

**European Network on New Sensing Technologies for Air Pollution
Control and Environmental Sustainability - *EuNetAir*
COST Action TD1105**

**1st EuNetAir Air Quality Joint-Exercise Intercomparison
*Sensors versus Analyzers for Air-Pollution Monitoring in Aveiro City***

**Institute for Environment and Development - IDAD
Aveiro, Portugal, 13 - 27 October 2014**

Action Start date: 01/07/2012 - Action End date: 30/06/2016 - Year 3: 2014-15 (***Ongoing Action***)

Gallium-Oxide based Microhotplate sensor

Oliver von Sicard

Erhard Magori, Roland Pohle

Function in the Action: Invited Expert

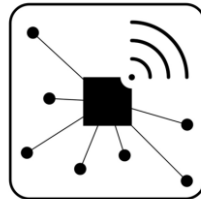
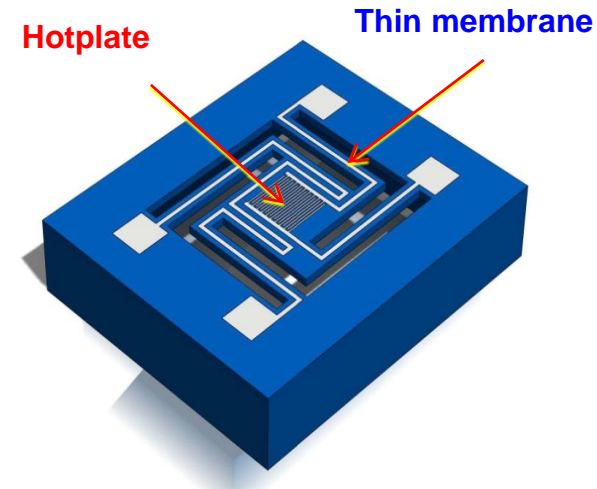
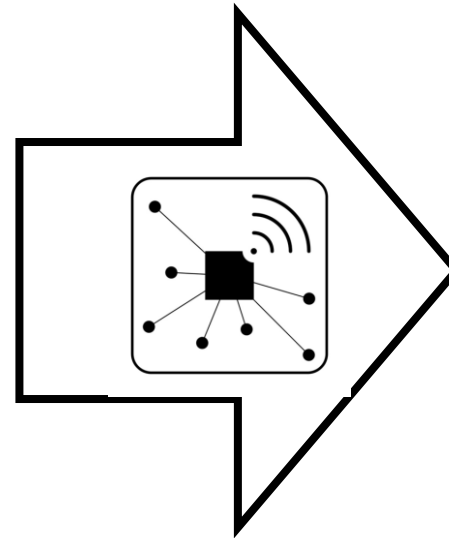
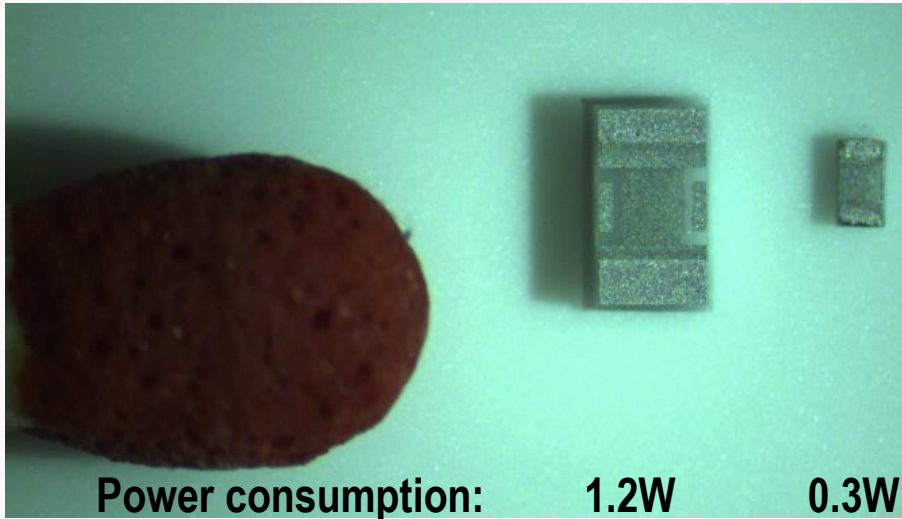
Siemens AG / Germany

SIEMENS

Si-based Ga₂O₃ Sensor developed within ESEE

Technology Development for Low Power, Low Cost Ga₂O₃ Sensor for Gas Detection (VOC)
Basic Idea: Gas Sensor on Silicon-based Micro Hotplate working up to 800°C

