

GREMAN

Materials Microelectronics
Acoustics Nanotechnology
UMR 7347



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GREMAN is a research laboratory of the University of Tours, CNRS and INSA Centre Val de Loire on materials, devices and systems for the conversion and management of electrical energy with a main objective of improving energy efficiency.

Thanks to the skills of its four teams which cover materials sciences (physics and solid-state chemistry) and engineering sciences (microelectronic, acoustic, electrical engineering), activities start from the synthesis of new materials with remarkable properties until the development of components and devices, and their integration into electrical systems.

The applications relate to new microelectronic devices, transducers and ultrasonic systems, electrical energy conversion systems.

These research activities include fundamental studies using simulation tools and models developed within the laboratory. They also rely on several technological platforms, particularly on CERTeM (R&D center for microelectronics) for manufacturing and multi-physical and multi-scale characterization.

RESEARCH TOPICS

- Oxides for energy
- Magnetic and optical properties of multiferroic and electronic correlated materials
- Ultrasonic devices and characterisations
- Energy, Components, systems, microelectronics

EQUIPMENT AND TECHNOLOGY

- 2400 m² clean rooms (ISO 5, 7 and 8), lithography, plasma etchings (RIE, IBE), annealing (RTA, high temperature, laser)
- Deposition methods (PVD, PLD, LPCVD, PECVD, ALD, spin coating)
- Synthesis of powders and ceramics (Spark Plasma Sintering), single crystals (image furnace)
- Structural, micro-structural and chemical characterizations (MEB, MET-STEM-EELS, FIB-STEM, diffraction X, WDS, EDS, AFM)
- Electrical measurements: DC and RF under probes, anechoic chamber, PPMS, AFM
- Optical measurements: spectroscopy (IR, visible, UV, Raman), ellipsometry, laser interferometry and vibrometry, holography, Kerr magnetometer, SNOM
- Thermal measurements: laser flash, thermoelectric (ZEM-3, PPMS), SThM, thermoreflectance, PPMS
- Acoustic measurements: microscopy, immersed and automated systems, US beamformers
- Mechanical measurements: AFM, micro-scratch, adhesion

INTERNATIONAL COOPERATIONS

- Jozef Stefan Institute - Ljubljana (Slovenia)
- Dublin City University & Limerick University (Ireland)
- IMM CNR & Catane University (Italy)
- Polytechnic University of Catalonia & ICMAB-CSIC (Spain)
- Applied Mineral Chemistry Laboratory – Tunis El Manar University (Tunisia)
- National University of La Plata (Argentina)
- Daegu Gyeonbuk Institute of Science and Technology DGIST (Korea)
- Tokyo & Tohoku Universities (Japan)

ACADEMIC PARTNERSHIP

- CEA – Le Ripault - Saclay - LETI
- GREMI, CEMTHI, ICMN – Orléans
- SPMS – Saclay
- CETHIL - Lyon
- IPR – Rennes
- IMN - Nantes
- LSPM-USPN – Paris
- ENSAM - PIMM - Paris
- ICS & ICPEES - Strasbourg
- IRCER - Limoges

INDUSTRIAL COLLABORATIONS

- STMicroelectronics – Tours
- VERMON
- THALES R&T – Avionics – DMS
- SOITEC
- PROTAVIC
- SRT Microcéramique
- Fractal Energy
- CTS – Ferroperm Piezoceramics

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