument	45 lakhs
Year of Installation	2012
Present status of Equipment(Up/Down/Under)	Up
% of total time to be made available to the external users	50%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Spark Plasma Sintering Furnace

Equipment Name	Spark Plasma Sintering Furnace
Approved Abbreviation	SPS
Landmark/Location	Room No-26, Ground floor, Main Building, CGCRI
Make(Manufacturer)	FCT Systeme GmbH
Model	HP D 25
Funding Agency Type	CSIR
Equipment Description	Plasma sintering with DC pulse, Maximum Operating Temperature- 22000C, Graphite heating element, Maximum Pressure- 50 MPa, Atmosphere- inert, N2, Ar
Sample specifications	Ceramic powder with electrical conductivity, Maximum product size: 75 mm diameter and 5 mm thickness.
Types of analysis /Usage	Fast sintering
Cost of Instrument	Rs. 200 L
Year of Installation	2014
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	20%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication

Name of the Equipment: Hot Pressing

Equipment Name	Hot Pressing
Approved Abbreviation	FCT-Hot Press
Landmark/Location	Room No-28, Ground floor, Main Building, CGCRI
Make(Manufacturer)	FCT Systeme GmbH
Model	HPW 315/400-2200-1000PS
Funding Agency Type	CSIR
Equipment Description	Maximum Operating Temperature- 22000C, Graphite heating element, Maximum Applied Pressure- 50 MPa, Atmosphere- inert, N2, Ar
Sample specifications	Ceramic powder, Maximum product size: 140 mm diameter and 10 mm thickness.
Types of analysis /Usage	Conventional sintering with uniaxial pressure
Cost of Instrument	Rs.70 L
Year of Installation	2005
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	20%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication

Name of the Equipment: Controlled Atmosphere Sintering

Equipment Name	Controlled Atmosphere Sintering
Approved Abbreviation	Brazing Furnace
Landmark/Location	Room No-26, Ground floor, Main Building, CGCRI
Make(Manufacturer)	Centorr Vacuum Industries
Model	20774
Funding Agency Type	CSIR
Equipment Description	Brazing (Ceramic-Metal joining), Maximum Operating Temperature- 2000^0C, Tungsten carbide heating element, Atmosphere- inert atmosphere (hydrogen)
Sample specifications	Available space for brazing- 150mm diameter X 150 mm height
Types of analysis /Usage	Brazing
Cost of Instrument	Rs.85 L
Year of Installation	2012
Present status of Equipment(Up/Down/Under)	UP
% of total time to be made available to the external users	20%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication

Name of the Equipment: High Temperature Bending Strength Tester

Equipment Name	High Temperature Bending Strength Tester
Approved Abbreviation	Hot MOR
Landmark/Location	PCE Room
Make(Manufacturer)	Netzsch GmbH
Model	HMOR 422D/3/G
Funding Agency Type	
Equipment Description	High temperature flexural strength tester Maximum temperature: 1500 °C
Sample specifications	Sample size: 25mmx25mmx150mm
Types of analysis /Usage	High temperature mechanical strength
Cost of Instrument	1,43,020 euro
Year of Installation	2018
Present status of Equipment(Up/Down/Under)	up
% of total time to be made available to the external users	50%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: Laser Flash Thermal Diffusivity Analyser

Equipment Name	Laser flash thermal diffusivity analyser
Approved Abbreviation	Laser flash
Landmark/Location	PCE Room
Make(Manufacturer)	TA Instruments
Model	DLF-1200
Funding Agency Type	CSIR
Equipment Description	Compact laser flash diffusivity system Operating principle: laser pulse Source of laser: Nd-glass Detector: IR Measurement temperature range: RT to 1100°C.
Sample specifications	Sample size: • 25mm O.D. cylinder × 4mm thickness • 12.5mm O.D. cylinder × 4mm thickness • 10 mm square × 4mm thickness
Types of analysis /Usage	Thermal diffusivity
Cost of Instrument	80,090 US$
Year of Installation	2016
Present status of Equipment(Up/Down/Under)	up
% of total time to be made available to the external users	50%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: High Temperature Compressive Creep Tester

