

SUCCESS STORY



vapour) in particular, but also hydrogen (H₂), are produced in battery failures before the TR and that electrolyte in particular is an attractive tracer gas ("detectable gas").

Based on the results, the FFG project GALION (GAssensorik für Li-IONen Batteriesysteme) selected sensors of different technologies and investigated them by means of specific safety tests. Currently, metal oxide-based sensors are very promising, as they react to all battery failures investigated within seconds, have a high sensitivity, and are very cost-effective and space-saving. Metal oxide sensors with multiple evaluation pixels are especially recommended, as they could increase selectivity and prevent false alarms.

In addition to LIB cell failures, these sensors can also detect overheating of electronic components and cable insulation (see cover picture with the detectable failures). Furthermore, GALION is researching on functional polymers that release tracer gases in the event of overtemperature, which can be detected by the gas sensors. For battery applications the combination of different monitoring techniques, such as the measurement of voltage,

current, temperature and the measurement of the gases, is recommended.

Effects and impacts

The gas sensor investigations have shown that it is possible to detect battery failures at an early stage, which in turn could prevent serious consequences of battery failures. The results thus contribute significantly to the detection of failures and the improvement of battery safety.

The published, detailed data on the failure behaviour of LIBs in the early stage helps to find suitable sensor technology, to develop sensors or to optimise already existing sensors for the battery failures. The journal publication on this topic received worldwide attention. Sensor manufacturers in particular gave feedback that the data is very valuable for sensor development and is gladly used as teaching material. The publication also led to invitations to speak at international conferences and workshops, such as the NASA Aerospace Workshop 2021. It is also very encouraging that the use of additional (gas) sensor technology to increase safety is also being considered in the EV sector on the basis of this research.



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- Technische Universität Graz, Österreich
- Polymer Competence Center Leoben GmbH, Österreich

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