ConSens
Sensoren · Geräte · Systeme

SMARTER - SI
Smart Access to Manufacturing for Systems Integration

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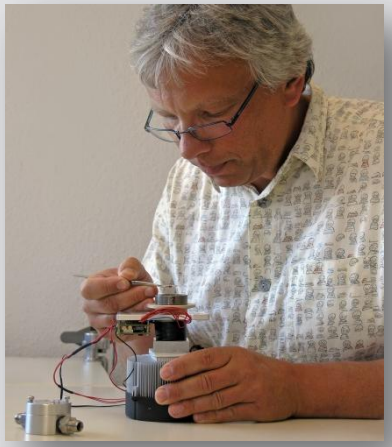


Workshop Smart Anything Everywhere 2016

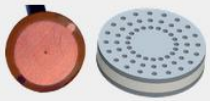
Brussels, 13th June 2016

Work package 3

Application Experiment #3
CO_2 measurement system

Steffen Welsch / CONSENS

Arndt Steinke / CiS

Building automation	Test equipment	Sensors
		
Gas analytics	**Development**	**Projects**
		

Facts

AE #3	Carbon dioxide measurement system
Lead Partner	CiS
Involved Partners	RTO: CSEM SMEs: ConSens and IL Metronic (both Germany)
Timeline	Feb 2015 – Jan 2017
Budget and Ressources	SMEs: 110.625 €; RTOs: 42 PM
Status	**Running on time and budget**

Our Market Philosophy

Carbon dioxide plays an increasing role for reasons of energy conservation and safety, healthy environment, quality assurance in building automation, food storage sector, process control, medical and biomedical applications

In **building automation** ConSens can deploy about 1000 sensors for the new product families in the first year, after that 5.000 pieces per year are realistic.

The developed technology and system competence must be seen as a **platform** for many other relevant gaseous and dissolved substances based on relevant building blocks

Product

We need for the growing demand for CO_2 sensors especially in the field <u>of new application</u> :

A small, low-cost CO_2 OEM sensor with high long-term-stability, higher performance and a life expectancy of 60 months

A solution realized in short time

The market objective for us:

CO_2 Sensor module specification:

- *Measuring range:* 0…10.000 ppm;
- *Measurement uncertainty:* ±100 ppm;
- *Current:* lower than 10mA (peak)
- *Long-term stability:* max. ±1% of end value / yr;
- *Life expectancy*: 5 years;
- *Interface:* Standardized serial I²C UART … or 0…1V
- *Price:* 20 - 50 €

