

List of equipment and software



CEMMPRE

CENTRE FOR MECHANICAL ENGINEERING, MATERIALS AND PROCESSES



ARISE

Advanced Production and Intelligent Systems
Associated Laboratory

Type	Objective	Equipment	Location
Characterisation	Reverse engineering	3D scanner for reverse engineering	IPN-LED&MAT
Characterisation	3D surface texture analysis	3D surface texture analysis (Optical focus variation) - Alicona – Universal System	IPN-LED&MAT
Characterisation	Abrasive wear evaluation	Abrasive wear evaluation equipment – standard ASTM G65	IPN-LED&MAT
Characterisation	Electrochemistry	AFM and STM Microscopes - Agilent Technologies	IPN-LEC
Characterisation	Roughness (nano)	Atomic Force Microscope (AFM) Veeco dilnova	UC-DEM
Characterisation	Surface wettability	Attension theta-flex	UC-DEM
Characterisation	Sterilizer	Autoclave sterilizer	IPN-LED&MAT
Characterisation	Samples grinding and polishing	Automatic polishing machine - Buehler Vector Power Head	UC-DEM
Characterisation	Weight (powder/bulk)	Balance (OHAUS, Analytical Plus)	UC-DEM
Characterisation	Abrasion test	Ball-cratering – CSEM	IPN-LED&MAT
Characterisation	Rheological properties	Capillary rheometer - Bradender	IPN-LED&MAT
Characterisation	Separate mixtures	Centrifuge - Beckman	IPN-LED&MAT
Characterisation	To perform Charpy tests (150 and 300 J)	Charpy - Roel Amsler RKP 300	UC-DEM
Characterisation	To perform Charpy tests (up to 50 J)	Charpy mini - CEAST	UC-DEM
Characterisation	Culture maintenance	CO2 Incubator - New Brunswick Scientific	IPN-LED&MAT
Characterisation	Colorimeter and Reflectometer	Colorimeter and Reflectometer	IPN-LED&MAT
Characterisation	Surface wettability	Contact Angle (Theta Flex, Biolin Scientific)	IPN-LED&MAT
Characterisation	Non-Destructive testing of material	C-scan no ar	UC- DEEC
Characterisation	Non-Destructive testing of material	C-Scan por imersão	UC- DEEC
Characterisation	Thermal analysis	Differential dilatometer - Netzsch – 402D	IPN-LED&MAT
Characterisation	Microscopy	Digital Microscope Hirox	UC-DEM
Characterisation	Thermal analysis	DSC / TG / DTA up to 1600°C - Setaram SetSys Evolution	IPN-LED&MAT
Characterisation	Thermal analysis	DSC up to 800°C - Netzsch 204 F1 Phoenix	IPN-LED&MAT

Type	Objective	Equipment	Location
Characterisation	Size and zeta potential measurements	Dynamic Light Scattering	UC-DEQ
Characterisation	Chemical analysis	EDS and WDS spectrometers for FEGSEM – Oxford Instruments	IPN-LED&MAT
Characterisation	Chemical analysis	EDS spectrometer – X-Max 20 Oxford Instruments	IPN-LED&MAT
Characterisation	Electrochemistry	Electrical Impedance Spectroscopy - Solartron	UC- DEEC
Characterisation	Electrochemistry	Electrical Impedance Spectroscopy - Agilent	UC- DEEC
Characterisation	Electrochemistry	Electrochemical Impedance Spectroscopy - Solartron	UC-DQ
Characterisation	Electrochemistry	Electrochemical quartz crystal microbalance - Advanced Wave Sensors S.L.	UC-DQ
Characterisation	Electrolytic polishing and etching samples	Electrolytic polishing - Struers Polipower	UC-DEM
Characterisation	Fiber production	Electrospinning (E-FIBER EF100, SKE Research Equipment)	IPN-LED&MAT
Characterisation	Cut and prepare samples	Equipment to cut and prepare samples – Struers	IPN-LED&MAT
Characterisation	Erosive wear evaluation	Erosive wear evaluation equipment - Falex – Alumina Airjet	IPN-LED&MAT
Characterisation	Sample observation	Field emission scanning electronic microscope - Zeiss – Merlin/Gemini II with STEM, ASB, ESB, Charge Compensation	IPN-LED&MAT
Characterisation	Powder Flowability	Flodex determination of intrinsic flowability (Hanson Research)	UC-DEM
Characterisation	Microscopy	Fluorescence optical microscope LEICA, DM 2000 LED	UC-DCV
Characterisation	Measure absorbance and Fluorescence	Fluorometer	UC-DCV
Characterisation	Chemical functional groups of polymers	FTIR	UC-DEM
Characterisation	Identification of chemical functional groups	FTIR	UC-DEQ
Characterisation	Separate and detect chemical components	Gas Chromatograph System	UC-DCV
Characterisation	Acquire and analyse Strain field, in mechanical test	GOM Aramis 5M measurement system	UC-DEM
Characterisation	Hardness (Shore A and D)	Hardness equipment for Shore A and D	IPN-LED&MAT

