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Fuel cells in commercial vehicles: New methods for accelerated reliability assessment - Online event

Hydrogen fuel cells are a promising solution for the future of electric mobility, especially in the commercial vehicle industry. But how can the challenges associated with their implementation be overcome while increasing the efficiency and reliability of these technologies? Fraunhofer researchers will share the latest findings and approaches from reliability assessment in an online event on April 15.

For the provision of energy in mobile systems, low-temperature polymer electrolyte membrane fuel cells (LPE-PEM fuel cells) are combined to form a stack. The use of these fuel cell stacks in commercial vehicles, for example, is subject to a large number of highly complex and superimposed multiphysical (mechanical, thermal and electrical) and chemical loads. The effects of these stresses on the safety and reliability of fuel cell stacks have not yet been sufficiently researched. New reliability assessment methods offer enormous potential here by providing a deeper insight into the complex loads and can significantly improve the reliability and safety of fuel cell systems.

New analysis and evaluation methods for fuel cell systems

In the "multiPEM" project, Fraunhofer researchers from 4 Fraunhofer institutes are working on new, interdependent analysis and evaluation methods for the reliability assessment of fuel cell stacks under multi-physical-chemical stresses. In the free online event on April 15, 2025 from 1 p.m. to 3 p.m., they will present the latest findings from the project. Topics include the influence and evaluation of vibration effects and pollutants, new diagnostic methods using computer tomography and magnetic field analysis, and microstructure analysis.

Interested parties from industry and business who are working on the mobility of tomorrow are invited to register for the event:

https://www.multipem-brennstoffzelle.de/en/news/seminar.html?utm_source=seminar-EN-PI

Information on the project: www.multipem-brennstoffzelle.de/en

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Expert knowledge for Greens mobility

At Fraunhofer LBF, experts are developing test methods to evaluate system reliability quickly and flexibly in the laboratory, even without the finished vehicle. To do this, the researchers combine experimental investigations and simulations in multi-physical environments. The focus is on analyzing and evaluating the influence of vibrations on the reliability of the fuel cell stack and deriving improvements. To this end, the research scientists are developing new approaches for testing fuel cell stacks on shakers.

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In "multiPEM", Fraunhofer researchers are evaluating the system reliability of fuel cell stacks under multi-physical-chemical stress in commercial vehicles.

Graphic: Fraunhofer LBF

The **Fraunhofer Institute for Structural Durability and System Reliability LBF** in Darmstadt has stood for the safety and reliability of lightweight structures since 1938. With its expertise in the fields of structural durability, system reliability, vibration technology and polymer technology, the institute today offers solutions for three important cross-cutting topics of the future: lightweight system design, functional integration and cyber-physical mechanical engineering systems. The focus is on solutions for social challenges such as resource efficiency and emission reduction as well as future mobility, such as electric mobility and autonomous, connected driving. Clients come from sectors such as vehicle construction, aviation, mechanical and plant engineering, energy technology, electrical engineering, medical engineering and the chemical industry. They benefit from the proven expertise of around 400 employees and state-of-the-art technology in more than 17,900 square meters of laboratory and testing space. www.lbf.fraunhofer.de

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