

# POWERFUL CROSS-LINKER ADDITIVE FOR HIGH-CAPACITY LITHIUM-ION BATTERIES



Anteo X is a game changer for lithium-ion battery binders, its unique technology boosts the performance of silicon containing anodes, increasing capacity and extending cycle life.

## MAKING **THE IMPOSSIBLE, POSSIBLE**

Anteo X is a powerful cross-linker additive that reinforces battery binders in silicon containing anodes and improves their performance.

The Anteo X technology creates cross-linking networks in the binder material resulting in a uniform 3D-network structure. This network structure:

- Improves electrochemical performance (increase capacity retention, extended cvcle life)
- Improves mechanical performance (stronger cohesion)

# **THE ANTEO X BENEFITS**



- ✓ Performance improvement and cost reduction for silicon rich anodes
  - Improves cost efficiencies; potential reduction of inactive materials used while maintaining performance
  - Increases capacity retention for silicon containing anodes/ or silicon rich anodes
- Compatible with a wide range of base binders including various SBR binders, PAA or proprietary PAA co-polymers, Alginate, CMC and more
- ✓ Low-cost alternative to complex binder synthesis
- ✓ Seamlessly integrates with existing manufacturing process. Anteo X is added as last step to conventional slurry preparation process, requiring no or minimal process adjustments
- ✓ Non-hazardous water based solution, safe to use

# **ANTEO X IS COMPATIBLE WITH A WIDE RANGE OF BINDERS**

Anteo X has demonstrated its ability to cross-link with a wide range of conventional and proprietary water-based binder chemistries, utilised in current and future anode production processes.









PAA + Anteo X





### **ANTEO X IMPROVES MECHANICAL PROPERTIES OF BINDER MATERIAL**

### ANTEO X + Standard SBR

• The addition of Anteo X to a commercially standard SBR latex binder shows an increase in the binder yield strength by up to 1147%, effectively delivering performance similar that of silicon SBR binder



### Results demonstrate Anteo X effectively improve the mechanical performance of the standard SBR & modified silicon SBR binder materials

**ANTEO X ACHIEVES SUBSTANTIAL IMPROVEMENTS IN CYCLE LIFE FOR VERY HIGH-CAPACITY SILICON ANODES** 

- At 4% binder content, the addition of Anteo X delivered a 100% increase in cycle life and 43% decrease in expansion.
- At 8% binder content, Anteo X delivered a 90% increase in cycle life and 8% decrease in expansion.



**EXPANSION STUDY** Capacity @ C/20 ~1600 mAh/g Capacity @ C/2 ~1300 mAh/g

Reduction in expansion @ cycle 100





ANTEO X - BINDER COMPATIBILITY

Alginate + Anteo X

CMC/SBR + Anteo X

### ANTEO X + Silicon SBR:

• The addition of Anteo X to a silicon SBR binder shows an increase in the binder yield strength by up to 221%



- Anteo X testing in high-capacity silicon anodes offers significant improvements in cycle life at various binder levels.
- Results demonstrate Anteo X is effective in helping to reduce the binder content, whilst maximizing active material in the anode resulting in improved cycle life.

# ANTEO X INTEGRATES SEAMLESSLY WITH EXISTING ELECTRODE MANUFACTURING PROCESS

- Results demonstrate that Anteo X maintains a stable slurry viscosity after addition
- Results demonstrate that Anteo X offers stable pot-life of > 7 days, even for very high PAA content slurries, while maintaining uncompromised electrochemical performance







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### **COLLABORATE WITH ANTEOTECH**

At AnteoTech, innovation is in our DNA. That's why we are on a mission to transform binder chemistries currently available in the market.

Partner with AnteoTech to deliver exceptional products to the industry, including the development of commercial battery solutions.