

skeleton+

Ultraschnellladen und -entladen in Sekunden mittels **Superkondensatoren** und **Superbatterien**

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COO & Geschäftsführer



Certified



Technology Advantage Throughout the Entire Energy Storage Industry

Highest performance and quality for every energy storage application, powered by Curved Graphene

skeleton⁺



High Power

Lithium Ion Batteries

- Limited power density (0.5 kW/kg)
- + High energy density (205 Wh/kg)
- + Limited cycle life (<3000)
- + Slow charge rate (2 C)
- + Contains Cobalt, Nickel, Copper
- + Safety concerns

SuperBatteries

- High power (10 kW/kg)
- Medium energy density (65 Wh/kg)
- 50,000+ lifecycles
- Fast charging (60s, 60C)
- Safe
- No Cobalt, Nickel or Copper
- Extremely competitive cost-base compared to similar energy storage technologies

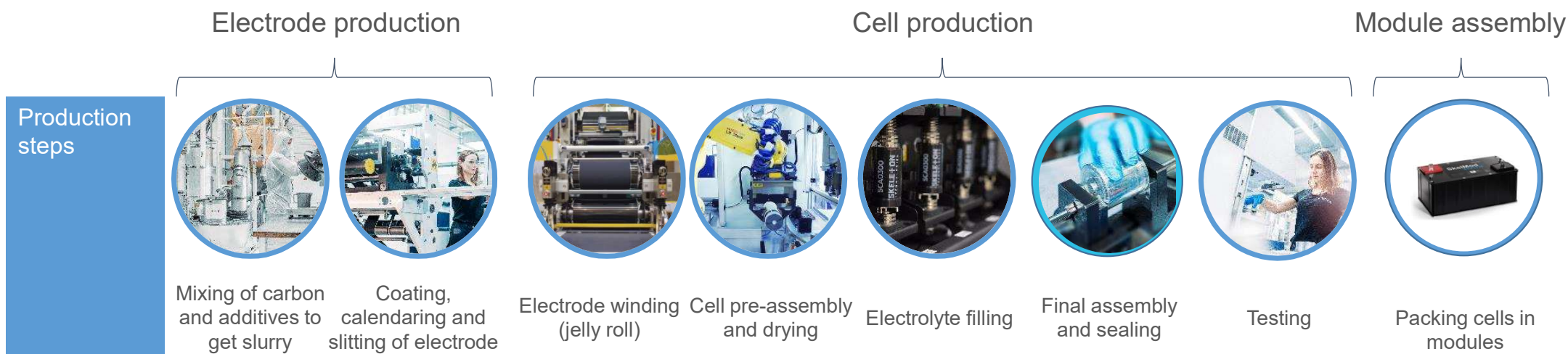
Supercapacitors

- Extreme power (21 kW/kg)
- Low energy density (16 Wh/kg)
- 1,000,000+ lifecycles
- Ultrafast charging times (<1 s, 3600C)
- Safe
- No Cobalt, Nickel or Copper
- Increased efficiency & lower footprint

Production processes for SuperCapacitors and SuperBatteries

State of the art manufacturing processes and equipment

- + SuperBatteries and SuperCapacitors follow the same electrode, cell and module production steps
- + Equipments used for supercapacitor manufacturing can be used also for SuperBatteries
- + Skeleton is producing SuperCapacitors in series production and SuperBatteries in pilot scale
- + Automotive standard traceability systems already in use (IATF)



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Key Enabling Technology to Power Electrification Across Industries

A qualified supplier & system provider to industry leaders

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- Fuel cell power support solutions
- 48V active suspension
- KERS / Push-to-pass
- 12V board net stabilization & back-up solutions



- KERS for light rail
- Engine start
- Mild hybrid bus energy storage
- Fuel cell power support solutions for rail and bus transportation



- Wind turbine pitch control
- Virtual inertia / Grid forming in STATCOMs
- Microgrid power back-up and quality



