

NATIONAL RESEARCH COUNCIL OF ITALY (CNR)

The Institute

The Institute for Microelectronics and Microsystems (IMM) belongs to the Physics and Matter Technologies Department (DSFTM) of the National Research Council of Italy (CNR), the largest Italian public research organization. IMM has the headquarters in Catania and research units located in Agrate, Bologna, Rome, Naples, Lecce and Catania. The Institute has a permanent staff of about 200 people, with expertise in physics, chemistry and electronics engineering. The temporary staff counts also several Post-Docs and Ph.D. students.



The research activity is focused on innovative solutions for micro and nanoelectronics, advanced materials and processing for smart components, optoelectronics and photonics, sensors and multifunctional micro/nanosystems. In particular, IMM has a recognized experience on wide band gap semiconductors (SiC and GaN) device processing and physics, carrying out fundamental research with important implications in power electronics.

Key research fields and competence areas

The main research interests and competences are focused on the physics of SiC and GaN power devices (Schottky diodes, JBS, MOSFETs, HEMTs, MISHFETs, MOSHEMTs,...), including materials, processing and devices behavior. The key research topics include:

- Physics of metal/semiconductor interfaces (Ohmic and Schottky contacts)
- Transport phenomena at dielectrics/semiconductors interfaces
- Carrier profiling after doping and activation
- Post-oxidation annealing of gate oxides and mobility in WBG transistors.
- Atomic Layer Deposition (ALD) of novel dielectrics materials
- Integration of 2D materials (like graphene, MoS₂, ...) on WBG devices technology

Facilities and highlights

The research activity takes advantage of the facilities of the Institute, in particular, of a clean room equipped for lithography (direct laser writing, e-beam and nano-imprinting lithography), etching (plasma etchers with F and Cl chemistry, dedicated

wet benches), thermal processes (conventional and rapid annealing furnaces), metal layer deposition (multi-target sputters and evaporation systems), atomic layer deposition. Moreover, the Institute holds competencies and equipments to carry out a wide range of advanced morphological, structural and electrical characterizations (TEM, XRD, AFM, SPM, Hall, I-V, C-V,...), required in power electronics devices technologies.

