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

COST Action TD1105

1ST 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*)

UNIVERSITAT ROVIRA I VIRGILI

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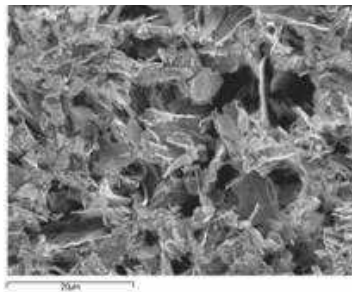
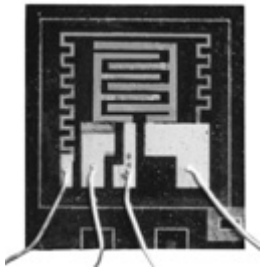
Expertise of the Trainee related to the Action

- Synthesis of nanostructured metal oxides films
- Study of morphology and structural characteristics
- Study of nanostructured materials gas sensing properties
  - Chemical and thermal stability
  - High sensitivity
  - Selectivity

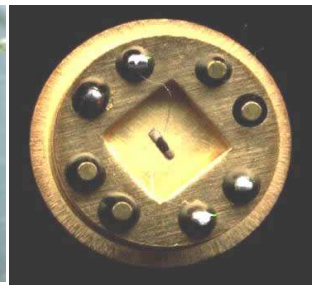
Current research activities of the Trainee (1/2)

- Design, fabrication and characterization of chemical microsystems





- Research in advanced signal processing techniques for multisensor systems
- Development of applications with multisensor systems and electronic nose instruments

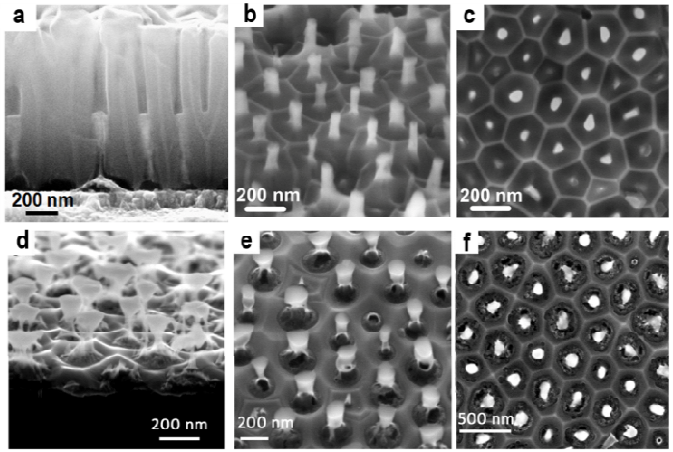


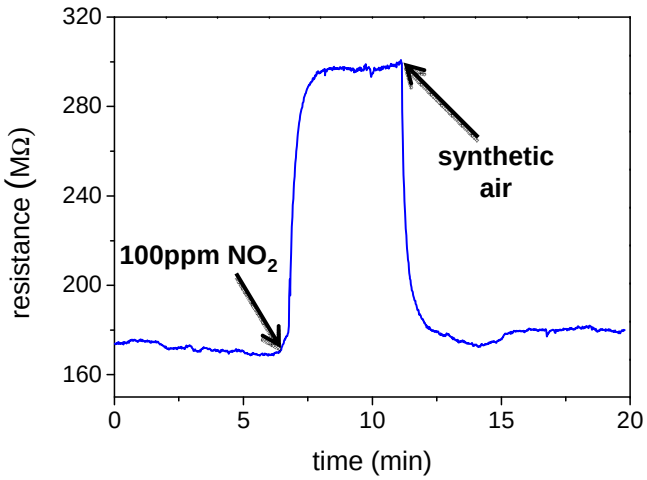
Current research activities of the Trainee (2/2)

- Fabrication of different nanostructured metal oxides films by anodic oxidation process: TiO_2, Nb_2O_5, ZrO_2-WO_3.
- Morphological and structural characterization
- Gas sensing characterization
- Improvement of techniques used for microhotplate Si microtechnology fabrication

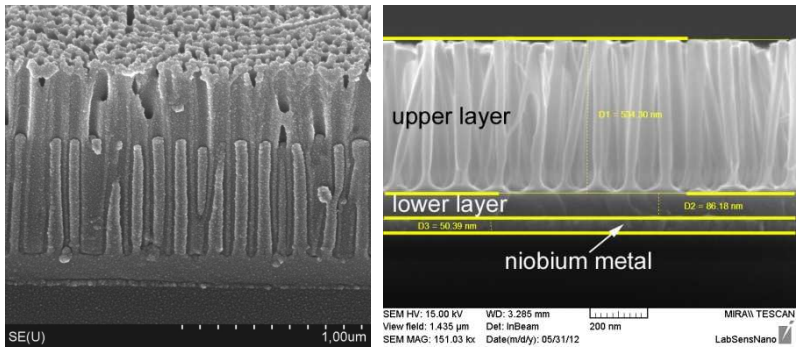
Achieved **RESULTS** and future activities