- Peak load shaving to cover short-term peak power demands
- KERS for port cranes, forklifts, and elevators
- Fast-charging for warehouse AGVs and shuttles



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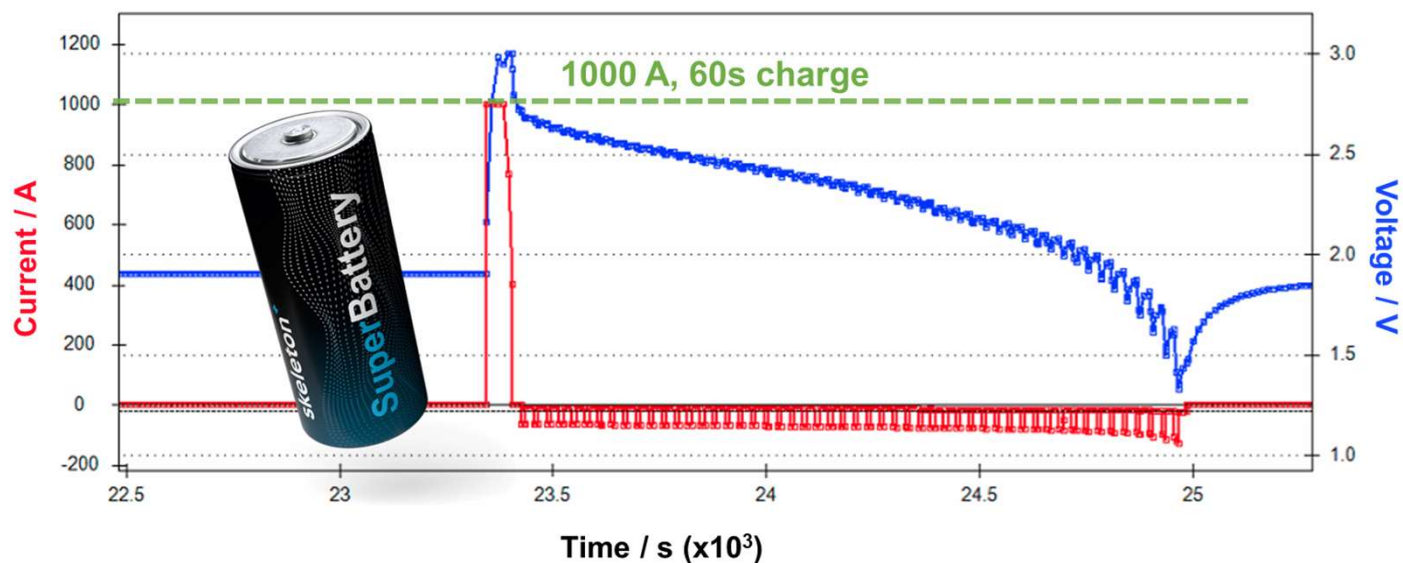
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SuperBattery: Super fast and super safe charging in 60 seconds

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Advantages over Li-ion batteries from materials to cell design



- + 1000 A charge in 60 seconds
- + 60 mm diameter
- + 138 mm length cell
- + Customers have proven the technology
- + No risk of fire or explosion

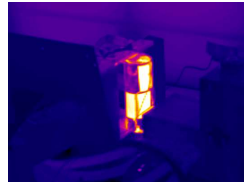
3rd party testing conducted by:



