

IMS LABORATORY



The IMS Laboratory of Bordeaux develops original and coherent research actions in the domains of:

- Modelling and elaboration of materials, sensors and microsystems for the electronic devices; modelling, design, integration and reliability analysis of components, circuits and assemblies;
- Identification, command, signal processing and images, supervision and conduct of the complex and heterogeneous processes.

The fields of application of the laboratory concern in particular transports and are investigated through numerous European, national or regional projects.

Key Research Fields and Competence Areas:

Reliability:

- Behavioral modelling based on physical phenomena
- Multi-physics approach: electrical, thermal, physico-chemical, mechanical, EMC
- Interaction on the three domains: material, device and system

- Identification and modelling of degradation and failure mechanisms
- Life time distribution modelling

Power semi-conductor devices:

- Influence of thermal and mechanical stresses on active devices
- Electrical, thermal and mechanical characterization of Si, SiC, AsGa
- Finite elements electrothermal modelling for gate power devices (IGBT, MOSFET) under extreme operating conditions
- Electrothermal behavior in harsh environment

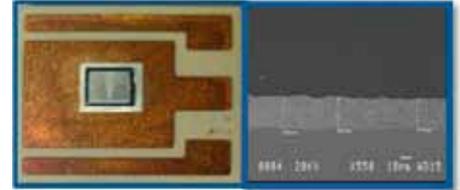


System topologies and assembly:

- Development of characterisation tools for complex assemblies
- Determination of parametric degradation laws
- New 3D-oriented mounting technologies of assemblies (low pressure sintering contact paste)

Energy storage systems and hybrid sources management:

- Characterization of storage devices close to the use (SCap, batteries...)



- Behavioral modelling closely related to physics
- Ageing monitoring, failure mechanisms identification
- Ageing modelling and specification of State Of Health criteria
- Taking into account the module integration constraints (real system)
- Simulation of the interaction storage / power and management electronics
- Hybridization strategy adaptation to the storage device

Highlights:

Virtual prototype design platform

- FEM simulations tools
- High performance computing platform

Assemblies characterization

- Failure analysis equipment
- Electrical, thermal and mechanical characterization

Ageing tests platform

Characterization and cycling of energy storage systems platform

- Electrochemical workstations
- Accelerated ageing from power cycling, endurance
- Environment (climatic chambers, ovens...)