Equipment Name	High temperature compressive creep tester
Approved Abbreviation	RUL & Creep
Landmark/Location	PCE Room
Make(Manufacturer)	Netzsch, Germany
Model	RUL421 E/6/G
Funding Agency Type	CSIR
Equipment Description	Determination of refractoriness under load (RUL) and creep in compression of ceramic materials Measurement temperature: upto 1650 °C
Sample specifications	Sample size: 50 mm O.D. cylinder × 50 mm height with a coaxial hole 12.5 mm
Types of analysis /Usage	Refractoriness under load (RUL) and creep in compression
Cost of Instrument	115840€
Year of Installation	2018
Present status of Equipment(Up/Down/Under)	up
% of total time to be made available to the external users	50%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: 400T Press

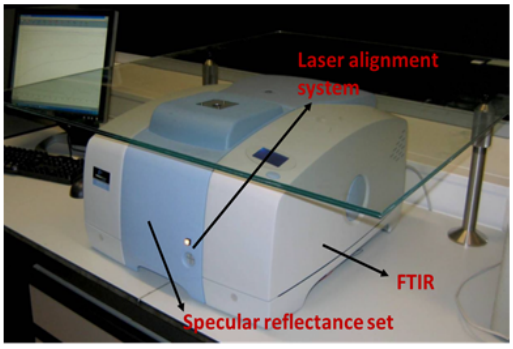
Equipment Name	400 T Press
Approved Abbreviation	Press
Landmark/Location	RTCD Shed
Make(Manufacturer)	Zibo Dekuan Automation Equipment Co. Ltd.
Model	SD 20A-400
Funding Agency Type	CSIR
Equipment Description	Electric Screw Press Maximum pressure: 8000 kN
Sample specifications	Mould size: 9″ × 4.5″ ×3″
Types of analysis /Usage	Green compaction
Cost of Instrument	82,100 US$
Year of Installation	2018
Present status of Equipment(Up/Down/Under)	up
% of total time to be made available to the external users	50%
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication

Name of the Equipment: Multilayer Test Bench

Equipment Name	Multilayer Test Bench
Make(Manufacturer)	Germany
Model	exact Multilayer Test Bench
Equipment Description	Measurement of parameters like polarization, fatigue, piezo
Cost of Instrument	Rs 98 lakhs
Year of Installation	2010

Architectural Glass Research and Testing (AGRT) Facility

A joint initiative of CSIR-CGCRI and Glazing Society of India (GSI) for testing of energy performance of architectural glass, glazing system



Energy performance testing of glazing system using FTIR spectrometer and UV-Vis-NIR spectrophotometer Make : Perkin Elmer

Energy Performance Testing:

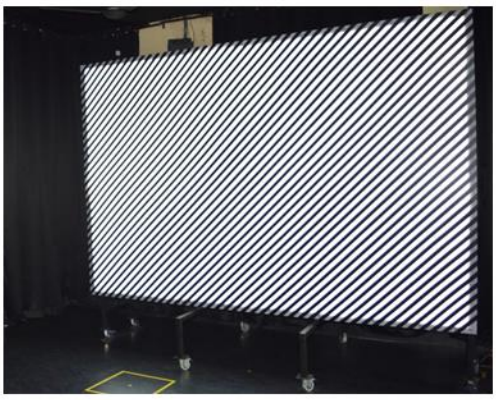
- Solar Direct Transmittance,
- Solar Direct Reflectance (External)
- Light Direct Reflectance (Internal)
- UV Transmittance
- Shading Co-efficient (SC)
- Emissivity & U Value
- Solar Factor (SHGC)
- Light Direct Reflectance (External)
- Light Direct Transmittance,
- Solar Direct Reflectance (Internal)

Architectural Glass Research and Testing (AGRT) Facility

Float glass testing as per standard IS 14900: 2018

DETERMINATION OF SPOT FAULTS

DETERMINATION OF REAMS, STRINGS, LINES AND LINEAR FAULTS



DETERMINATION OF OPTICAL FAULTS
Zebra Board of 2500 mm x 2000 mm

UV test to identify the tin side of float glass
Determination of visual light transmittance