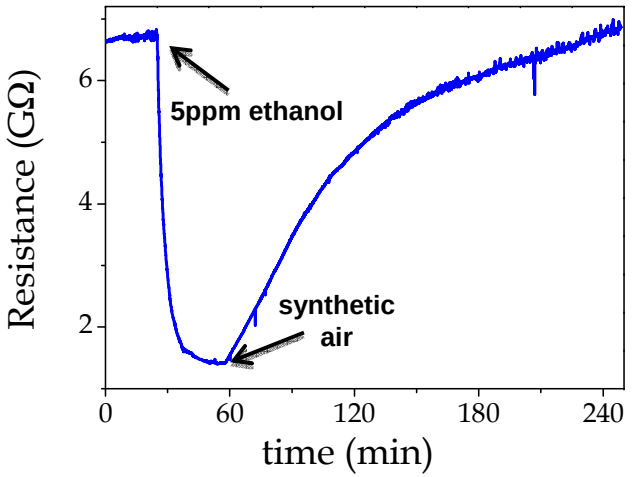
- TiO_2 nanocolumns:





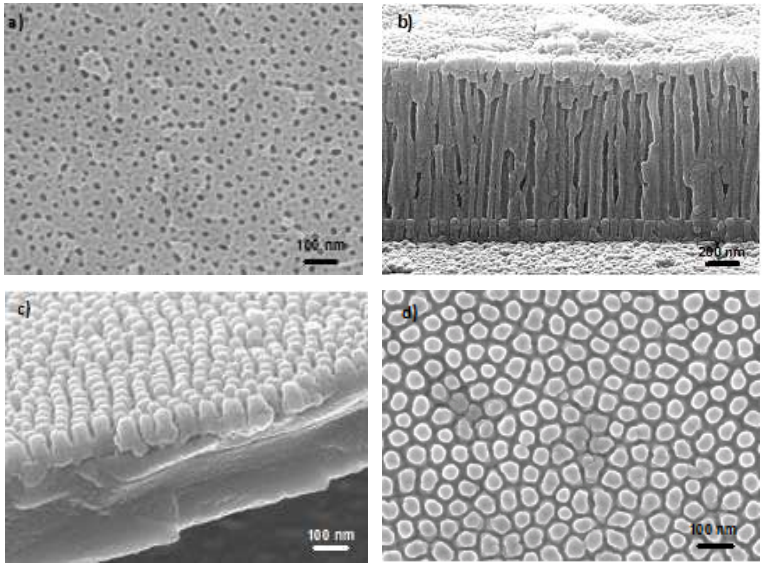
- Nb_2O_5 nanocolumns:



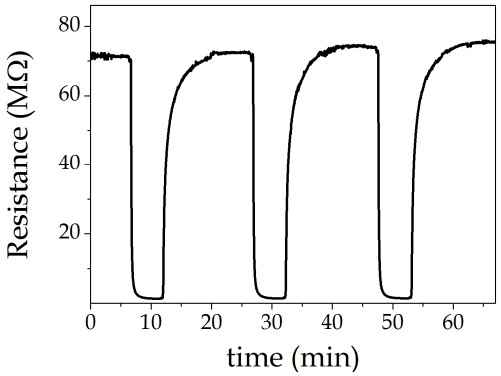


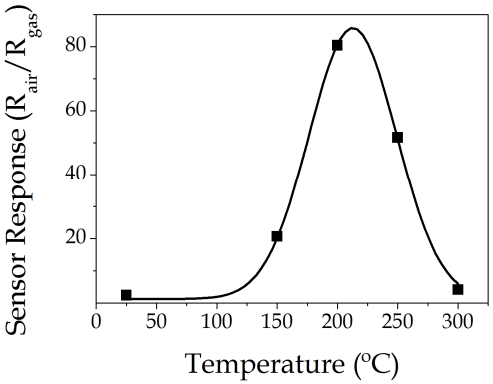
Achieved **RESULTS** and future activities

- **ZrO_2-WO_3:**



➢ **Hydrogen measurements**





- **Future work**
  - Further gas sensing measurements
  - Improve the sensing properties by means of doping and catalysing
  - Implementation of improvements on microhotplates with Si microtechnologies

CONCLUSIONS

- **Obtention of tailored metal oxide nanostructured films**
  - **Control of dimensions and density of nanocolumns**
- **Tuneable nanostructures → tailored sensing properties**
- **Full compatibility with Si microtechnology**
- **Zr-W mixed oxide → High potential for hydrogen detection and good chemical and compositional stability**