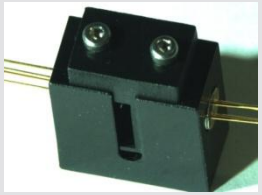
Building Blocks & System Integration

Functionalised nanoporous layer

csem

Optical sensor head (MORES™) and lifetime testing

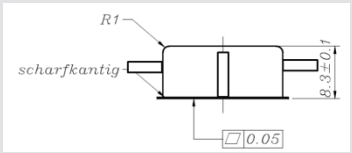
CiS



Soft-/Hardware and final testing

CONSENS

Protective housing with gas in-/outlet

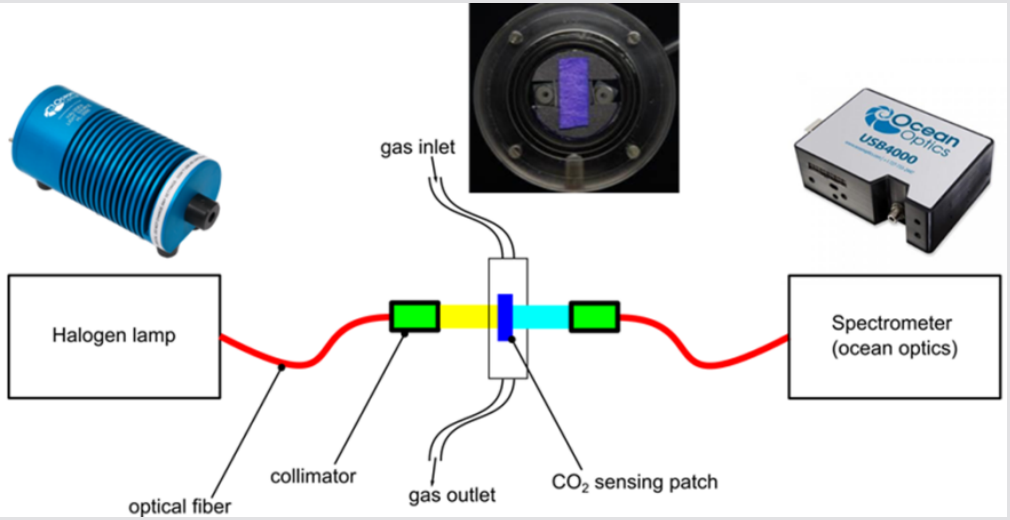


IL METRONIC
Sensortechnik GmbH

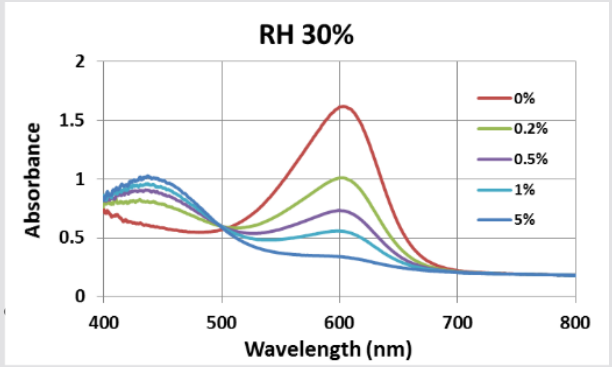
building blocks
system integration

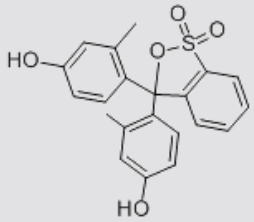
Results delivered by CSEM

→ Fluidic & optics (spectroscopic analysis)

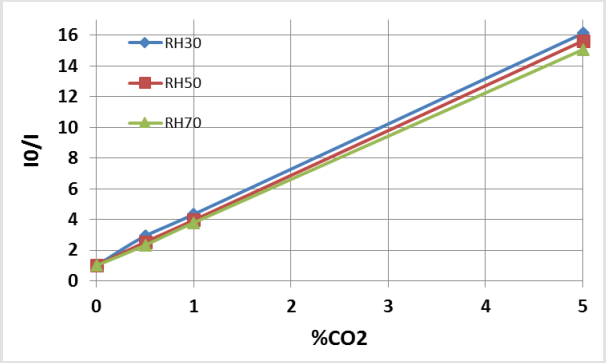


→ Mesoporous layer functionalised by a dye+TONOH solution





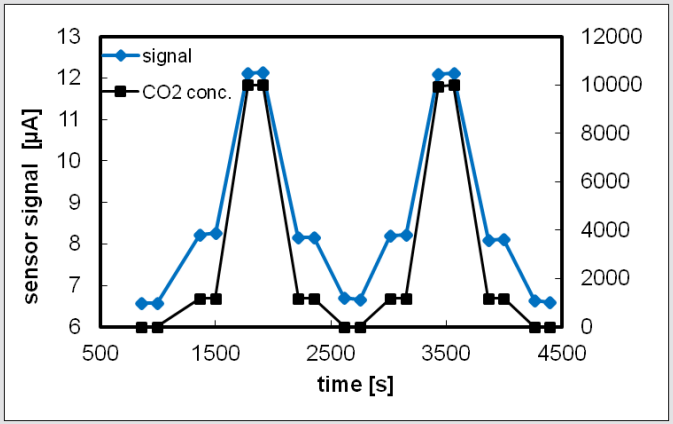
M-Cresol Purple (-)
pK_1 ~ 2, pK_2 ~ 8.5



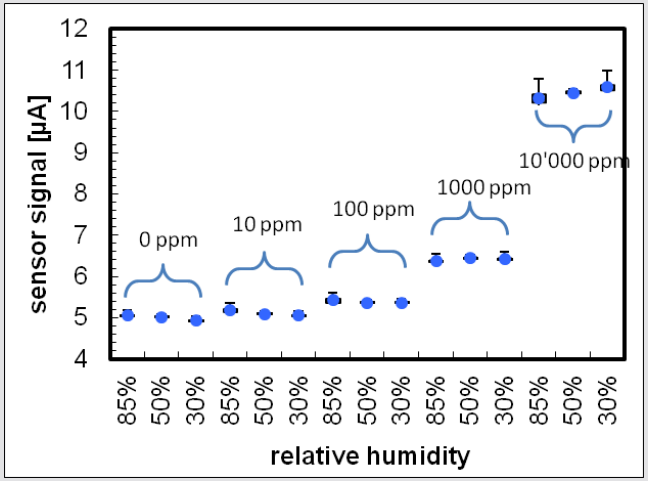
No significant impact of humidity on CO_2 sensitivity