Type	Objective	Equipment	Location
Characterisation	Density	Helium pycnometer – Micromeritics	IPN-LED&MAT
Characterisation	Measure of electrical current or conductance in a solution	High Range TDS and Conductivity Meter	UC-DCV
Characterisation	Phase analysis	High temperature chamber for XRD - Anton Paar	IPN-LED&MAT
Characterisation	Heat treatment up to 1300°C	High temperature furnace up to 1300°C	IPN-LED&MAT
Characterisation	Heat treatment up to 1850°C with controlled atmosphere	High temperature furnace up to 1850°C with controlled atmosphere	IPN-LED&MAT
Characterisation	Wear evaluation	Home Built Pin-on disk with samples heating (hot air driers)	UC-DEM
Characterisation	Wear evaluation	Home Built Pin-on disk with system for testing in liquids (needing maintenance)	UC-DEM
Characterisation	Samples chemical etching and chemical products storage	Hotte	UC-DEM
Characterisation	Measure Traverse strain during tensile test. Coupled with mechanical longitudinal extensometer, is suitable for 'r' and 'n' testing on sheet metals.	Instron 2640 Series Averaging Traverse Extensometer	UC-DEM
Characterisation	Culture maintenance	Laminar flow chamber - Memmert	IPN-LED&MAT
Characterisation	Friction and wear evaluation	Linear reciprocating wear and friction testing machine - SRV – Optimol	IPN-LED&MAT
Characterisation	To perform Vickers, Brinell or Rockwell hardness measurements (from 1kgf)	Macro Hardness - Karl Frank GMBH	UC-DEM
Characterisation	Observation of as-received, mounted, polished and etched samples	Magnifier - Zeiss	UC-DEM
Characterisation	Optical Mycroscopy	Magnifying Glass (Nykon)	UC-DEM
Characterisation	Observation of as-received, mounted, polished and etched samples	Magnifying glass (Zeiss, Stemi SV6)	UC-DEM
Characterisation	Chemical analysis	Mass spectrometer – Sensor Hyden	IPN-LED&MAT
Characterisation	Porosity	Mercury porosimeter - Micromeritics Autopore III	IPN-LED&MAT
Characterisation	Observation of as-received, mounted, polished and etched samples	Metallographic microscope – Nikon - Optiphot	IPN-LED&MAT

