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

## COST Action TD1105

## WGs and MC Meeting at Rome, 4-6 December 2012

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

**Year: 2012-2013 (*Starting Action*)**


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**WG Participant**

**Functional Materials, Germany**



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# Scientific context and objectives in the Action

- **Background / Problem statement:**

  Sensors and catalysts for exhaust gas aftertreatment and environmental monitoring

  ⇨ Detection of **gas components** with novel types of
  **sensor devices, materials and methods**,
  e.g. for air quality monitoring

- **Brief reminder of MoU objectives:**

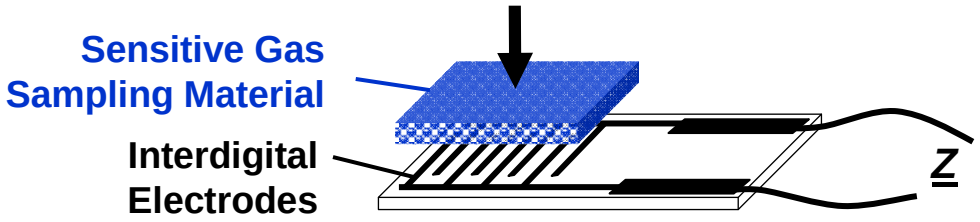
  - Protocols for fabrication of gas sensors
  - Protocols for design and implementation of new transducers for AQC gas sensors
  - Report on device characterization for AQC gas sensors

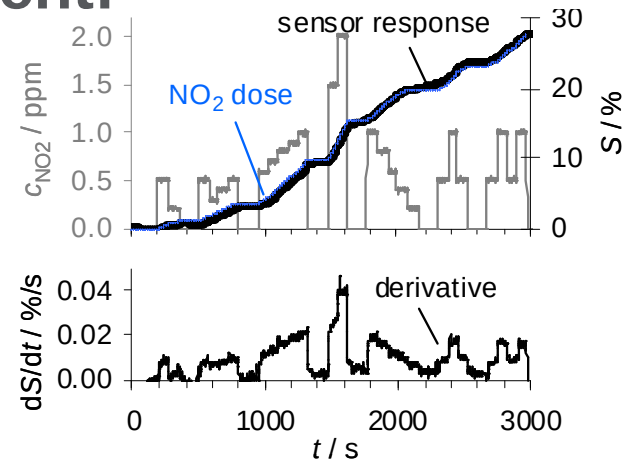
  ⇨ **Member of WG2 and EB**

# Current research activities of the Partner (1/2)

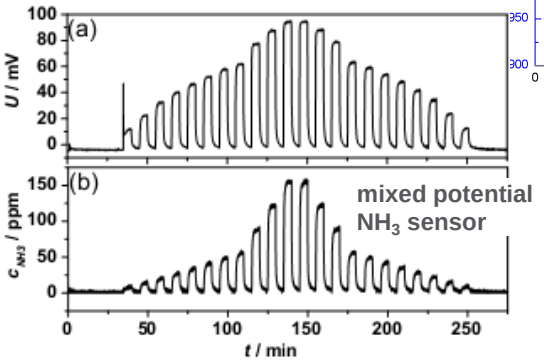
- **Current research topics / Problem statement:**
  - long-term detection of **low levels** of hazardous gases (e.g. dosimeter-type $NO_x$ monitoring)
  - catalyst materials like zeolites as functional layers
  - polymers as sensitive layers for RT applications

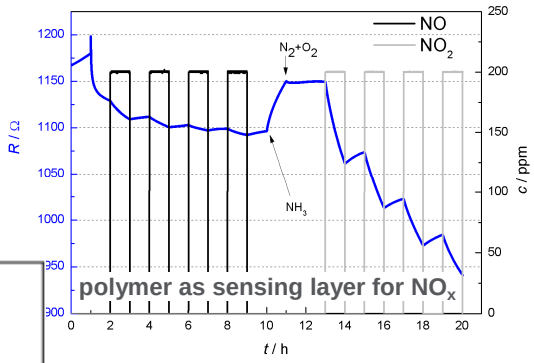
  ⇨ **emerging new sensor materials**




- **Brief list of ongoing research topics:**
  - Novel gas sensing principles: dosimeter-type, thermoelectric, mixed-potential, pulsed polarization-type gas sensors
  - In-situ radio-frequency based determination of catalyst status