Crushing



Short circuiting



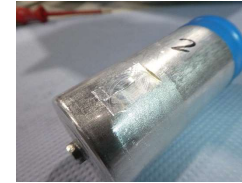
Cell after overcharge



Nail penetration

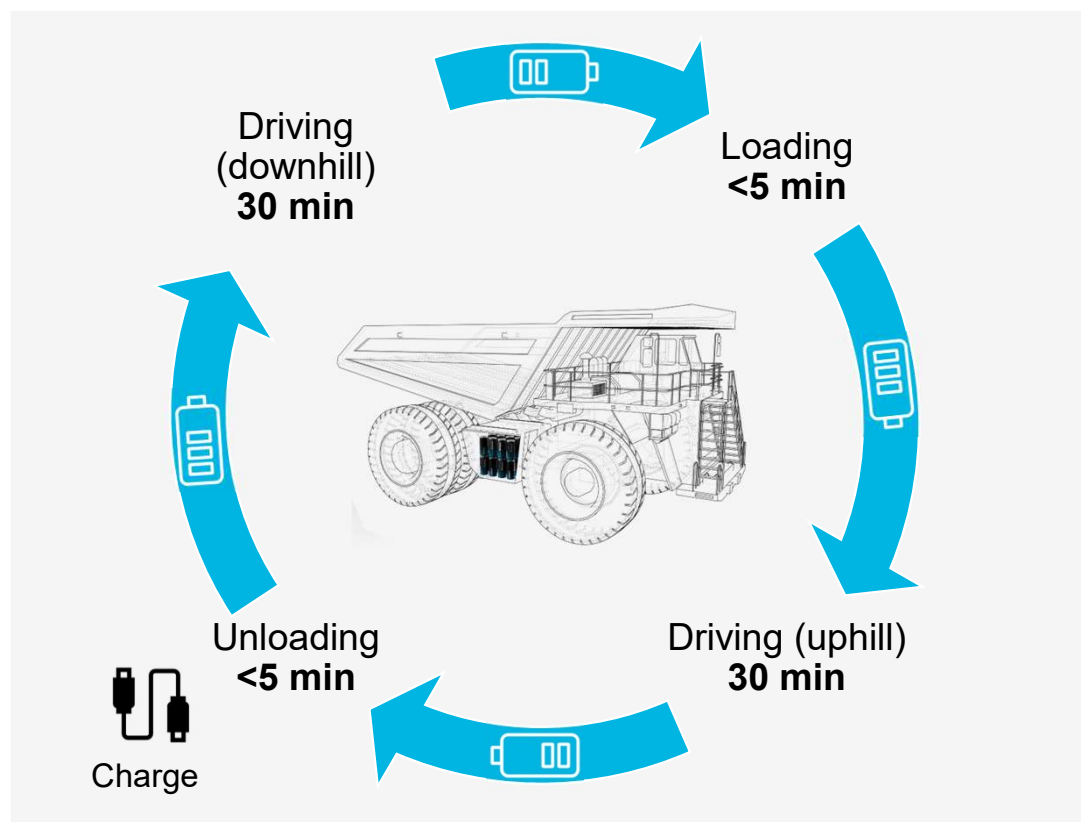


Cell after heating to 350°C



Electrification of Heavy-Duty Equipment

Example Use Case: 90 seconds of charging, 30 minutes of operation



SOLUTION

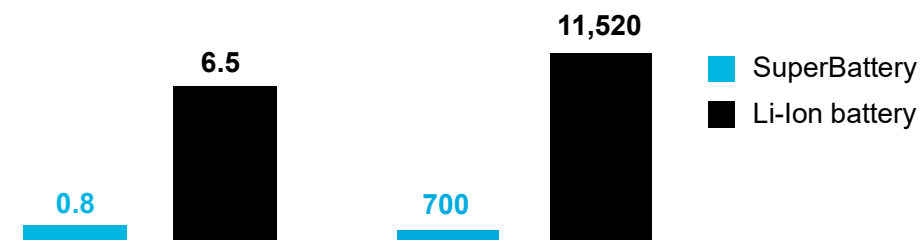
- + Fast charging **SuperBattery system** on board
 - 400 kWh charged in 90 seconds
 - Higher utilization than with diesel possible, study by Shell

KEY ADVANTAGES

- + **Fast charging (<90 sec) during operation – no fueling time**
- + **>60% TCO savings** vs 30 min charging LIB over 3 years
- + **Long lifetime** of 50,000 cycles
- + **Inherent safety** and no risk of fire in case of overheating, overcharging or mechanical damage

Charging time per day in hours

Cost of battery packs per vehicle over 4 years (€'000)



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Thank you!

