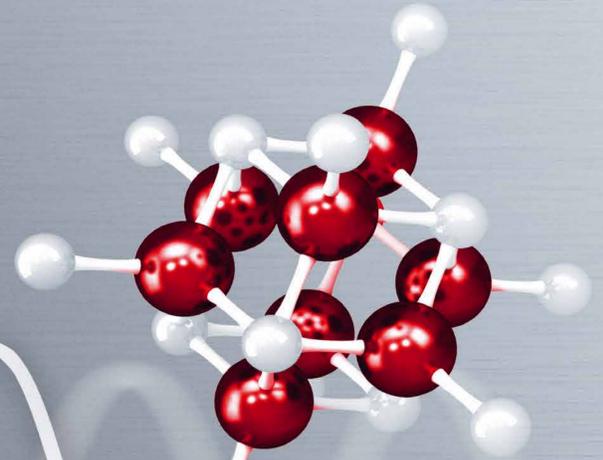


# APPtec®



## A NEW GENERATION OF SPRAY PYROLYSIS TO PRODUCE ADVANCED BATTERY MATERIALS

Rising demands on functionality and durability of components and devices lead to new challenges in the development of materials. Utilize high performance powders, produced with Glatt APPtec®, to enhance the batteries of the future.

The new **Advanced Pulse Powder Technology APPtec®** is a unique, continuous process to generate and modify powders. In the specially designed combustion chamber, the heart of the synthesis reactor, a **pulsating stream of hot gas** is created. In this particles are generated, treated and modified. The pulsating stream of hot gas can be adjusted in **frequency, amplitude, temperature and flow-velocity**. The reactor is constructed in a way that the gas stream pulsates within strictly controlled parameters.

Due to the pulsation of the gas stream, the **heat transfer** from gas to particle is **increased by a factor of five to ten**, compared to continuous gas streams. Because of this the generation of particles and phase-transitions are much faster and **unique structures** can be created.

Because of large turbulences pulsating gas streams exhibit **no gradients in temperature or flow-velocity**, as they are typical for continuous gas streams. Because of this all particles experience an identical treatment regarding temperature and retention time as basis for homogeneous NMC, LNMO, LLZO or modified graphites.



APPtec® pilot and production plant

### Advanced Pulse Powder Technology to design YOUR materials

Benefit from the advantages of this new Glatt-technology for targeted design of particles with desired properties!

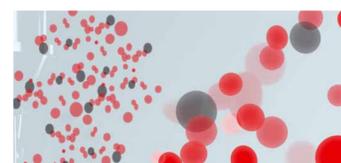
Develop new technological solutions with Glatt. Create tailor-made high-performance materials for your batteries.



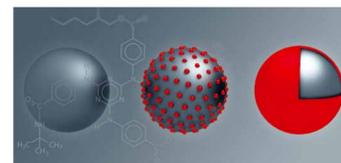
Contract manufacturing or own production plant



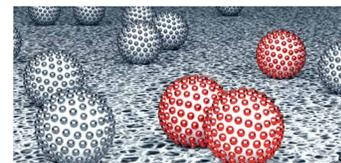
Simple oxides, doped materials, complex mixed oxides



Adjustable particle size and narrow size-distribution



Functionalization of powder particles



Very high capacities for batteries

#### Our Service

- » joint development of materials & processes
- » material characterization/optimization
- » lab scale production and scale up
- » set-up of your own lab scale ProAPP 15
- » set-up of your own production scale ProAPP 500
- » toll production on our ProAPP 500

#### Chemical + Phase Composition

- » adjustable chemical composition
- » doped and undoped complex oxides
- » mixed oxides like Spinel or Mullite
- » adjustable by process parameters

#### Particle Size & Surface

- » from nano to micro
- » very narrow particle size distribution
- » adjustable surface properties

#### Coating & Core-Shell

- » unique core-shell particles
- » defined layer thickness
- » defined porosity and activity

#### Advanced Materials

- » catalytic materials with exceptionally high activities
- » ceramic high-performance powders
- » active materials for batteries and solid electrolytes