IMPRESA

Use of polymeric and composite materials for embedded sensors in low cost devices for multi-field applications

IMAST members involved:

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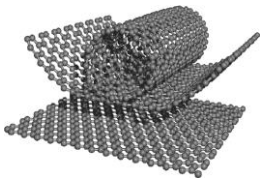
- **CRF S.c.p.A. -** FIAT Research Center
- **STMicroelectronics s.**r.l.
- **CNR -** Institute for Composite and Biomedical Materials (**IMCB**) and Institute for Microelectronics and Microsystems **(IMM)**
- **University of Salerno –** Department of Industrial Engineering **(DIIN)**

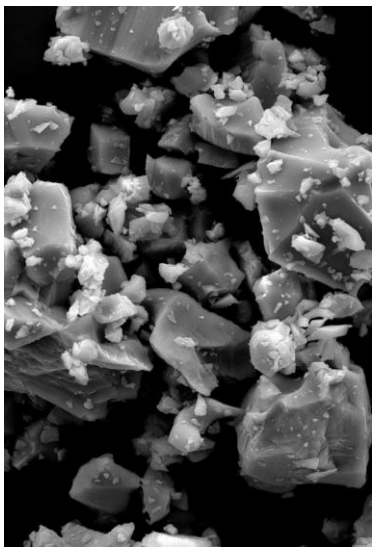
Objective

In the frame of the IMPRESA project, a set of **sensors devices** for transportation and environmental monitoring, will be realized. In particular, systems able to monitor **pressure** and **moisture** and able to detect the **presence of toxic gases,** will be implemented through multifunctional composite materials development.



Polymeric composite systems, with thermosetting and thermoplastic matrices, will be developed for sensor devices realization, by adding inorganic fillers: carbonaceous structures, such as graphene and carbon nanotubes (CNTs) and metal oxides with sensing function (Zn, In, Sn, W, Mo).

In addition, thin film transistors with a semiconductor channel of zinc oxide (ZnO) and its derivatives will be realized for gas sensors through a deposition process compatible with the low cost processes typical of the printed electronics platform. Predictive computational models on molecular and mesoscopic scale will be developed for the definition of functional hybrid organic-inorganic nanostructures.



The developed multifunctional systems will be applied on board vehicle both as pressure sensors for the sitting passengers posture identification and as moisture sensors interfacing with air conditioning system for the detection of environmental comfort parameters of passenges. Furthermore, gas sensors arrays will be used to evaluate the air conditions inside passenger compartement to check the passengers safety status.