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Physico-chemical data of fumed aluminum and titanium oxides.
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AEROXIDE® Fumed Metal Oxides

Evonik is a global leader in specialty chemicals. As a worldwide manufacturer of high-quality silica and metal oxides Evonik offers innovative solutions in the design of ultra-fine nanostructured particles as performance additives in Li-ion batteries.

AEROXIDE® fumed metal oxides from Evonik are used as additives in Li-ion batteries to increase the performance, life-time and safety of the battery.

A dry coating of cathode active materials, such as LCO, NCA and Ni-rich NMC types with AEROXIDE® features the following benefits:

- Surface protection of the cathode particles
- Less cathode material and electrolyte decomposition
- Significantly increased capacity retention
- Longer battery life
- Dry coating process applicable

The AEROXIDE® fumed metal oxide layer acts as defined SEI (solid electrolyte interface). It protects the cathode material from undesired reactions with electrolyte, especially at increased cut-off voltage.

A successful dry coating of the cathode particles with nano-structured AEROXIDE® is visible in the increase of powder density after coating process.

Preferred AEROXIDE® products:

- **AEROXIDE® Alu 130**
- **AEROXIDE® TiO₂ P 25**  
  Mixture of both oxides beneficial!

High intensity powder mixing is required to de-agglomerate AEROXIDE® successfully to obtain a very homogenous coating.

AEGRIDE® Alu 130

example for stabilization of LCO Nano-structured AEROXIDE® is visible in the increase of powder density after coating process.

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Example for stabilization of LCO:

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Example for stabilization of LCO.

Similar effect for Ni-rich NMC types (e.g. 811-NMC)

AEROXIDE® fumed metal oxides (Al₂O₃ and/or TiO₂) as dry coating on cathode particles leads to a significant increase in capacity retention of LIB cells!
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The SEM image shows a single AEROXIDE® TiO₂ P 25 aggregate.

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