Results delivered by CiS

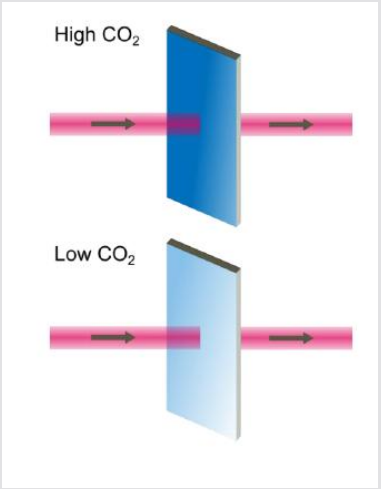
→ Good reproducibility



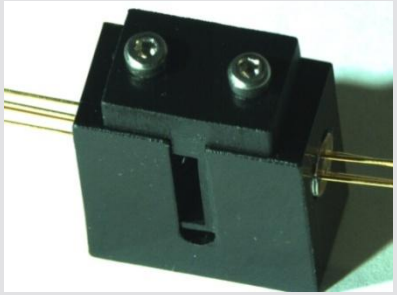
→ Stable signal under humidity variation



Transmission change with CO2



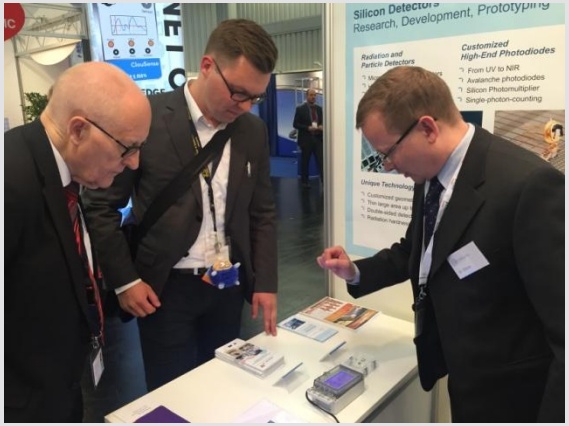
Optical sensor head used in measurements



Results by CONSENS

First prototype
made by CONSENS

Public demonstrations at industrial fairs

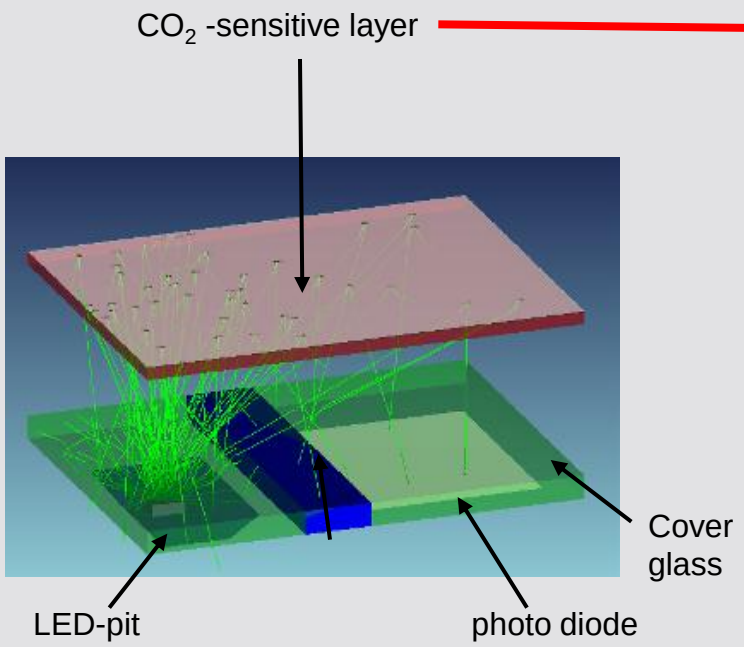


Sensor + Test 2016, Nuremberg

Hannover Fair2016

Looking forward

A sophisticated product family with high diversification potential



Further gas-sensitive layers are interesting for CONSENS:

- Ammonia
- Oxygen
- Chlorine
- Nitrogen oxide
- Fluorene
- Carbon monoxide
- Nitrogen monoxide

Diversification in the field of dissolved substances is possible.

Thank you for your attention!

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SMARTER - SI www.smarter-si.eu

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SmartAnythingEverywhere

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