Type	Objective	Equipment	Location
Characterisation	To perform Vickers or Brinell hardness measurements (up to 1kgf)	Micro Hardness - Shimadzu HMV-G	UC-DEM
Characterisation	Hardness measument	Microhardness equipment for Vickers – Shimadzu HMV-2	IPN-LED&MAT
Characterisation	Precise absorbance, flourescence and luminescence measurements	Microplate reader	UC-DEQ
Characterisation	Cell and tissue culture applications and routine cell maintenance	Microscope - digital transmitted-light inverted imaging system	UC-DEQ
Characterisation	Observation of as-received, mounted, polished and etched samples	Microscope - Leica DM400 M LED	UC-DEM
Characterisation	Observation of as-received, mounted, polished and etched samples	Microscope - Zeiss AxioTech	UC-DEM
Characterisation	Precision lenght X-Y measurements using an magnified observation of samples' surface	Mitutoyo Toolmakers Microscope	UC-DEM
Characterisation	Wear evaluation	Multifunctional tribometer - High temperature - Humidity control - low load - 3D interferometer analisys in real time	IPN-LED&MAT
Characterisation	Hardness measument	Nano Indenter (MicroMaterials NanoTest Platform 1)	UC-DEM
Characterisation	NonDestrutive testing of material	Omniscan	UC- DEEC
Characterisation	Observation of as-received, mounted, polished and etched samples	Optical microscope (Zeiss, AxioLab)	UC-DEM
Characterisation	Optical Mycroscopy	Optical microscope for correlative analysis with FEGSEM and particle analysis – Zeiss - Axio Imager 2	IPN-LED&MAT
Characterisation	Optical Mycroscopy	Optical Microscopy (Nykon 241943)	UC-DEM
Characterisation	Optical Mycroscopy	Optical Microscopy (Nykon 276012)	UC-DEM
Characterisation	Oxygen Transmission Rate Test	Oxygen Transmission Rate Test System (C201 B, Labthink)	IPN-LED&MAT
Characterisation	Environmental Nanoparticles evaluation	Particle counter (TSI, model 3034 SMPS)	UC-DEM

Type	Objective	Equipment	Location
Characterisation	Particle size analyser	Particle size analyser - Malvern 3000	IPN-LED&MAT
Characterisation	Measure of pH values	pH meter	UC-DCV
Characterisation	Phase analysis	Philips X-Pert X-ray diffractometer – Panalytical	IPN-LED&MAT
Characterisation	Friction and wear evaluation	Pin on disk friction and wear evaluation equipment – standard ASTM G99	IPN-LED&MAT
Characterisation	Samples grinding and polishing	Polishing table - Buehler	UC-DEM
Characterisation	Potenciometry	Potentiometer	UC-DEQ
Characterisation	Electrochemistry	Potentiostat - Autolab	UC-DQ
Characterisation	Electrochemistry	Potentiostat - Princeton Applied Research	UC-DQ
Characterisation	Measure potentials and currents	Potentiostat EMStat4S/LR with software PSTrace5	UC-DCV
Characterisation	Electrochemistry	Potentiostat with Faraday cage	UC-DEM
Characterisation	Electrochemistry	Potentiostate Palmsense	UC-DEQ
Characterisation	Electrochemistry	Potentiostate/Galvanostate Autolab - Led solar simulator	UC-DEQ
Characterisation	Raman Spectroscopy	RENISHAW inVia Raman Microscope	UC-DEM
Characterisation	3D image	Scanner 3D handheld Einscan Pro HD	UC-DEM
Characterisation	Sample observation	Scanning electronic microscope - Jeol JSM-5310	IPN-LED&MAT
Characterisation	Adhesion	Scratch-tester – CSEM	UC-DEM
Characterisation	To Heat Samples using high heating rates for mechanical testing	SEALEY - Induction Heater - Rapid Heat	UC-DEM
Characterisation	Sample observation/Chemical analysis	SEM/EDS	UC-DEM
Characterisation	Surface area of particles	Surface area analyser - ASAP 2000	IPN-LED&MAT
Characterisation	Surface texture analysis	Surface texture analysis (laser and mechanical) Mahr Perthen – S4P	IPN-LED&MAT
Characterisation	Thermal analysis	TG up to 800°C - Netzsch 209 F1 Libra	IPN-LED&MAT
Characterisation	Conditioning with thermal and humidity	Thermal and Humidity Conditioning Chamber	IPN-LED&MAT
Characterisation	Thermal conductivity analysis	Thermal conductivity analyser – Applied Precision – ISOMET 2104	IPN-LED&MAT
Characterisation	Thermal conductivity analysis	Thermal conductivity analyser – HotDisk	IPN-LED&MAT

