"Cost-effective and reliable hydrogen sensors for facilitating the safe use of hydrogen"

Grant agreement number: 325326

Interim progress report on WP3
"Approaches to overcome barriers to commercialization of new technologies"

Milestone 4: "Barriers breakthrough"

The sensor market barrier analysis in Tasks T3.1 and T3.3 reached an advanced level and first suggestions were presented. All proposal objectives were inspected in order to focus on open questions. A project meeting for discussion and decisions was held in Ulm on 26-27 February 2014. The status of WP3 was presented by Dr. C. Loos, UST GmbH, and discussed by the consortium members.

C. Loos presented the project status related to Tasks T3.1 "Sensor market analysis and barriers to commercialization" and T3.2 "Critical success factors for development, production and commercialization of hydrogen sensors". In order to complete these tasks, C. Loos suggests to look at the hydrogen supply chain including influencing factors and applications of interest to reach the goal of a zero carbon energy and mobility. In defining the product – hydrogen sensor, hydrogen detection apparatus, hydrogen safety monitoring and control – it is important to make a distinction between a "one-fits-all" sensor and an application-specific sensor. A suitable measurement principle and the scope of the product to the market can then be selected accordingly. In a second step an application datasheet can be prepared.

The definition of commercialization barriers is strongly related to the hydrogen sensor market which can be broken down into specific applications. General issues are

- Identification of processes that actually need monitoring
- Stability and maintenance of sensors
- Comparability of sensor performance
- Unique performance testing procedures
- Market entry regulation
- Pricing

This leads to the naming of some of the most important barriers to commercialization:

- Stable processes do not need hydrogen monitoring
- Unclear long term stability, service and maintenance
- Lack of knowledge in sensor performance
    - Comparability: Accuracy, response time, stability, cross-sensitivity
    - Definition of unique performance testing procedures
- Market entry regulation
    - Regional regulations, codes and standards
    - Functional safety
- High costs

In addition, some of the most important cost drivers were named. These include costs for:

- Material
- Process
- Machine
- Apportionment

The consortium members discussed their possible input with respect to the hydrogen sensor market issues. Input to markets by application, to manufacturing economies of scale and to calibration requirements depending on the sensor technology by all participants are appreciated. Numbers for pieces of hydrogen sensors per year are welcome to be included into the provided tables. Performance and EOL testing requires clarification of what has to be tested and a harmonization of test benches and testing procedures accordingly. Contacting the FCH JU Industry Grouping for market information on quantities, pieces/year, applications, etc. for hydrogen sensors was suggested.