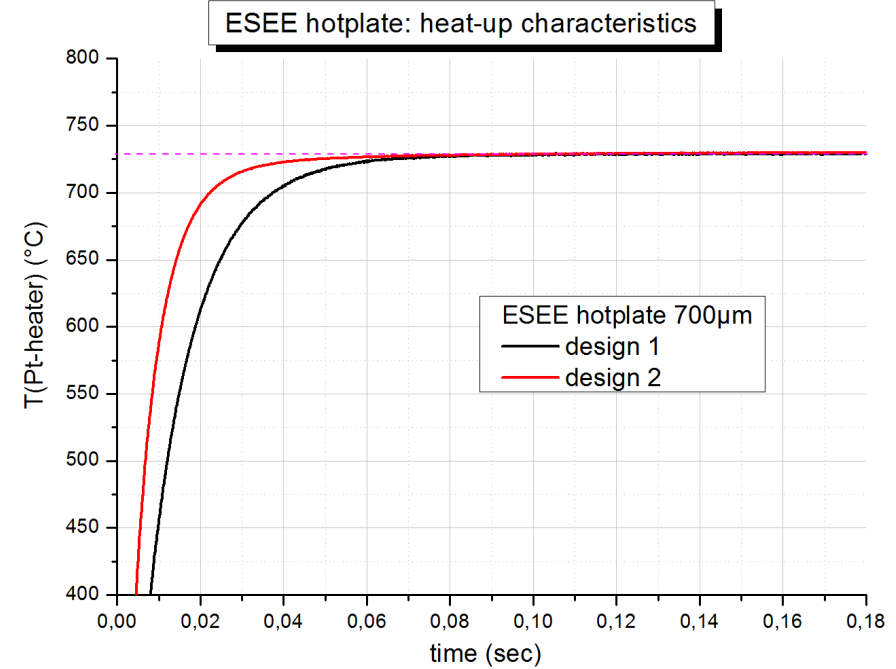
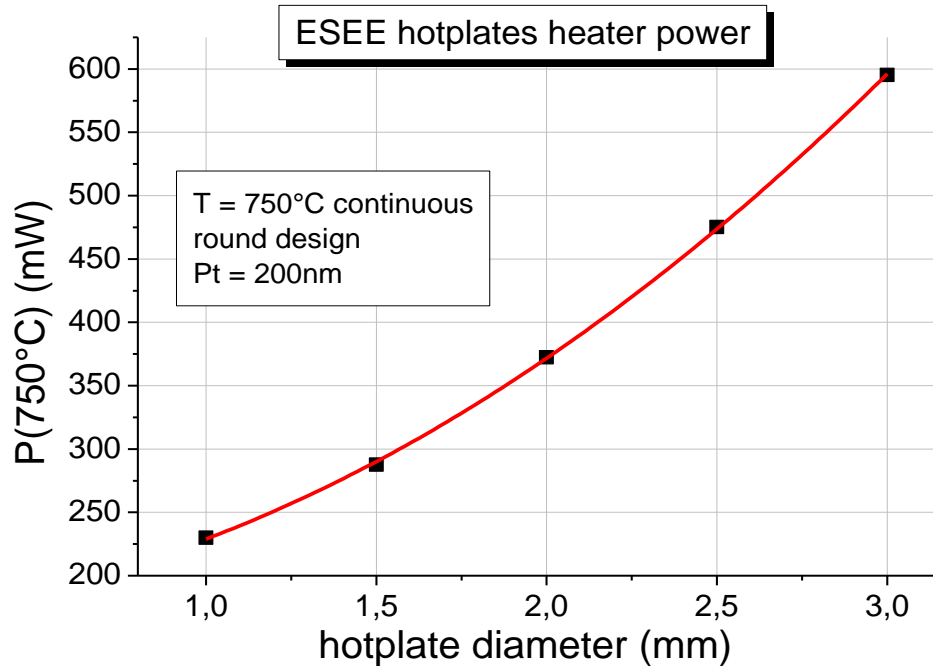
State of the Art Ceramic Technology