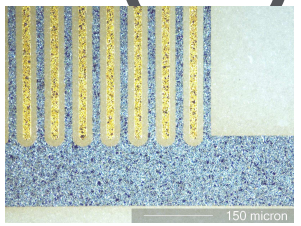


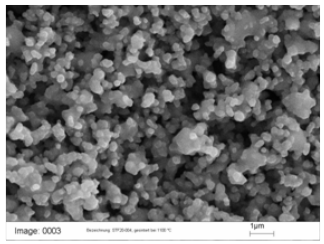



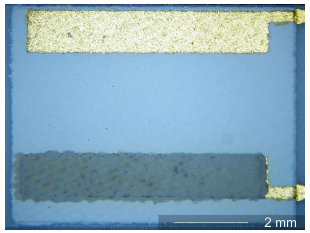
# **Research Facilities** available for the Partner (2/2)

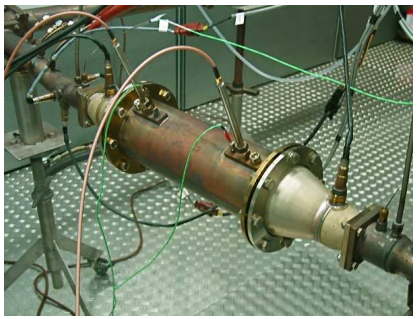
- **Research Facilities:**

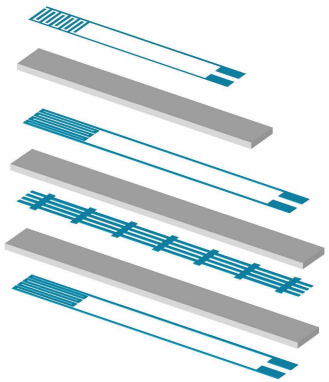
- preparation & characterization of functional materials
- Sensor preparation by thick film technology or aerosol deposition
- LTCC- and HTCC-technology, e.g. micro-hot-plate, tube-type transducer
- Gas sensor tests: synthetic mixtures, electrical & electrochemical methods
- Gas analysis: FTIR, CLD, NDIR, FID, UV-$NH_3$, paramagnetic $O_2$, λ-probes
- Electrical catalyst characterization: mHz to GHz
- Extended simulation tools (Comsol Multiphysics ) with almost all modules

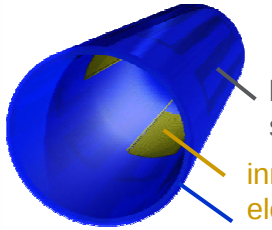


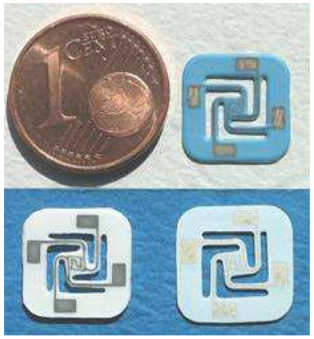



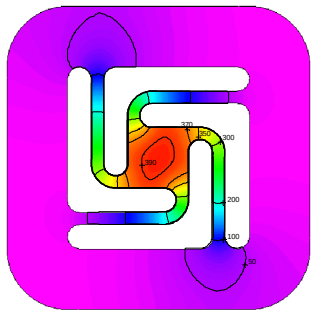



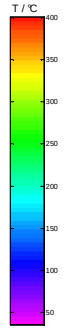











# Suggested **Priorities** for future research

- **Research directions as PRIORITIES:**

Investigation of new sensor materials and development of new sensing principles:

- further development of **pulsed polarization** principle and **dosimeter-type** sensors to **measure selective low levels** of NO, $NO_2$, $SO_2$, and/or $NH_3$
- **mixed potential type sensors** for detection of $NH_3$ and/or hydrocarbons

Micro-hot-plate with **low power** consumption