Name of the Equipment: ***Modified Chemical Vapour Deposition System***

Equipment Name	Modified Chemical Vapour Deposition System
Make(Manufacturer)	Nextrom & Tystar Corporation
Equipment Description	Specialty silica optical fiber preform fabrication
Specification	Length of the preform: 500 mm Diameter: up to 20 mm
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication

Name of the Equipment: ***Optical Fiber Drawing Tower***

Equipment Name	Optical Fiber Drawing Tower
Make(Manufacturer)	Control Interface Limited, UK
Equipment Description	Standard 125, 400 µm optical fiber fabrication
Specification	10mm to 25mm OD Glass Preform of about minimum 200mm length
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication

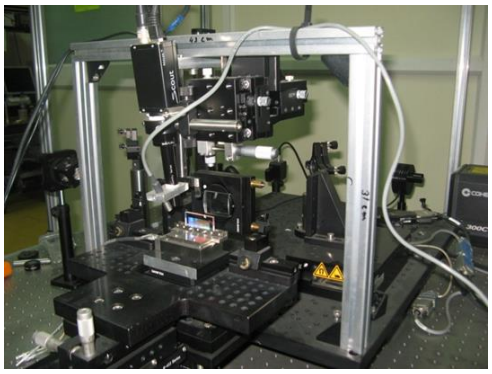
Name of the Equipment: ***Optical Preform Analyzer***

Equipment Name	Optical Preform Analyzer
Make(Manufacturer)	Photon Kinetics (Model PK-2600)
Equipment Description	To measure Refractive Index Profile of optical preform
Specification	Length of the Preform: 500mm Diameter: up to 20 mm
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: ***Optical Fiber Analyzer***

Equipment Name	Optical Fiber Analyzer
Make(Manufacturer)	EXFO, Canada
Equipment Description	Optical Fiber Refractive Index Profiler & Geometry Analyzer
Specification	125 Micron OD fiber about 1 meter length
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: ***Fiber Bragg grating Inscription system***



Equipment Name	Fiber Bragg grating inscription system
Equipment Description	System is used for FBG sensor fabrication. Uniform, apodized, chirped, phase shifted fiber Bragg gratings and also Long period fiber grating can be produced. Facility for phase mask based as well as point by point inscription technology is available.
Specification	FBG can be inscribed using UV, visible and IR lasers. Laser wavelengths are 213 nm, 244 nm, 515 nm and 1030 nm. Length of the FBG can be varied from 0.5mm to 100 mm. FBGs can be inscribed in silica optical fibers of diameter 80 µm, 125 µm, 200 µm and 400 µm.
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication equipment

Name of the Equipment: ***Fiber Bragg grating recoating system***

Equipment Name	Fiber Bragg grating recoating system
Equipment Description	System is used for recoating FBG sensor. Recoating materials: Acrylate polymer and also polyimide
Specification	Recoating length: 20mm to 100 mm Curing method: UV and thermal curing
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication equipment

