

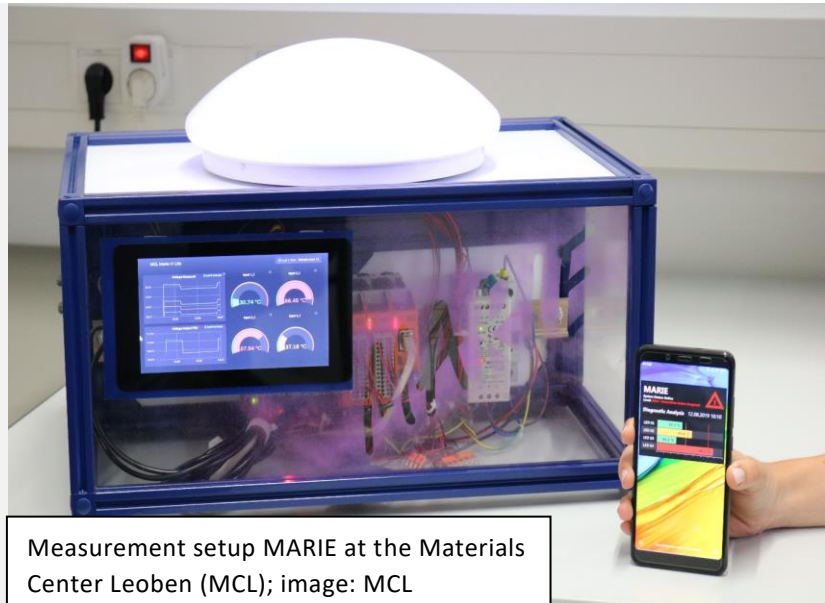
IC-MPPE / Integrated Computational Materials Process and Product Engineering

Programme: COMET – Competence Centers for Excellent Technologies

Programme line: COMET-Centre (K2)

Project P1.4 “Model based Condition Monitoring and process control”

Strategic project (2018-2020)



Measurement setup MARIE at the Materials Center Leoben (MCL); image: MCL

MARIE – MOBILE ADVANCED RELIABILITY EVALUTATING INSTRUMENTATION FOR ELECTRONICS

MCL-SYSTEM FOR THERMAL MANAGEMENT ENABLES THE LIFETIME PREDICTION OF LED LUMINAIRES

MARIE was primarily developed for monitoring LED systems during standardized life tests. To be able to bring LED-based lighting systems onto the market, many OEMs require proof that certain life tests have to be carried out and also passed. If new materials are used or production batches are changed, they must be tested again. In order to be able to recognize material, production, system errors etc. early on during these lengthy tests (~ 4 months) and to initiate appropriate counteractions (redesign, design loops, adjustment of machine settings etc.), a monitoring system is advantageous, which provides relevant information about the electronic system already during the tests. The innovation MARIE describes a

solution for realizing early failure detection for electronic components and is therefore the basis for a "SMART HOME" application.

Innovation MARIE

MARIE enables a fast assessment of the current state as well as a qualitative analysis of the overall electronic system based on the time constant spectrum and has the potential to be integrated into a lighting element. Through the qualitative analysis, material damage can be localized and exchanged in a targeted manner, which means that a resource-saving service can be offered.

SUCCESS STORY

Effect and impact

Is it possible to assess the health status of an LED lighting element? Can you get added value of information based on the existing data? Can you measure changes in the electronic component during a release test or field application and are they sensitive enough?

MARIE is currently in use as a monitoring system at the MCL, where electronic components are evaluated at regular intervals during a life test. These data are used on the one hand for monitoring the health status of the component in actual time, on the other hand for the development of corresponding models for life prediction.

This data will also be used for the research of data-driven lifetime models at the MCL. With the help of these life prediction models, the remaining service life of an LED system can be estimated and provides information about when it should be replaced.

The ongoing recording of TSEP data leads to entire swarms of data, which are evaluated and transformed



MCL employees at the nomination of MARIE for the Fast Forward Award, image: MCL

into information. Information that is crucial on the one hand for the OEM (e.g. finding the weak points within an LED system) or for the facility manager (when and how many lights have to be replaced). Exactly this method from measuring to information is the cornerstone for SMART Lighting in a "SMART HOME".

The innovation MARIE could be used here, with appropriate miniaturization, i.e. integration into the control unit, for life cycle assessment and could ensure a perfectly coordinated maintenance use. So that the light customer of the future is satisfied with her lighting provider and her home corresponds to a "SMART HOME".

Project coordination (Story)

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