For more information
contact us:

www.skeletontech.com



Global Reach from the Heart of Europe

Combining German engineering & Estonian IT

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The largest and most modern supercapacitor factory in Europe

Großröhrsdorf, Germany

- SuperBattery R&D and production
- Supercapacitor research & development center
- Main production location from cells to systems



Markrandstädt, Germany

- The largest and most modern supercapacitor factory in the world
- Start of production in 2024
- Curved Graphene supercapacitor production



Bitterfeld-Wolfen, Germany

- Curved Graphene synthesis and production
- Material pilot & development plant
- Solid-state material research



Berlin, Germany

- Sales & application engineering
- Grant & IP management
- Solid-state battery development



Tallinn, Estonia

- Software development
- Electronics engineering
- Module & system development

From Single Cells to Full Energy Storage Systems

The only full value-chain manufacturer on the market

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Raw Material

Curved Graphene

Single Cells

300-5000F
Industrial supercapacitors

Industrial Modules

From low to high voltage needs
Supercapacitor modules with smart
balancing and management systems

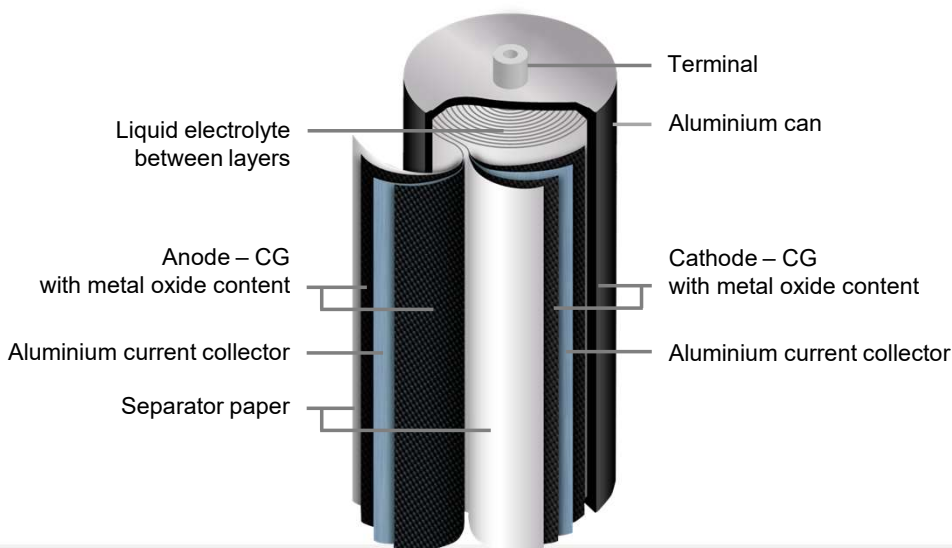
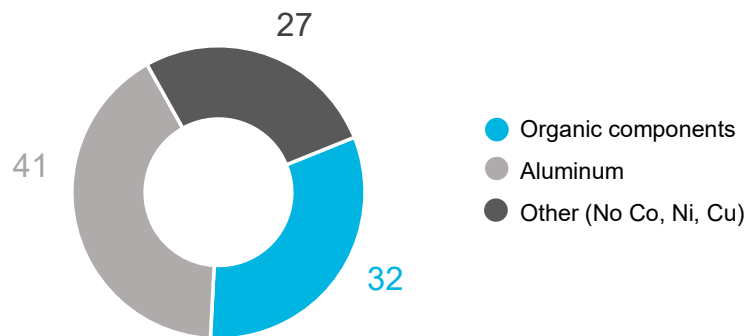
Systems

MWs of immediate power
Modular, supercapacitor-based
energy storage systems

SuperBattery: A sustainable Energy Storage Product

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- + **Narrow range of materials**
- + **Minimal number of components**
- + **Aqueous coating for both Anode and Cathode**

- + **No Cobalt, no Copper, no Graphite, <5% Lithium**
- + **Aqueous processing for recycling possible**
- + **No risk of fire or explosion upon disassembly**