

MORELIFE

MATERIAL, OPERATING STRATEGY AND RELIABILITY OPTIMISATION FOR LIFETIME IMPROVEMENTS IN HEAVY DUTY TRUCKS



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| Project ID: | 101007170 |
| PRD 2023: | Panel 3 – H2 end uses – transport |
| Call topic: | FCH-01-2-2020: Durability-lifetime of stacks for heavy duty trucks |
| Project total costs: | EUR 3 499 913.75 |
| Clean H₂ JU max. contribution: | EUR 3 499 913.75 |
| Project period: | 9.1.2021–31.8.2024 |
| Coordinator: | AVL List GmbH, Austria |
| Beneficiaries: | EKPO Fuel Cell Technologies GmbH, Mebius, Raziskovalno Razvojna Dejavnost, Zastopanje in Trgovina DOO, Nedstack Fuel Cell Technology BV, Technische Universität München, Technische Universiteit Eindhoven, Univerza v Ljubljani |

<https://morelife-info.eu/>

PROJECT AND OBJECTIVES

MORElife is addressing the need for highly efficient material utilisation, maximised durability and optimised matching of the operation conditions for a proton-exchange membrane fuel cell in heavy-duty applications. The objectives are to:

- perform accelerated stress tests for the shortened test duration for lifetime verification;
- make improvements at the material and operation strategy levels;
- create advanced degradation models;
- find the optimised and validated operating conditions based on the improved materials;
- achieve a fuel cell predicted lifetime of 30 000 hours.

PROGRESS AND MAIN ACHIEVEMENTS


- Accelerated stress testing and accelerated durability testing protocols and accelerated stress tests for state-of-the-art (SoA) catalyst material have been created.

- Two generations of novel catalyst material have been created and are under investigation, with promising initial results in terms of performance. However, the catalyst is dealing with leaching of copper.
- Post-mortem analysis on aged SoA material has been performed in order to improve mechanistic degradation models created in this project.

FUTURE STEPS AND PLANS

- Accelerated stress testing protocols and accelerated stress tests for novel catalyst material will be created.
- A second generation of promising novel catalysts will be investigated. If performance is sufficient, a third generation will be created, with improvements based on the previous generations.
- If proven sufficient, the third generation of catalysts will be integrated in a 5- to 10-cell short stack for testing and validation, while a reference stack with SoA material will be built in order to compare durability and performance.

QUANTITATIVE TARGETS AND STATUS

| Target source | Parameter | Unit | Target | Target achieved? |
|--------------------------|--------------------|-------------------|--|---|
| Project's own objectives | Power density cell | W/cm ² | 1.2 @ 0.675 V/cell |  |
| | PGM loading | g/kW | < 0.3 Pt loadings of corresponding 0.36 mgPt/cm ² MEA | |