STORHY FINAL EVENT
HYDROGEN STORAGE SYSTEMS FOR AUTOMOTIVE APPLICATION
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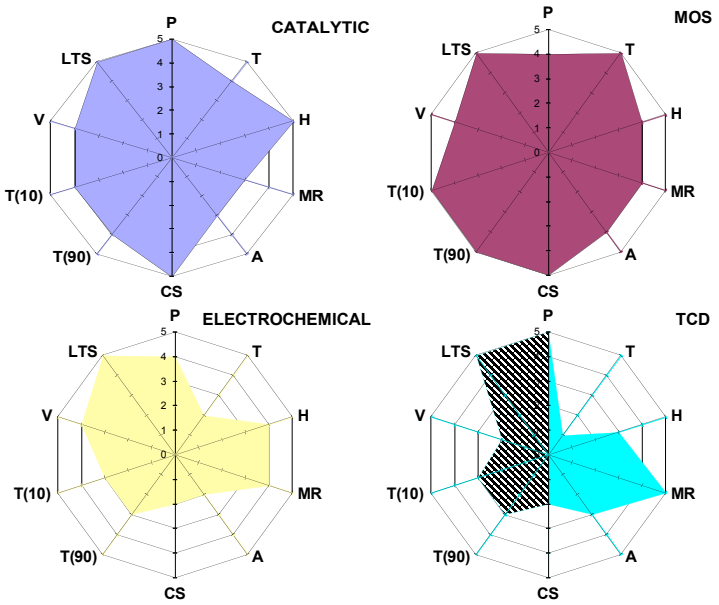
Safety Aspects: Assessing Different Automotive Technologies for Hydrogen Detection

Objectives

- Hydrogen utilization as a fuel involves using many ancillary components, which enables its safe use as current gasoline and diesel fuels.
- The special characteristics of hydrogen (i.e. colorless, odorless, tasteless and highly flammable when mixed with air) make necessary the use of specific detection devices within the surrounding environment.

Achievements

- Available hydrogen detectors based on four different technologies have been tested under *real-life* conditions.
- A test protocol based on standard procedures has been determined in order to verify detectors suitability for automotive applications.
- The application of the protocol to the testing of commercially available detectors has allowed the objective assessment of different detection technologies performance.
- Catalytic-type detectors have shown high stability under very different environmental conditions. Their main drawback lies in the lack or linearity and accuracy of their response. Since they consume hydrogen during measurement, inaccuracy is particularly important at small hydrogen contents and gas flows.
- MOS-type detectors also show remarkable measurements stability. They are to be preferred to the catalytic-type detectors in term of reaction time and accuracy.



P=Pressure; T=Temperature; H=Humidity; MR=Measuring Range; A=Accuracy; CS=Cross Sensitivity; T(90)=Response Time t90; T(10)=Recovery Time t10; V=Velocity; LTS = Long Term Stability

Stripped zone is a theoretical estimation due to the lack of data

5 Best behaviour; 1 Worst behaviour

- Electrochemical detectors failed markedly in sub-zero temperatures. Their response time is also slower than the previous types. Despite the linearity of their signal, low precision and sensitivity to contaminant species was observed.
- Thermal conductivity technology based sensors have shown the best linearity of all detector types but show shortcomings in many other aspects, as shown in the chart.

Future Perspectives

- Working in mixed or new detection technologies to improve the current features of the sensors is needed
- Improving scattering among measurements of the same model

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