Application 2005

Performance range of a catalytic oxyhydrogen sensor device

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HOPPECKE Batteries developed during the last years a oxyhydrogen sensing device, i.e. a sensor to detect the hydrogen concentration in H2/O2 mixtures. The physical principle for detecting H2 relies on the temperature increase from the catalytic recombination of hydrogen and oxygen on a Pd catalyst rod , i.e. the well known exothermic 2H2 + O2 --> 2H2O reaction:

Essentially it is the the same working principle of a pellistor but in an implementation which is able to withstand service under adverse environments (high humidity, poisonous gases) i.e. in those cases where ordinary sensors would fail after short time.

HOPPECKE was granted for this invention a US patent (US7829344B2), "METHOD AND DEVICE FOR THE DETECTION OF HYDROGEN" in 2010 .

In addition there are also an European (EP2015057A1) and a Canadian (CA2613430A1) pending applications.

In the initial phase, the prototype development of our sensor was sponsored by the German ministry of science and technology (BMBF) under contract Nr. BMBF 0327777 (programme of small components for fuel cells).

The final report of this project can be downloaded under:

http://edok01.tib.uni-hannover.de/edoks/e01fb10/642339708.pdf

Since then we have introduced further improvements in the sensing device, these include new housing, new electronics to increase sensitivity and also costs reductions for some of the components.

At the present stage we would need the support of the H2FC testing facilities for the following purposes:

1. Determination of the performance range of our H2 sensor under different environmental parameters, i.e. temperature, humidity and pressure

1. in order to quantify variations in sensitivity, response time (t90, t50), linearity, hysteresis and reproducibility

2. Check of the cross-sensitivity to gas mixtures (N2, CO2) and the sensitivity changes under different Hydrogen /oxygen concentrations

3. Test of the impact of chemical species which are known to have detrimental effects on sensor life like H2S, CO, H2SO4 (spray) and gaseous silicon compounds

The priority of the issues is given by the numerals 1..3

With some of these results we would attain the basic knowledge to fulfil standard performance requirements for stationary H2 detection (ISO 26142) ,i.e. a step forward to achieve a certification

Notice: We have already discussed some of the issues concernig the test facility with Dr. Lois Brett JRS (Institute of Energy),