Type	Objective	Equipment	Location
Characterisation	Sample observation by electron transmission	Transmission Electron Microscope (TEM) FEI TECNAI G2	UC-DEM
Characterisation	Hardness measurement	Ultramicroindenter – FischerScope	UC-DEM
Characterisation	Clean	Ultrasound cleaning equipment	IPN-LED&MAT
Characterisation	Mechanical test	Universal mechanical testing machine – Inspekt SOLO 2.5	IPN-LED&MAT
Characterisation	Mechanical test	Universal mechanical testing machine – Instron Autograph – 100,000kN	IPN-LED&MAT
Characterisation	Absortion spectrum	UV-Vis spectrophotometer	UC-DEQ
Characterisation	Water vapor permeability testing	Water Vapor Transmission Rate Test System (C301 B, Labthink)	IPN-LED&MAT
Characterisation	Roughness	White Light Interferometer	UC-DEM
Characterisation	Phase analysis	X-ray diffractometer (Rigaku SmartLab) – Cu source with transmission, capillary, residual stress, pole figures	IPN-LED&MAT
Characterisation	Phase analysis	X-ray diffractometer (x Pert Pro)	UC-DEM
Characterisation	Elemental analysis	X-ray fluorescence spectrometer – Axios maX – Panalytical	IPN-LED&MAT
Characterisation	Microdefects (inside)	X-ray microtomography from Bruker for parts up to 120mm	IPN-LED&MAT
Manipulation	Robot for repetitive motion commands	6 DOF robot	UC-DEM
Manipulation	Robot for compliant manipulation	3D surface texture analysis	UC-DEM
Manipulation	Handling materials in protected atmosphere	Glove chamber (vacuum) Plas Lab	UC-DEM
Manipulation	Culture maintenance	Incubator shaker	UC-DCV
Manipulation	Amplify DNA and RNA samples by polymerase chain reaction	Prime Thermal Cycler 96x0.2ml	UC-DCV
Manipulation	Removal of solvents and synthesis	Rotary evaporator	UC-DEQ
Manipulation	Culture maintenance	Vertical laminar flow MSC-advantaged 1.2	UC-DCV
Preparation	Weigh	Analytical balance Bioblock Scientific LB-3000	UC-DEM
Preparation	Samples mounting at T > RT	Automatic mounting press (Digipress, Mekton)	UC-DEM

Type	Objective	Equipment	Location
Preparation	Powder/Feedstock	Bradender, Plastograph	UC-DEM
Preparation	Separate mixtures	Centrifuge refrigerated for falcons 15 ml and 50 ml	UC-DCV
Preparation	Separate mixtures	Centrifuge refrigerated for small volumes (eppendorf 1.5 and 2 ml)	UC-DCV
Preparation	Powder manipulation	Chamber with control atmosphere (Homemade)	IPN-LED&MAT
Preparation	Samples cutting	Cutter (South Bay Technology Inc, Model 660)	UC-DEM
Preparation	Powder/Feedstock	Dimpler Grinding (Gatan, model 656)	UC-DEM
Preparation	Drying filaments	Electrical excicator	UC-DEM
Preparation	Disrupt samples	Emulsiflex	UC-DCV
Preparation	Samples cutting	High precision cutter (Struers, Secotom 10)	UC-DEM
Preparation	Measure of mass weight	Industrial balance - 3 Kg	UC-DCV
Preparation	Water removal process	Lyophilizer / Freeze dryer (with vacuum pump)	UC-DCV
Preparation	Stirring a solution	Magnetic stirrer	UC-DCV
Preparation	Stirring a solution with temperature	Magnetic stirrer with heating	UC-DCV
Preparation	Powder/Feedstock	Milling (Hellweg M50/80)	UC-DEM
Preparation	Powder/Feedstock	Mixing Z-Blade (Morton machine N0.0 DUP)	UC-DEM
Preparation	Samples grinding and polishing	Polishing machine (Struers, Planopol-3)	UC-DEM
Preparation	Samples cutting	Rough cutter (Stuers, Mesotom)	UC-DEM
Preparation	Surface cleaning	Ultrasonic cleaner Branson 5200	UC-DEM
Preparation	Bulk sample/specimen/3D Object cutting	Ultrasonic Disk Cutter (Aname, model 170)	UC-DEM
Preparation	Size reduction, cell disruption, emulsification, and dispersion of nanoparticles	Ultrasonic probe	UC-DEQ
Preparation	Disrupt samples	Ultrasonic Processor for Small Volume Applications	UC-DCV
Production	Manufacturing	3D printer	UC-DEQ
Production	Additive Manufacturing	3D printer machines for polymer filament and UV resin polimerisation	IPN-LED&MAT
Production	Additive Manufacturing	3D Printing (Prusa MK3)	UC-DEM
Production	Additive Manufacturing	3D Printing (Prusa MK3S)	UC-DEM
Production	Cleaner/remover	Abrasive air jet cleaner/remover	IPN-LED&MAT
Production	Milling	Ball mill equipment - Retsch PM 400	IPN-LED&MAT

