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Workshop on Monitoring and Diagnostics of Fuel Cells

Innovative on-board diagnosis towards fuel cells performance enhancement

13 November 2018 – Brussels (B)

Info: <http://pemfc.health-code.eu/#contact>
<http://insight-project.eu/#contact>

The workshop presents the current status and the most recent advancements concerning research on monitoring, diagnostics and control of both PEMFC and SOFC systems. It is jointly organized by the projects HEALTH-CODE* and INSIGHT*. Both projects provide advanced solutions towards improved performance, management and maintenance scheduling, aiming at higher reliability and increased lifetime of PEMFC and SOFC technologies.

HEALTH-CODE focuses on developing an advanced Monitoring, Diagnostic and Lifetime Tool (MDLT) for μ -CHP and backup PEMFC systems equipped with air and O₂-fed stacks, respectively. Such a tool is based on the measurement of the Electrochemical Impedance Spectroscopy (EIS) while the stack is running in real operations. EIS allows the identification of FC current status to support the detection of five stack failure modes, as well as inferring on its remaining useful life.

The INSIGHT project aims at developing an MDLT for SOFC stacks based on EIS, Total Harmonic Distortion (THD) and Pseudo-Random Binary Sequence (PRBS) methods. The hardware necessary for its implementation into a real SOFC system is improved for on-board implementation of such approaches focusing on three different stack faults. The effectiveness of the MDLT is demonstrated through tests on a real micro-Combined Heat and Power system.

The workshop gathers engineers and researchers from industry, academia and research institutions interested in the most recent advancements on monitoring and diagnostics tools. A comprehensive overview and the exploitation potential of the projects results are offered to the interested stakeholders and users at various levels. Emphasis is given to methodological approaches for advanced diagnosis that can help achieving enhanced performance of both PEMFC and SOFC systems.

The workshop will start with an overview of the projects; then, main results will be reported on the experimental activity and on various approaches for monitoring and diagnostics. Scientists and engineers from 15 teams will present their activities, bringing their knowledge, expertise and perspectives. Two invited guests will also offer a further look into key topics tightly connected to monitoring and diagnostics of both PEMFC and SOFC. A final open discussion among the attendants will be set to share experience and draft future paths towards FC improvements via on-board diagnostics.

Registration is free of charge; coffee, beverages and networking cocktail will be offered to all guests.

* The project HEALTH-CODE (Real operation pem fuel cells HEALTH-state monitoring and diagnosis based on dc-dc COnverter embeddeD Eis) has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 671486. This Joint Undertaking receives support from the EU Horizon 2020 research & innovation programme.
The project INSIGHT (ImplementatioN in real SOFC Systems of monItoring and diaGnostic tools using signal analysis to increase tHeir lifeTime) has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 671486. This Joint Undertaking receives support from the EU Horizon 2020 research & innovation programme



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PROGRAM

13:00-13:20: Registration, Coffee and Welcome

13:20-13:30: Diagnostics, Prognostics and Control of FCs – motivations, challenges and main issues.

13:30-13:45: Description of project HEALTH-CODE.

13:45-14:00: Description of project INSIGHT.

14:00-14:20: EIS characterization of air- and O₂-fed PEMFCs under five faulty operations.

14:20-14:40: EIS, THD and PRBS characterization of SOFC under three faulty operation.

14:40-15:00: HW and SW for on-board implementation of EIS.

15:00-15:30: Coffee break

15:30-15:50: PEMFCs EIS-based diagnostics and its on-board implementation.

15:50-16:10: SOFC perturbation-based diagnostic techniques.

16:10-16:40: *Invited presentation HEALTH-CODE.*

16:40-17:10: *Invited presentation INSIGHT.*

17:10-17:40: Discussion among guests, partners, participants

17:40-17:50: Closure

18:00: Networking cocktail

Project partners:

HEALTH-CODE: AAU, Aalborg University (DK); AK, Absiskey (F); BPSE, Ballard Power System Europe (DK); BIT, Bitron Industrie S.p.A. (I); EIFER, European Institute for Energy Research (D); EPS ELVI ENERGY, Electro Power System S.p.A. (I); UFC, University of Franche-Comté (F); UNISA, University of Salerno (I);

INSIGHT: AK, Absiskey (F); AVL, AVL List GmbH (A); BIT, Bitron Industrie S.p.A. (I); CEA, French Atomic and Alternative Energies Commission (F); DTU, Technical University of Denmark (DK); EPFL, École Polytechnique Fédérale de Lausanne (CH); HTC, HTceramix SA (CH); IJS, Jožef Stefan Institute (SI); SP, SOLIDpower S.p.A. (I); UNISA, University of Salerno (I); VTT, Technical Research Centre of Finland (FI).

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