Harvesting chemical aging data from batteries with gas sensors

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In order to optimize the life cycle of a lithium-ion battery (LiB), the path-dependent aging mechanisms and state of health of the battery must be known and understood [1,2]. Novel chemical data, such as specific gas profiles from inside the battery during its operation, can be helpful for improving the battery analytics and modeling.

Aging of LiBs involves gas evolution reactions linked to the degradation of the battery materials. Interesting gases marking cell aging and degradation are e.g. carbon dioxide (CO2), carbon monoxide (CO), ethylene (C2H4) and hydrogen (H2) [3]. Use of chemical gas sensors to collect the chemical information from batteries is still in early stages mainly focusing on venting gases and pack safety [4].

In our current work, we are developing a set-up integrating gas sensors in contact with the internal environment of the battery to measure aging related gas evolution. The aim is to provide data for improved aging models and enhance the safety of batteries. The set-up will be applicable to various battery chemistries, thus promoting battery development, safety and 2nd life use.

References:

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