

Italian research institute looks for partners to use, test and further develop nano-enabled Micro-Electro-Mechanical Systems providing analytical functionalities to chemical sensing systems

- **SCHEDA**
- **APPROFONDIMENTI**

Identificativo proposta: TOIT20211122001

RICHIEDI MAGGIORI INFORMAZIONI

An Italian research institute offers miniaturized gas sensing systems combining analytical functionalities of nano-enabled Micro-Electro-Mechanical Systems devices with microsensors, which provide higher sensitivity and selectivity as well as low cost in chemical analysis. The institute would like to conclude commercial agreements with technical assistance or technical cooperation agreements with R&D partners in order to continue the research.

An established Italian research institute, expert in microelectronics and microsystems, has a long experience in Micro-Electro-Mechanical Systems (MEMS) based devices for analytical chemistry applications. The research institute has the biggest publicly funded facility for silicon micro-machining in Italy, located in a 500 m² clean-room (controlled environment) with 100 (ISO 5) and 100000 (ISO 8) class laboratories, fully equipped with technological instrumentations for research on materials and processes in the fields of micro-nano electronics and micro-systems. The institute is capable of developing and manufacturing high TRL prototypes devices, in particular MEMS, using micro-machining techniques for silicon (Si), silicon carbide (SiC), and quartz substrates, third-generation solar cells and photovoltaic devices. In synergy with Si technologies, research activities on carbon-based materials, like carbon nanotubes (CNTs), graphene and silicon carbide, are extensively carried out. The research institute is engaged in a demonstration case within the "New Nano-Enabled Products" pilot of the Vanguard Initiative - an association of 30 European regions committed to stimulating industrial modernisation through more effective deployment of new technologies, offering companies easier access to facilities for demonstration, to lower technology uncertainty and speed up market uptake of new technologies, more advanced industrial production and value chain. The institute is working on the diffusion of MEMS technology integrated with analytical functional nanomaterials to produce innovative miniaturized sensing systems or enhance existing ones, by adding analytical functionalities of nano-enabled MEMS devices to microsensors. By using multifunctional sensing systems - MEMS technology in combination with molecular recognition nanomaterials, featuring selective pre-concentration capabilities - it is possible to enhance the performance of sensing systems. The combined use of nanomaterials and MEMS technologies, in fact, enables higher sensitivity and selectivity (due to nanomaterials), as well as transportability and shorter analysis time while ensuring smaller size and low cost (due to MEMS technology). For example, to perform reliable chemical gas analyses, very high selectivity is necessary to avoid false signals provided by interferences in the sample. Specifically engineered nanomaterials feature selective pre-concentration capabilities, which means that they retain only some classes of volatile molecules (e.g. aromatics) and discard the other ones, or under a certain concentration, dimension, form and material selection. Application areas include: - safety & security (detection of chemicals released by accidents or terrorist attacks) - food safety and quality, also in food in logistics - environmental sensing (air quality, pollution) - industrial process monitoring - smart cities - indoor air quality monitoring. The institute produces, in small to medium volumes, advanced analytical multi-sensing systems, whose components are developed as MEMS-based devices: gas and/or liquid injectors, fast pre-concentrators, gas chromatographic separation columns, and miniaturized or micromachined detectors. These devices are currently integrated at the system level, including custom electronics, firmware, and software. The Italian institute is looking for research and industrial partners along the value chain to adopt and test the technology, or to co-develop miniaturized innovative sensing systems integrating MEMS and functional nanomaterials, to further research and develop new versions, and to discover and test new applications for different markets. Partners will work jointly under technical cooperation agreement or commercial agreement with technical assistance. Partners sought come from Belgium, Germany, Netherlands, Slovenia, Spain, Sweden and Portugal, and all regions members of the Vanguard Initiative.

Riferimento Esterno: TOIT20211122001

Tipo: Technology Offer

Paese: Italy

Presentazione: 30/11/2021

Ultimo aggiornamento: 09/12/2021

Scadenza: 09/12/2022