ESEE Project

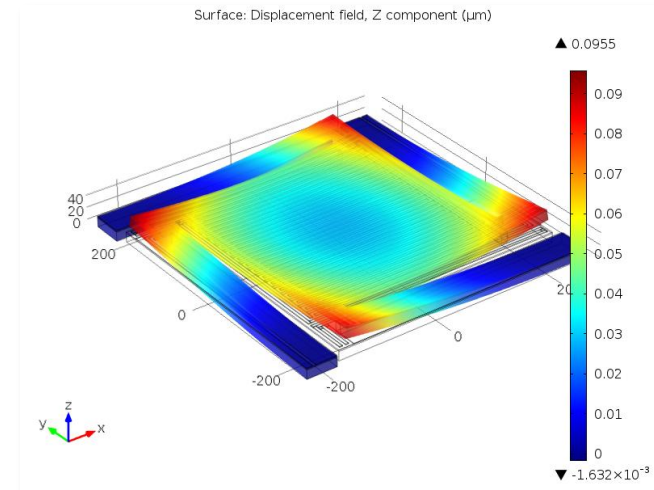


DESCRIPTION of Sensor-System to be Used in Exercise



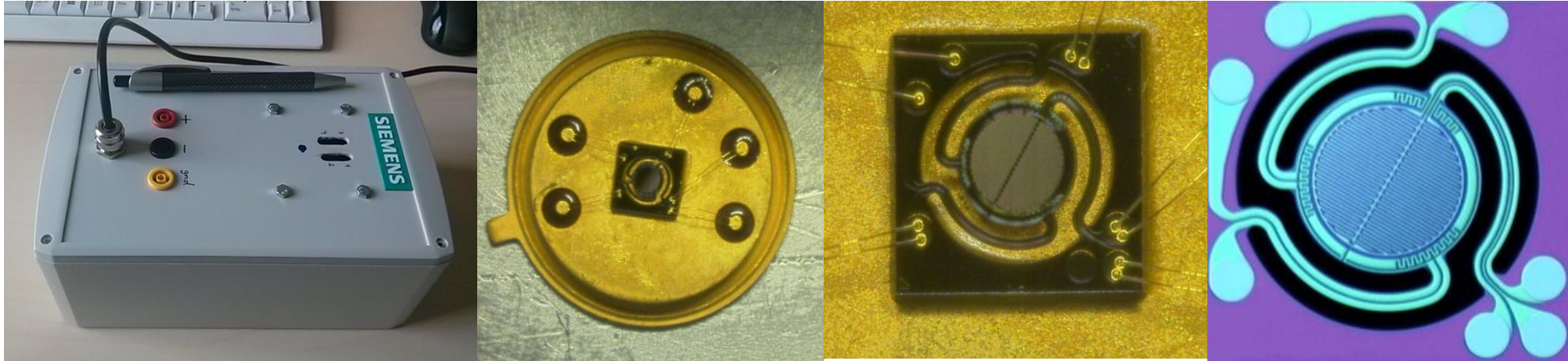
- Continuous power 220mW – 600mW (size depending)
- Heat-up time 40msec – 100msec
- overall power consumption heating < 1mW achievable in application

Target gases: VOC, H₂, CO, EthOH, O₃
Advantage of Ga₂O₃ as sensing material at high temperature
→ fast chemical reactions (short measurement pulses)
→ no burn-in behavior



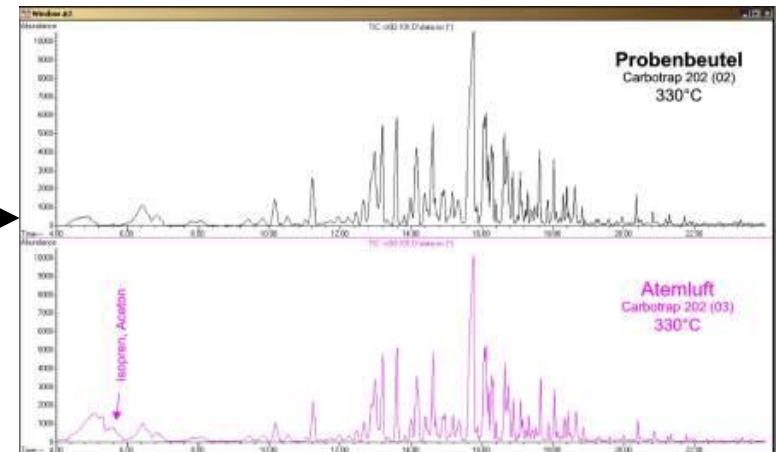
DESCRIPTION of Sensor-System to be Used in Exercise

Ga₂O₃ Sensor:



additionally:

air samples for GC-MS analysis with adsorption Tubes (Carbotrap 202)



CONCLUSIONS

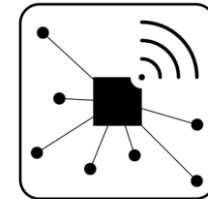
Expected results:

- Verify stability of sensing element in outdoor conditions (heater, membrane @ 700-800°C...)
- Evaluate stability of sensitivity of gallium-oxide sensor

Note: sensor is in very early stage of development → first field trial of sensor and electronics

- Evaluate correlation with air samples taken in adsorption tubes and other sensing systems

Ga₂O₃- Sensor developed within „Environmental Sensors for Energy Efficiency” (ESEE, ENIAC-ED-52, Call 2012-1)



Participation in meeting supported by „Multi-Sensor-Platform for Smart Building Management - MSP” (FP7, GRANT AGREEMENT No 611887)