Name of the Equipment: ***Optical Spectrum Analyzer***

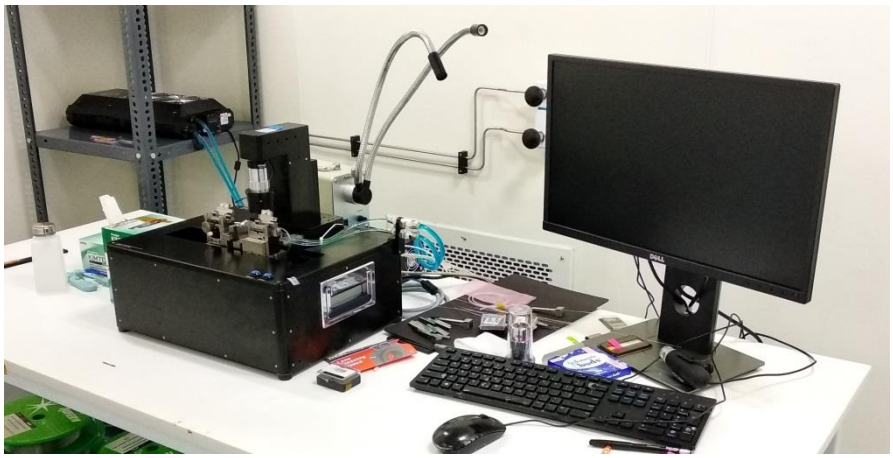
Equipment Name	Optical Spectrum Analyzer
Make(Manufacturer)	Yokogawa, Japan
Equipment Description	Wavelength range : 350 nm -2400 nm Input power level: < 18 dBm Wavelength resolution: 10 pm
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Measurement, Characterization

Name of the Equipment:

Optical Fiber Spectral Attenuation Measurement System

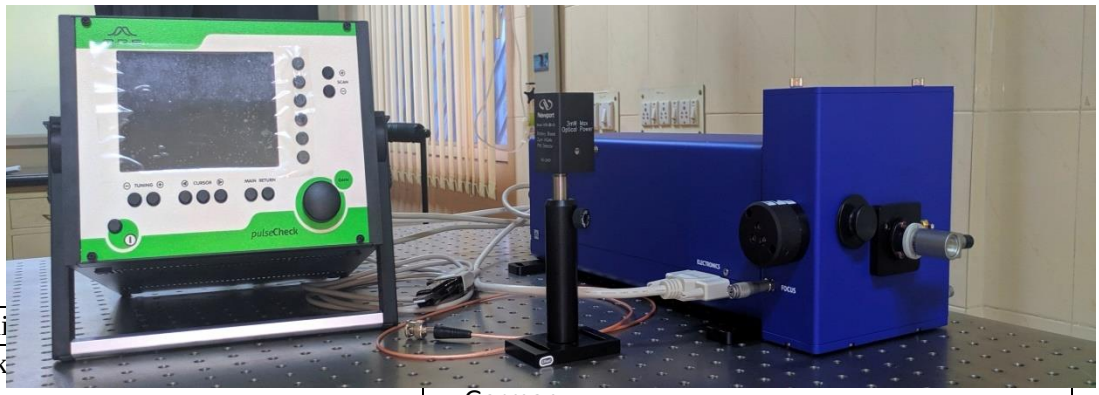
Equipment Name	Optical Fiber Spectral Attenuation Measurement System
Make(Manufacturer)	Bentham Instruments Limited, UK
Model	FLS 300 (TMc300F)
Equipment Description	The equipment is used for measurement of attenuation in silica optical fiber. Wavelength range: 300-5000 nm Resolution: 0.5 nm
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization

Name of the Equipment: ***Automated Glass Processor Unit***



Equipment Name	Automated Glass Processor Unit
Make(Manufacturer)	Vytran, Thorlabs, US
Model	GPX 3600
Equipment Description	Equipment is used for splicing silica optical fiber and producing taper in fiber. Optical fiber upto 1.25mm or 1.7mm Cladding Ideal for Single Mode, Multimode, Polarization-Maintaining, and Specialty Fibers
Specification	Automatic XY and Rotational Alignment Fiber Z-Axis Travel of 180 mm The precision fiber handlers with a resolution of 0.25 µm and rotate a fiber up to 200° with a resolution of 0.02°
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Fabrication

Name of the Equipment: ***Auto-correlator***



Equi	
Mak	Germany
Model	Pulse Check SM 1600
Equipment Description	Equipment is used for Laser pulse characterization in picosecond to femtosecond domain Pulse Width Measurement Range: < 120 fs -400 ps Wavelength span: 1800-5200 nm Resolution: < 0.001 % of scan range
Specification	Input Beam Coupling: Free-space (aperture 6 mm), fiber coupling FC/PC, FC/APC, SMA Input power max. : 1W
Category of the equipment (Fabrication/Characterization/ Measurement etc)	Characterization