

THERMAL PROCESS SOLUTIONS FOR THE LITHIUM ION BATTERY INDUSTRY



Expertise in battery kiln manufacturing

Thanks to our extensive expertise we offer a broad, customizable, high quality equipment/solutions range for Lithium-ion battery materials.

High manufacturing quality

- High level quality control management by Riedhammer / Sacmi
- Use of high grade materials and components / Reliable suppliers
- Quality and performance validation in our workshop (FAT)
- Continuous development / improvement of equipment
- Special / tailor-made solutions

High efficiency

- Reliable long lifetime equipment / High productivity
- Very low specific energy and media consumption
- Excellent temperature uniformity
- Strong, reliable sagger circulation and handling system

Excellent service

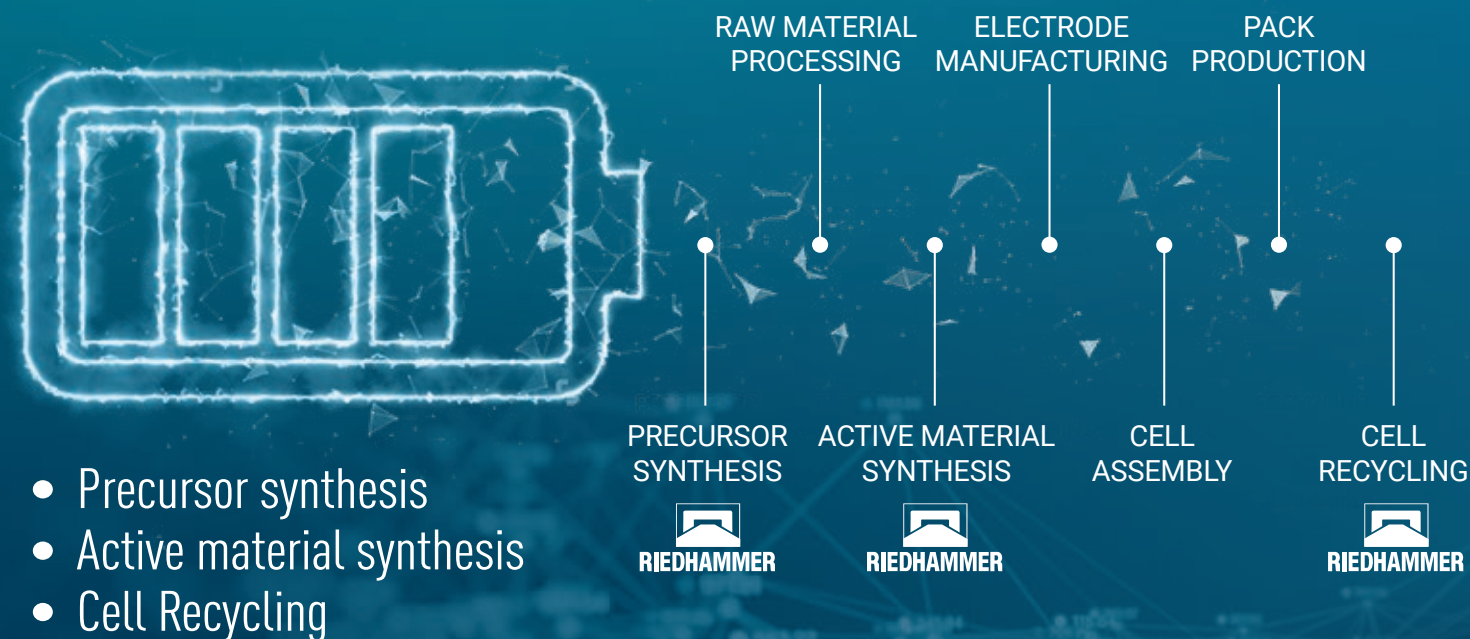
- High performance service
- Efficient operator training
- 24-hour response time for troubleshooting
- Remote control for fast technical support

Large number of completed projects worldwide

- ✓ More than 450 battery kilns successfully built and in operation
- ✓ > 170 kilns for high O_2 operation
- ✓ > 300 kilns in Asia
- ✓ Successful projects in China, South Korea, North America and Europe
- ✓ Supplying key players in the battery business