Type	Objective	Equipment	Location
Production	CNC machine with triaxial force/binary acquisition	CNC machine with triaxial force/binary acquisition system up to 25,000 rpm from Kistler - Leadwell V-40	IPN-LED&MAT
Production	Heat treatment	Conventional Oven, resistant wire heater (Termolab)	UC-DEM
Production	Thin Film Deposition	Edwards PVD deposition chamber with two chatodes and RF power supplies	UC-DEM
Production	Fiber production	Electro-spinning - Nabond electro-spinning kit	IPN-LED&MAT
Production	Polymeric filament production	Extruder	UC-DEM
Production	Mixing and Filaments Production	Extruder (Bradender)	IPN-LED&MAT
Production	Polymer 3D printing	FlashForge	UC-DEM
Production	Freeze dryer	Freeze dryer – ScanVac down to -80°C	IPN-LED&MAT
Production	Thin Film Deposition	Hartec PVD deposition chamber with two chatodes and DC and HIPIMS power supplies	UC-DEM
Production	Coating of powders	Home-made deposition chamber with one chatode and DC power supply	UC-DEM
Production	Precision materials deposition system	Inkject Dimatix	UC-DEQ
Production	Green Densification	Isostatic Pressure (200 MPa) R7 12 30)	UC-DEM
Production	Mixer	Magnetic rotation mixer – Snijers	IPN-LED&MAT
Production	Thin Film Deposition	Magnetron sputtering equipment – Teer Coatings (4 targets) UDP 650	IPN-LED&MAT
Production	Thin Film Deposition	Magnetron sputtering equipment (2 targets) with 2 ion guns for associated nanoparticles– Prototype	IPN-LED&MAT
Production	Drying	Muffle (SLW simple 53 Forlab)	UC-DEM
Production	Powder mixing	Planetary ball milling - Fritsch Pulverisette 5	UC-DEM
Production	Powder mixing	Planetary ball milling - Fritsch Pulverisette 6	UC-DEM
Production	Powder mixing	Planetary ball milling - Fritsch Pulverisette7	UC-DEM
Production	Polymer injection	Polymer injection machine - Arburg 20 MPa	IPN-LED&MAT

Type	Objective	Equipment	Location
Production	Polyurethane production	Polyurethane reactor - Afros Cannon	IPN-LED&MAT
Production	Polymer 3D printing	Robot	UC-DEM
Production	Extrusion	Single axle extruder - Bradender	IPN-LED&MAT
Production	Turning machine with triaxial force acquisition	Turning machine with triaxial force acquisition system from Kistler – Gurutzep	IPN-LED&MAT
Production	Freeze	Ultra freezer system down to -86°C - NewBrunswick U410	IPN-LED&MAT
Production	Densification	Uniaxial Pressure (LARZEP)	UC-DEM
Production	Heat treatment	Vertical oven, IR radiation heater (Research Incorporation) heat rate (100°C/s) (Research Incorporation)	UC-DEM
Production	Manufacturing of PCBs	Voltera	UC-DEQ
Simulation	Nonlinear Multi-scale Material and Structure Modeling Platform	Software “Digimat”	UC-DEM
Simulation	Numerical simulation using different codes	Workstations (different characteristics, up to i7-10700K CPU @ 3.80GHz, 3.79 GHz, 32Gb RAM)	UC-DEM
Other	Freeze samples to -80°C	Deep Freezer	UC-DCV
Other	Heat treatment	Furnace (Thermolab)	UC-DEM
Other	Heat treatment	Horizontal quartz furnace (controlled atmosphere)	UC-DEM
Other	Motion sensors	Magnetic tracking systems	UC-DEM
Other	Incubate cultures	Universal oven	UC-DCV
Other	Create an area devoid of air	Vaccum pump	UC-DCV
Other	Heat treatment	Vertical furnace (Thermolab)	UC-DEM

