



COST

European Network on New Sensing Technologies for Air Pollution Control and Environmental Sustainability - *EuNetAir*

COST Action TD1105

Special Interest Group 1 : *NETWORK OF SPIN-OFFS*

Action Start date: 01/07/2012 - Action End date: 30/06/2016



Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile

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SIG-1 Leader

ENEA - Italy



Context of the SIG-1

- Special Interest Group 1 – Network of spin-off – involve, at present, 11 spin-off and/or start-up from 8 different COST Countries that develop their economic activities on the four principal areas of the Action (Sensor Material and Nanotechnology, Sensors, devices and systems for AQC, Environmental measurements and air-pollution modelling, protocols and standardisation methods).
- The network **will favour the reciprocal exchanges for knowledge transfer towards industrial and project partnership** and will be useful to **boost the exploitation of the research results** and to promote technology transfer towards new business models based on green economy and environmental sustainability.



Objectives of the SIG-1

Objectives:

- Favour reciprocal knowledge between innovative SME in the field of AQC.
- Contribute to the state-of the art report focusing on actual technology needs, future perspectives, integration possibilities, standards, protocols and guidelines for future agenda.
- Mapping the similar or complementary industrial organizations (i.e., spin-off, start-up, spin-out etc.) in the EU area involved in the fields covered by the Action.
- Define and propose new cooperative instruments for EU spin-offs and innovative SME.
- Support to define Action position papers in the knowledge transfer in air quality control (AQC) issues for future research and innovation agenda.



Proposed Activities of the SIG-1

Activities:

- Supporting to the writing of the State-of-Art planned in the Action for spin-offs activities related to the Action issues.
- Promotion/Definition of EU proposals for funding of new SMEs in the core-business of Action for research and innovation.
- Map of EU Spin-Off in AQC.
- Inform of EU instruments and opportunities
- Create a virtual linked community.



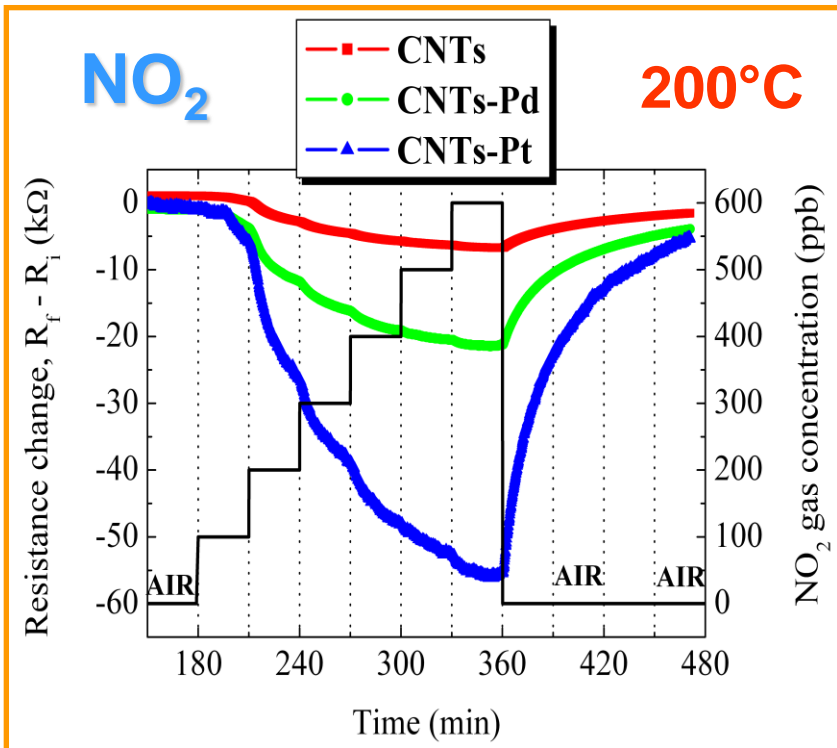
Deliverables of the SIG-1

Deliverables (MoU):

- Reports on mapping of EU spin-offs.
- Reports on proposed Activities to be approved by Action Management Committee.

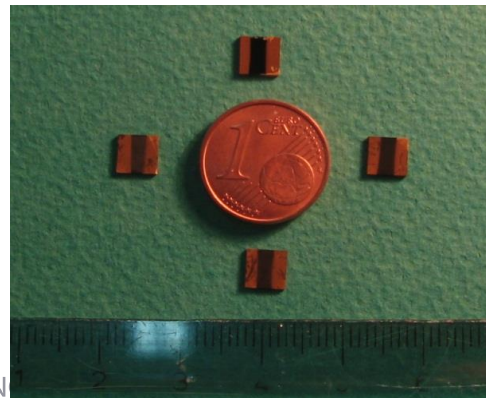
Current research activities of ENEA (1/2)

