

# Microtechnology Department of MFA – Hungarian developer of physical and chemical sensors as well as integrated systems



## WHO WE ARE:

The Microtechnology Department belongs to the Research Institute of Technical Physics and Materials Science (MFA) of the Hungarian Academy of Sciences. Our primary R&D activity is in the field of **sensing principles, semiconductor based sensors, novel semiconductor structures** and related processes. Special attention is devoted to the **needs of SMEs** and the **involvement of education**. The work of researchers is supported by a strong staff of engineers and technicians by operating a complete Si processing line.

## COLLABORATION INTERESTS:

The research groups of MFA are interested in participating in international research programmes in the field of the research areas listed below. Cooperation in bi- or multilateral level is preferred in case of large scale projects in the medium term. Our possible role: major partner, technology provider. We can also take coordination tasks on mutual demand.



**WHAT  
MAKES US  
A GOOD  
PARTNER**

- We have a **massive research group of 2 D.Sc, 14 PhD and 3-6 PhD students** every year.
- We operate a complete Si processing line with a mask shop and back end processing capabilities.
- Our R&D work is supported by **strong analytical background** in the institute and at our Hungarian cooperating partners.

## AREAS FOR POTENTIAL R&D COLLABORATION:

- Sensorics: gas, chemical, pressure, force and tactile sensors
- MEMS related process development with special attention to porous Si and its application
- Semiconductor LEDs and different LPE techniques
- Nanocrystal structures (Si, SiC, etc.)
- Process development of Si and CIGS solar cells
- SAW devices and MicroWave antennas
- Modelling and analysis of ion-implantation, oxidation processes
- Ion-beam analysis, electrical characterization

## MAIN ACHIEVEMENTS:

The MEMSWAVE project that we participated in as a partner was among the ten finalists nominated to the Descartes prize in 2002.

In 2007, a new gas sensor system will be introduced to the market that operates with the gas sensor chip we developed in the frame of the SAFEGAS project.

## REFERENCE PROJECTS:

The Microtechnology Department of MFA has participated in 8 EU funded projects and 2 projects in the frame of NSFP. In addition to this, we participate in several domestic research projects and industrial R&D cooperation projects every year.

### Selection of EU projects

**SAFEGAS (EU FP5 GROWTH):** Sensor Array for Fast Explosion-proof Gas Monitoring. As a result of this project a new sensor structure will be developed based on an integrated microsensor array of calorimetric catalytic sensors (not sensitive to humidity effects), which with adequate signal processing aims at the olfactory detection and compositional analysis of combustible gas mixtures. MFA's task was to develop an integrated calorimetric gas sensor array chip for olfactory detection of combustible gases in explosive environment. Role of MFA: Partner

**MEMSWAVE (EU, INCO-COPERNICUS):** Micro-machined circuits for microwave and millimetre

wave applications. MFA's task was the functional testing of devices fabricated in the frame of the project by the other partners. Role of MFA: Partner.

**FRENDTECH (EU FP5, IST):** Model development and verification for ion implantation, diffusion, and oxidation in future Si and SiGe devices. Role of MFA: Partner.

**CADRES (EU FP6, IST):** Coordinating Action on Defects relevant to Engineering Silicon-Based Devices. Role of MFA: Partner.

**SEMINANO (EU FP6, STREP):** Formation of semiconductor nanocrystals for micro- and optoelectronic applications. Task of MFA: Fabrication and characterisation of embedded nanocrystal structures. Role: Partner.

### Selection of other projects

**TELESENSE:** Sensing computers and telepresence (Hungarian National Office for Research and Technology). Task of MFA: Development of integrated micro force sensor array for tactile sensing. Role: Partner.

**AQUANAL** (Hungarian National Office for Research and Technology) - On-site analysis of underground water and soil with micro- and nano-sensing systems. Task of MFA: Elaboration of measuring principles and development of sensors for detection of hydrocarbons in soil and underground water. Role: Coordinator.

## OTHER INFORMATION:

Name of the research department:

Microtechnology Department

Name of organisation: Research Institute for Technical Physics and Materials Science (MFA)

Legal structure of organisation: MFA is a research institute of the Hungarian Academy of Sciences

Country: HUNGARY

Number of researchers: 20

Working languages: Hungarian, English

Contact person: Gabor Battistig

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