

Project Report



Application No. 2005
Short title Performance range of a catalytic oxyhydrogen sensor device

Objectives: short, medium and long term (<250 words)

short: performance range of the H₂ sensor under different environmental parameters, i.e. temperature, humidity and pressure

medium: cross-sensitivity to different gas mixtures (H₂, SO₂, H₂S) of chemical species which are known to have detrimental effects on sensor life. Changes for the H₂ sensitivity due to periodic exposure to catalyst poisons

long term: reliability, ageing effects, i.e. long term sensitivity changes and background signal drifts

Brief summary of work carried out:

1. Short term stability, linearity and accuracy (three sensor prototypes exposed to 0 vol%, 1 vol% and 2 vol% H₂ concentrations)
2. Temperature dependence (the H₂ sensitivity for three sensor prototypes was tested at 5 , 20 and 35 °C)
3. Response and recovery time at 1% H₂, 20°C and 0% RH.
4. Pressure Test: sensitivity at 100, 110 and 120 kPa (0.5 and 1% H₂)
5. Relative humidity (RH) effect: Sensitivity at 20, 50 and 80% RH (0.5 and 1% H₂) simultaneously measured for three prototypes
6. Cross sensitivity to poisonous gases CO, H₂S and SO₂

Main achievements intended for publication <250 words

1. Linearity and accuracy
 2. Temperature dependence
 - 3 Response time and relative humidity
 4. Pressure dependence
 5. Cross sensitivity
- The results are going to be evaluated in detail in Hoppecke

Difficulties encountered <250 words

There were difficulties to achieve low temperatures ($T < 0\text{ }^{\circ}\text{C}$) with the three prototype sensors in the test chamber (due to the sample masses to be cooled and the heat generation of the circuit boards). The measurement was repeated by the SenTef personell with one sensor in the chamber the week later.

There were sporadic difficulties with the PC data acquisition of the sensor CAN bus signals

Further comments:

Through these testing results we have gained an extended knowledge on the performance of our sensor under different environmental conditions.

We are very grateful to the technical SenTeF staff for the excellent preparation of the experimental setup (sensor prototype wiring, communication checking) the week before our arrival and we would also like to take this opportunity to express our gratitude for SenTeF 's efficient cooperation and commitment to carry on the extensive measuring program during our 5-day stay.