INNOVATIVE GAS SENSORS BASED on **CNT LAYERS FUNCTIONALIZED by Pt and Pd NANOCCLUSERS** for AIR QUALITY CONTROL of **NO₂ POLLUTANT at PPB LEVEL**



| Gas | Limit of Detection calculated by measurements of CNT-SENSORS (ppb o ppm) | | |
|------------------|---|---------|---------|
| | CNTs | CNTs:Pd | CNTs:Pt |
| NO ₂ | 19 ppb | 9 ppb | 3 ppb |
| H ₂ S | 46 ppb | 23 ppb | 4 ppb |
| NH ₃ | 3.8 ppm | 1.7 ppm | 0.2 ppm |
| CO | 90 ppm | 32 ppm | 4 ppm |

ATTENTION LEVEL = 100 ppb NO₂
ALARM LEVEL = 200 ppb NO₂
 (Italian Law DM 15 April 1994 and daughters)



IT PATENT ENEA BO2008 A000100

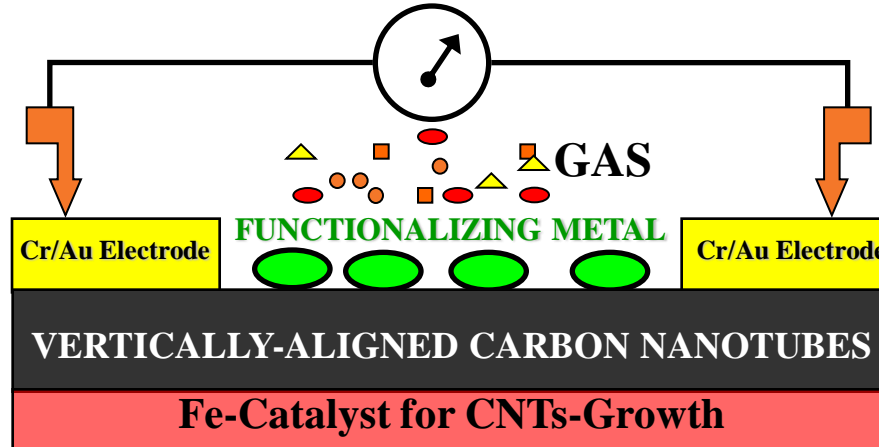
**Conductometric Gas Sensor
based on Carbon Nanotubes**

Research Facilities available for the Partner (2/2)



- FUNCTIONAL CHARACTERIZATION
- ELECTRONICS

METAL NANOCLUSTERS FOR GROWING CNTs LAYER



Lab THIN FILMS



Lab THIN FILMS

← METAL FUNCTIONALIZATIONS AND ELECTRICAL CONTACTS

CNTs GROWTH →

by RF-PECVD TECHNOLOGY



Lab CVD

Industrial Liason Office

Technology Transfer Activities:

- Scouting of research activities
- Market research
- Mapping of research results
- Matching the industrial needs with the Enea technology offer
- Support on licensing
- Regional, national and international networking (i.e. Enterprise Europe Network)
- Pushing researchers to “Spin Off” their results
- Support on collaborative research contract



Suggested **Priorities** for future research to Action SIG1 General Assembly

- Contribute to the state-of-the-art report focusing on actual technology needs, future perspectives (new customer market) integration possibilities, standards, protocols and guide-lines for future agenda (Marco Brini)
- Mapping similar or complementary industrial organizations
- Define and propose new cooperative instruments for EU spin-offs and innovative SMEs (screening of available EU instruments and evaluate their effectiveness, etc.)
- Support to define Action position papers in the knowledge transfer in air quality control (AQC) issues for future research and innovation agenda.



Suggested **Priorities** for future research to Action SIG1 General Assembly

Activities as SIG1 PRIORITIES for Action TD1105:

- Odour measurements is not big market due to absence of regulation so harmonization of odour measurements
- push the adoption of regulations (i.e. methodologies, guidelines)
- low cost devices and easy to use for odour monitoring
- performance that reduce the cost
- communication distances for wireless network of sensors
- new sensors for odour assessment
- air-quality case-studies, stability assessment
- calibration strategies for low cost sensing devices
- work on POP detection



Suggested **Priorities** for future research to Action SIG1 General Assembly

Research directions as SIG1 PRIORITIES for Action TD1105:

- chemical and radiation environmental monitoring
- Ozone sensors, NOx and CO and CO2 sensors for automotive application
- improve stability of available sensors, compatibility with CMOS microelectronics, soft CMOS post-processing methods for reproducible high throughput manufacturing
- toxic and explosive (hydrogen) gas leakage
- biosensor based on enzyme for dioxin and POP, work on POP detection
- VOC detection developing sensors modules and sensor systems
- indoor air quality control, leak detection
- odour monitoring system (odour tel)
- enhancement of the sensing properties by introducing functional receptive groups
- coupling different transduction modes in the same device