

Empowering high voltage lithium batteries

Dense, low surface area materials for low degradation during cycling

In the battery business, it's well known that the choice of nominal voltage is often a tradeoff between high energy density and low battery degradation.

You can achieve higher energy density in lithium ion batteries by increasing the operating voltage of the cathode. TBM-129 series $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ (LNMO) battery materials, with nominal voltages above 4.7 V vs. Li/Li^+ , make this possible. The innovative dense spherical particle shape ensure a tap density above $2.3 \text{ g}/\text{cm}^3$ and a low surface area that is less than $0.2 \text{ m}^2/\text{g}$ to minimize degradation.

Tailored particle size distribution

We can tailor the size distribution of spherical TBM-129 particles to suit any application, with average particle sizes ranging from 6 μm to 100 μm.

High stability at elevated temperatures

Half cell elevated temperature stability is better than 0.10% capacity loss per cycle when cycled between 3.5 V and 5 V.

Collaborators wanted

If you are working on application projects with end-users and battery manufacturers and are seeking ways to optimize battery performance, we'd welcome a chance to work together. The choice of anode and electrolyte is entirely flexible.

Our capabilities

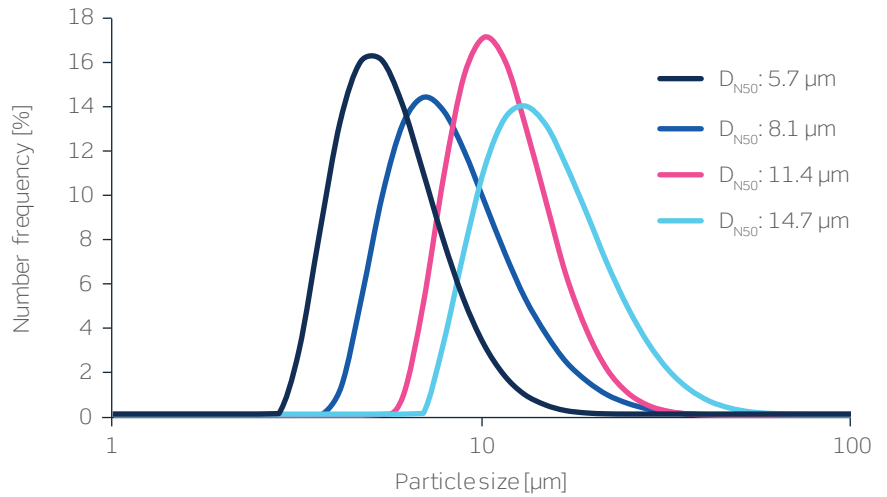
Haldor Topsoe is the market leader within heterogeneous catalysis and surface science. The TBM-129 series is one example of how we apply our expertise to advance material performance.

Advantages

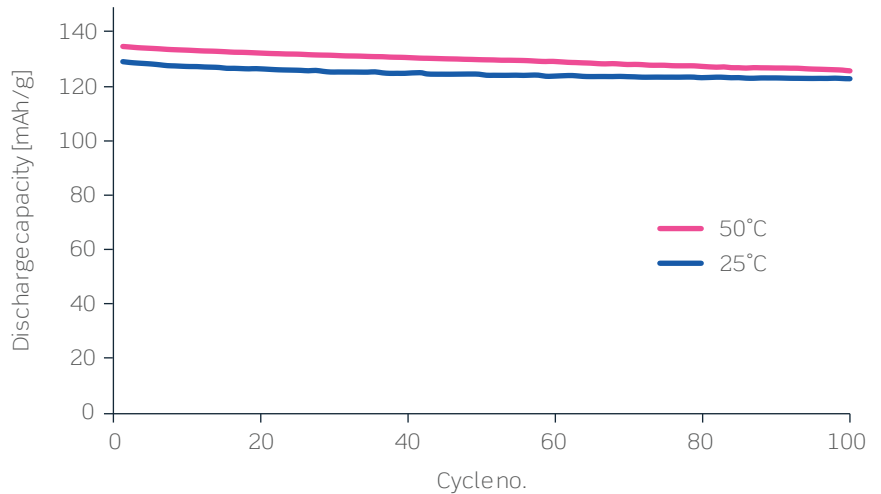
- Initial capacity greater than 130 mAh/g
- Tap density greater than 2.3 g/cm³
- Surface area less than 0.2 m²/g
- Spherical particle shape

Test conditions for cycling performance of half cells

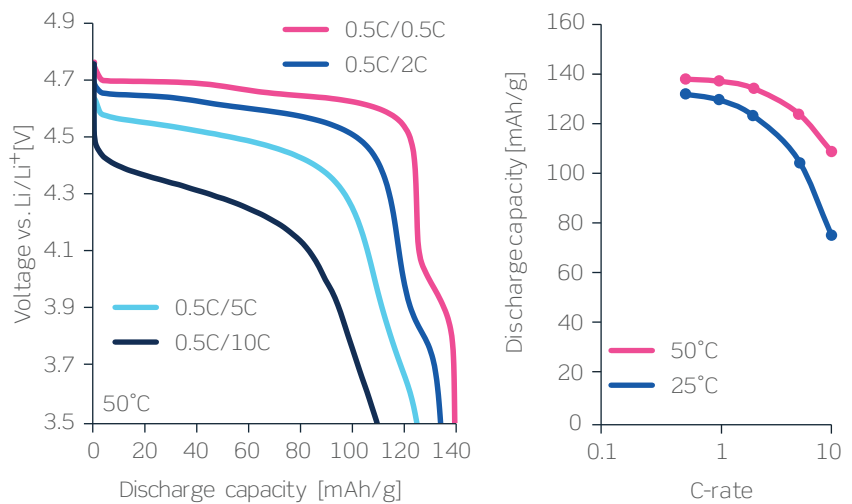
Anode: Lithium
 Cathode: LNMO: Carbon: PVdF 84:8:8 wt%
 Electrolyte: 1 M LiPF₆ in 50:50 vol% EC:DMC
 Cycling info: 0.5C/1C charge/discharge in 2032 coin cell
 Capacity: 0.5 mAh/cm²



Particle size distribution of different TBM-129 materials



Cycling performance in half cells



Power performance in half cells

Get in touch today
www.topsoe.com/batteries