



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

COST Action TD1105

**1<sup>ST</sup> TRAINING SCHOOL**

**Universitat de Barcelona, Spain, 13 - 15 June 2013**

**organized by UB, MIND-IN2UB - Dept. of Electronics and CSIC-IDAEA**

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

Year 1: 2012 - 2013 (*Ongoing Action*)

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UNIVERSITÄT  
DES  
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# **Expertise** of the Trainee related to the Action

- gas sensitive field effect transistors (GasFETs)
- $\text{ZrO}_2$  oxygen sensors
- dynamic operation / virtual multisensors

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

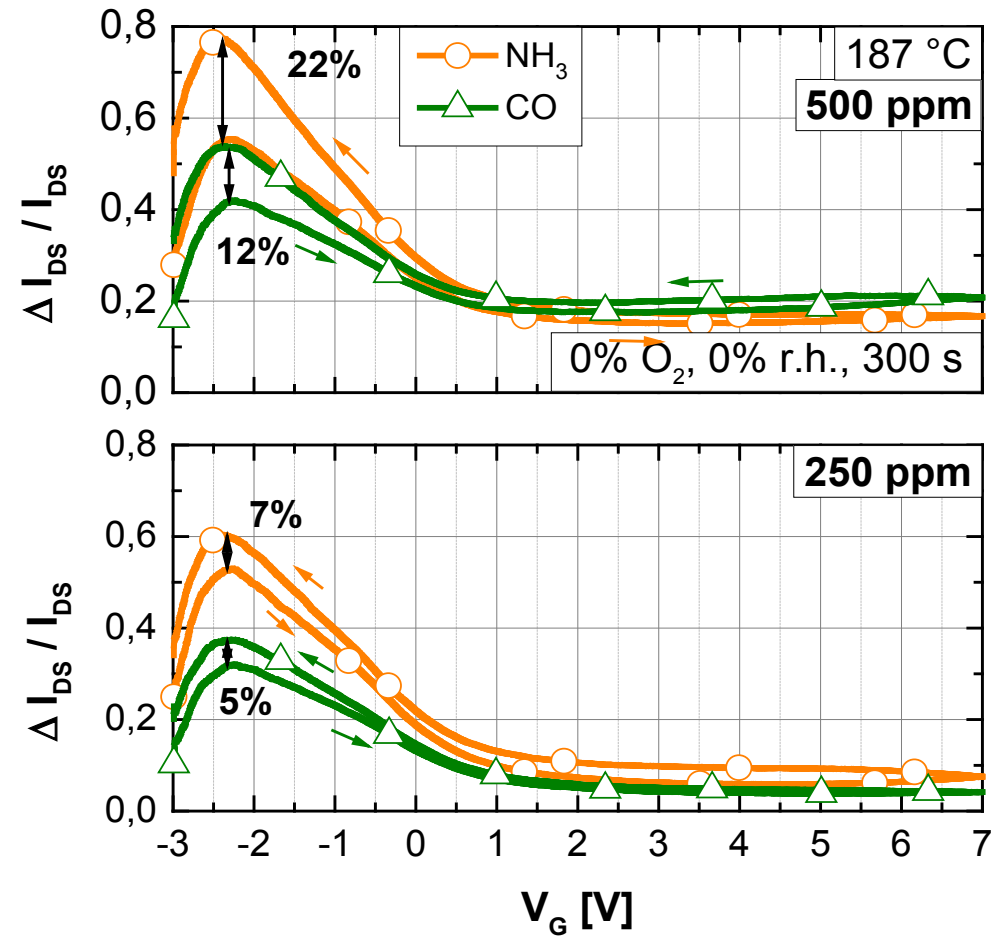
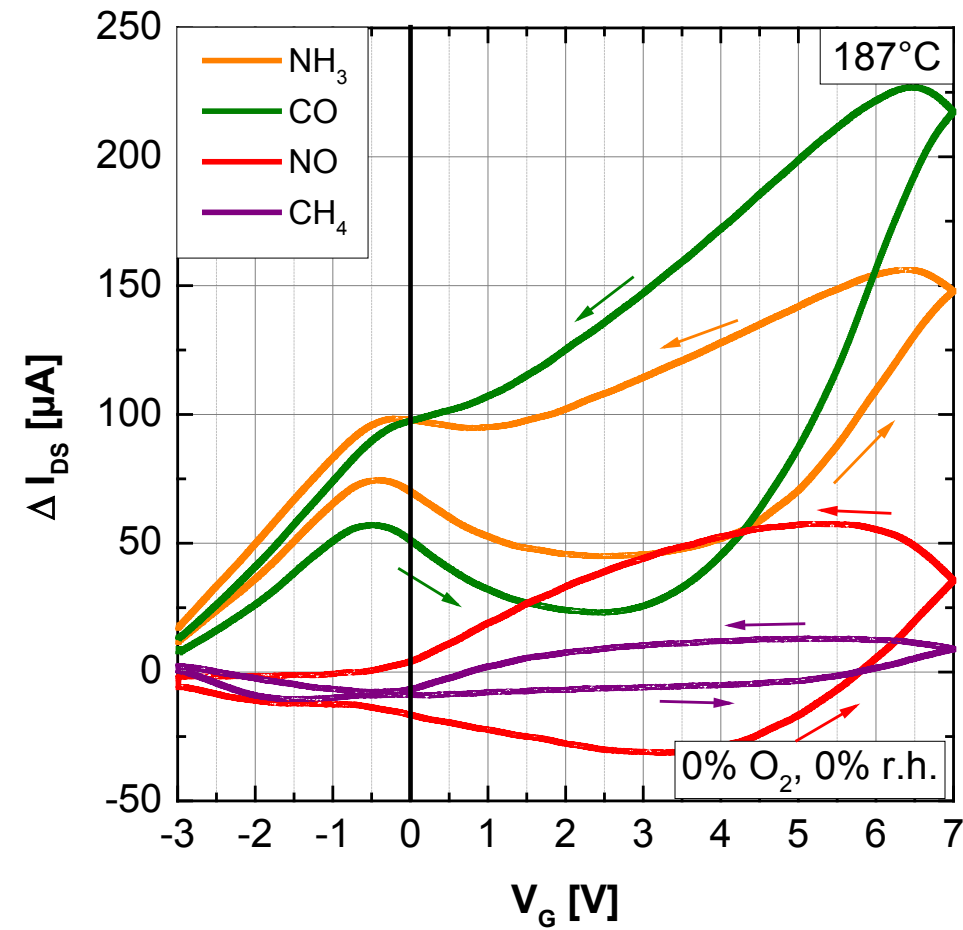
- Project: VOC-IDS, (BMBF / MNT-ERA.net)
  - Optimization of micro- / nano structured gas sensors for indoor VOC detection
- Project: self monitoring of the sensor, (AiF-IGF)
  - Combination of EIS and temperature cycled operation (TCO)
- Combination of NDIR and PAS
  - For CO<sub>2</sub> detection
- Gas sensitive SiC - Field Effect Transistors
  - Dynamic operation for selectivity enhancement (virtual multisensor)

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# Current research activities of the Trainee (2/2)

- **exploitation of inherent hysteresis in GasFETs for gate bias cycle operation (GBCO)**  
→ allows identification and quantification of gases
- **modeling of degradation of ZrO<sub>2</sub> oxygen sensors through HMDSO**  
→ allows better lifetime estimation and improve of the sensor

# Achieved **RESULTS** and future activities (1/2)



# Achieved **RESULTS** and future activities (2/2)

- different gases result in different shape of hysteresis  
→ **selectivity improvement**
- gas concentration correlates with hysteresis width  
→ **new feature for quantification**
- future work  
→ **combine GBCO with temperature cycle operation**

# CONCLUSIONS

- selectivity of GasFETs is strongly increased by GBCO
- GBCO can help to understand processes in the sensor (e.g. by measuring time constants)
- problem: instability of sensor