

## GLANCE- Glasses, Ceramics and Composites

### AVAILABLE FACILITIES

	Details
Clean Room (*)	- Class 1000 - Wet etching
Cutting machines	- ATM Brillant T220 - Buehler IsoMetHS
Fibre Drawing	Drawing of soft glass fibres and optical fibres Drawing Temperatures up to 1000 °C - Typical drawing speed: 4 to 50 m/min - Diameter fluctuations: $\pm 3\%$ - Preform size requirements: max 15 mm diameter, max 100 mm length
Heating microscope	- Hesse Instruments – EM 301
High temperature furnaces	Tubular Furnaces: - Nabertherm (1600°C) - LENTON(1600°C) - Carbolite STF12/180(1200°C) - Carbolite STF16/180 (1600°C) x2 Muffle Furnaces: - Nabetherm Benchtop High T furnace (1800°C) - Carbolite CWF 13-5 muffle furnace (1300°C) - NABERTHERM L 5/13/C550 (1300°C)x2 - Manfredi OVMAT2009 muffle furnace (1100°C)
Roller Mixer	- Phoenix RS-TR10
Hot press	- Hot-Press PRO.BA (1800°C, 40 tons) vacuum/Ar
Mechanical tests (*)	- Young's modulus via resonance frequency test (Grindosonic) (*) - Vickers, Brinell, Rockwell Hardness, Shore D, ASTM D2240 (*) - Mechanical test machine (SINTEC D/10) (*)
Thermal poling set up	-Thermal poling of materials
Climatic chambers and thermal shock tests	- Votsch™ VT 4020
Polishing machines	- Struer LaboPol-2 - Hi-Tech Europe AP311
Porosimeter	- Porosimeter 2000 FISIONS - Macropores Unit 120 FISIONS
Profilometry	Taylor Hobson Intra Touch 3D
Superficial Analysis	Contact Angle (Kruss)
Refractometer	Abbe Refractometer – Refractive index measurement by prism coupling method (Metricon M2010) at five different wavelengths: 633, 800, 1060, 1320, 1533 nm.
Spectroscopies	- UV/Vis-NIR Cary 500 Varian Absorption spectroscopy - Fluorescence spectroscopy resolved in frequency and time in the wavelength range between 400 and 5000 nm: pump wavelengths available 785, 793, 915, 976 nm. - Shimadzu UV- Visible spectrophotometer 2600-2700 + integrating sphere -X-ray Photoelectron Spectroscopy (XPS, Phi 5000 Versa Probe™) * -FTIR Thermo-Nicolet (with ATR accessory)
Sputtering and Surface Treatment	- Magnetron (RF, DC, pulsed DC) confocal three target (3 inches) co-sputtering with: atmosphere control (three gasses mixture) plasma etching reactive deposition substrate heating and cooling substrate biasing. - Two target magnetron (RF, DC, pulsed DC) co-sputtering (6 inches and 1 inches) with atmosphere control (three gasses mixture) - Quorum Sputter coater (SEM Applications) Q150TS - Atmospheric Plasma (PlasmaTEC-X TANTEC) - Vacuum Etching Plasma (TUCANO) - Corona Plasma (HF-SpotTEC TANTEC)
Thermal analysis	- DMA7 Perkin Elmer (max temp.1000°C) - DTA Netsch (max temp. 1500°C) - TG-SDTA Mettler Toledo (max temp. 1400°C) - Dilatometer Netsch (max temp.1550°C) - DSC 404 F3 Pegasus Netsch, (max temp.1600°C) - DIL 402 EXPEDIS Classic (max temp. 1600)
Microscopic analysis	- Optical microscopy DM750 Leica - Optical Microscopy DMRB Leica - Benchtop Scanning electron microscopy (JEOL JCM6000Plus) equipped with EDS analyzer

