Heraeus

Dear Reader,

we participated in the International Battery Seminar in Orlando at the end of March. It was good to finally be able to exchange face to face again and meet with customers and friends. If you were not able to attend, we would like to share our key learnings with you today.

Best regards,

Heraeus Battery Technology Team

350 TWh

...this number was brought up by Tesla's Vineet Mehta in the panel discussion. He estimates that in order to fully replace current fossil energies by electrification a battery storage capacity of 350 TWh is required.

It is immediately clear that those 350 TWh generate enormously high requirements on the calendaric and cycle lifetimes of storage systems. Even replacing cells just every 10 years would require production capacities around 35 TWh (35,000 GWh), more than one order of magnitude higher than current roadmaps for Li-ion cell production capacities. Even with competing storage technologies taking some of the market, there still would be a huge gap between available and required cell production.

One way to close this gap is to achieve even longer lifetimes of Li-ion cells. Good temperature dissipation and spatial homogeneity of electrochemical reaction are key factors that have a big impact on especially cycle lifetimes.
Performance additives such as our Porocarb® can help improve both factors. Our case study has shown that especially for highly compressed and thick electrodes, cell lifetime can be drastically improved.

10000 Cycles

...is the anticipated amount a battery will need to last if it is used regularly as a vehicle to grid energy storage. In his keynote, Prof. Jeff Dahn challenged the audience with this number, which is more than one order of magnitude higher than the typical 800 cycles expected for the lifetime of an EV battery.

In order to achieve this kind of cycle life with Ni-rich single crystal active materials it is not enough to just use an optimized electrolyte with tailored additives. As demonstrated by the group of Prof. Jeff Dahn, the best leaver is the upper cell voltage of the battery. By reducing the cell voltage to 4.1 V and below the mechanical expansion of the Ni-rich NMC can be mitigated and thus capacity fading over time drastically reduced. In combination with artificial graphite and a proper capacity balancing to the lower cell voltage a cycle life of up to 10000 and beyond is achievable.

Looking at the life cycle assessment of a Li-ion battery and considering the resource footprint for the transition to a fully electrified society, the choice between the tradeoff of energy density vs. cycle life should be clear.

Did you know?

At our headquarter, we have a well established application lab for Li-ion batteries. Especially well-suited for paste and small cell development, we are set for supporting you in your design-in needs. Please do not hesitate to contact us anytime.

Do you have questions?

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