Process chain for the Lithium battery production



Roller hearth kilns

Sagger circulation line with automatic sagger handling and powder handling systems

- Tailor-made process requirements
- 4-tray, 6-tray width with multiple layer configuration
- High O_2 atmosphere > 99 %
- Inert gas atmosphere (N_2 , Ar, CO_2 and others) < 30 ppm O_2
- Special atmosphere (H_2 , CO, CH_4 and others)

- Optimal temperature distribution
- Length up to 150 m
- Gas-tight kiln casing
- Uniform product treatment



Rotary kilns

- No need for saggars or handling
- High output capacity due to excellent heat transfer and short cycle time
- Customized solution, tailored to your product
- Adjustable tilt and rotation speed
- Precise atmosphere adjustment inside rotary tube
- Gas-tight feed system
- Cooling tube



Wide range of powder calcination and sintering processes

- High O_2 atmosphere > 99 %
- Inert gas atmosphere (N_2 , Ar, CO_2 and others) < 30 ppm O_2
- Special atmosphere (N_2CO , CH_4 and others) < 30 ppm O_2 / Air atm.



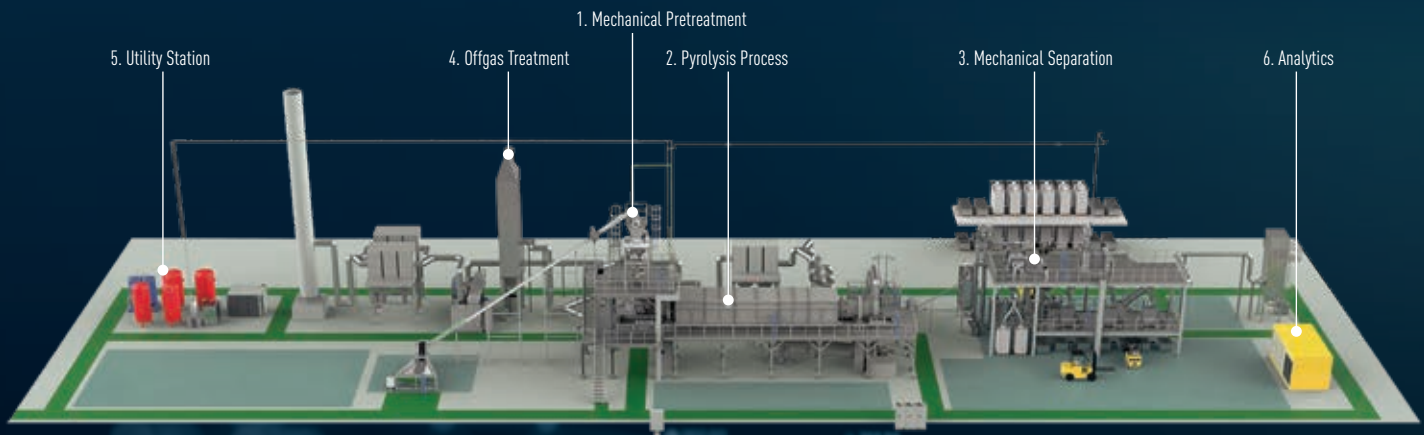
Services

- ✓ Analysis of individual requirements
- ✓ Customized kiln solutions
- ✓ Design concepts
- ✓ Detailed offers
- ✓ Process engineering
- ✓ Production and testing
- ✓ Shipping, assembly, commissioning on site
- ✓ Documentation
- ✓ Production support
- ✓ Process analysis
- ✓ Maintenance
- ✓ Plant revamping

Support for related processes and equipment via a broad network throughout the LIB industry

Combined Lithium cell recycling plant

All-in-one



Product Innovation

- Processing of different cell shapes and cell chemistries
- Continuous Recycling Operation
- Capacity of up to 48 tons/day

Innovative Technology

- Robust and efficient Pyrolysis Kiln – fully developed technology
- Efficient removal of binders, organics and fluorine sources
- Regeneration of commercially available recycled materials of highest quality



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