	<ul style="list-style-type: none"> <li>- FE-SEM SUPRA 40 ZEISS equipped with EDS analyzer (**)</li> <li>- FE-SEM MERLIN ZEISS equipped EDS analyzer (*)</li> <li>- FIB-SEM SOLARIS X Tescan (*)</li> <li>- TEM THALOS F200X Thermofisher (*)</li> </ul>
Electrophoretic deposition	<ul style="list-style-type: none"> <li>- Electrophoresis BOCHEM LABOR BEDARF</li> </ul>
XRD Analysis	<ul style="list-style-type: none"> <li>- X'Pert Philips diffractometer (*)</li> <li>- X'Pert Empyrean Series III equipped with Hot stage (max 1200C)(*)</li> </ul>
Facilities for biological samples treatment	<ul style="list-style-type: none"> <li>- Laminar flow biological cabinet FASTER CYTOSAFE 2000N modified with filters for chemical reagents. (M-MEDICAL)</li> <li>- Thermostatic bath with adjustable shaking speed (Julabo SW23)</li> <li>- Autoclave (ASAL mod. 760)</li> <li>- Welding machine for sterilization bags (DNT/HW, Falc Instruments s.r.l.)</li> <li>- Refrigerator (T=4°C) with freezer (T=-20°C) (Joint Lab mod. DO4477)</li> <li>- Orbital shaker KS 4000i control, IKA®</li> <li>- Centrifuge (Z326- HERMLE)</li> <li>- Diode Laser 808 nm</li> </ul>
Fluorescence spectroscopy equipment	<ul style="list-style-type: none"> <li>- MM and SM Laser diodes for sample and fibre optical excitation at the following emission wavelengths: 785, 795, 808, 976 nm with powers.</li> <li>- iHR320 Horiba JobinYvon Spectrometer</li> <li>- Lock-in amplifier, chopper, signal generators, Agilent oscilloscope, mounts and optical benches for bulk glass and optical fibre handling and positioning</li> </ul>
Prism coupling	<ul style="list-style-type: none"> <li>- Metricon 2010 prism coupling method with measuring wavelengths of 633, 800, 1060, 1320 and 1533 nm</li> </ul>
Mass Spectrometry	<ul style="list-style-type: none"> <li>- ICP - MS (ICAP Q ICP-MS) (*)</li> <li>- TGA equipped with GCMS (**)</li> </ul>
Vacuum induction melting	<ul style="list-style-type: none"> <li>- NEUTRODYN EASYTI, EGMA 10 FELMI</li> <li>- Induction casting machine up to 2000° C in inert atmosphere</li> </ul>
Shear strength tests	<ul style="list-style-type: none"> <li>- Torsion, lap-shear tests</li> </ul>
Low temperature ovens	<ul style="list-style-type: none"> <li>- BINDER</li> <li>- Memmert UF55-P</li> </ul>
Sonic cleaning	<ul style="list-style-type: none"> <li>- BICASA</li> <li>- Sonica S3</li> </ul>
Milling, mixing and sieving equipment	<ul style="list-style-type: none"> <li>- FRITSCH planetary mono mill (Pulverisette 6 classic line)</li> <li>- FRITSCH milling/sieving Spartan (Analysette 3 Pulverisette 0)</li> <li>- Retsch MM400</li> <li>- Automatic Siever Octagon 200</li> </ul>
Precision balances	<ul style="list-style-type: none"> <li>- OHAUS,</li> <li>- ORMA BCA 510s</li> <li>- RADWAG AS 220-R2</li> </ul>
Cold Press	<ul style="list-style-type: none"> <li>- Autopress t-40 GRASEBY SPECAC,</li> <li>- Autopress P400ir CAGIMBRA SAS</li> </ul>
Electrokinetic Analyzer - Zeta Potential of bulk Solid Samples	<ul style="list-style-type: none"> <li>- SurPASS - Anton PAAR</li> </ul>
Particle size Analysis	<ul style="list-style-type: none"> <li>- Mastersizer 3000+ Malvern Panalytical</li> </ul>
UV-Lamps	<ul style="list-style-type: none"> <li>- Dynamic UV-LAMP (fusion)</li> <li>- Static UV-LAMP (Dymax)</li> <li>- UV-LAMP With optical fiber</li> </ul>
Facilities for antibacterial test (non-pathogen microorganism)	<ul style="list-style-type: none"> <li>- Incubator ICN 35 Plus (Argo Lab)</li> <li>- Refrigerator MediLine (Liebherr)</li> <li>- Bacterial Bioaerosol generator ATM 220 (TOPAS)</li> <li>- McFarland Densitometer DEN 1 Biosan</li> <li>- Autoclave Steristeam 2</li> </ul>
3D Printing Equipment	<ul style="list-style-type: none"> <li>- Prusa SL1S</li> <li>- Asiga MAX</li> <li>- Zmorph VX</li> <li>- Lithoz Cerafab 7500</li> </ul>
Rheology (*)	<ul style="list-style-type: none"> <li>- MCR302e equipped with TC30 controller – Anton Paar(**)</li> </ul>

(\*) DISAT equipment, available under specific conditions

(\*\*) Shared Equipment