



FINEST QUALITY SERVICE

## Jet Milling's Indispensable Value in Lithium-Ion Batteries' Supply Chain

APPLICATION NOTE *Lithium Ion Batteries* | June, 2017

**INDUSTRY:** LITHIUM-ION BATTERIES

**LOCATION:** GLOBAL

**KEY CHALLENGES:** MEET MANUFACTURERS' Li-ion SPECS

**SOLUTION:** DEVELOP JET MILLING TOLLING & EQUIPMENT

**BENEFITS:** INCREASE SURFACE AREA & MICRONIZE  $\text{LiTiO}_3$  &  $\text{Li}_2\text{CO}_3$



Since 1946, Jet Pulverizer has been responding to customer demands with high quality, engineered solutions. From as early as 2009, Jet Pulverizer has used its first mover advantage to respond to customers' needs in the battery segment, improving its customers' capabilities.

### The Challenge

The Jet Pulverizer Company has developed a process solution for the emerging lithium-ion battery technology using the compounds Lithium Titanate Oxide ( $\text{LiTiO}_3$ ); aka LTO as well as Lithium Carbonate,  $\text{Li}_2\text{CO}_3$ ; aka LCO. The beneficial properties of LTO & LCO are directly related to its size and purity. JP's jet milling technology provides a distinct processing advantage using its dry, high-purity processing, with fine particle generation in the single digit micron average with an extremely tight distribution and near zero contamination.

Many energy storage applications require lithium-ion extracted from lithium bearing minerals. One conversion process of these minerals is to a finished LCO or LTO. Within this process, there is only one last step prior to bagging...jet milling. Many lithium-ion applications require the starting lithium carbonate product feed stock to be in the  $d_{90} = 7 - 10 \mu\text{m}$  particle size range which can be provided, ever so well, by the Micron-Master® Jet Mill by the Jet Pulverizer Company.



### The Jet Pulverizer Co.

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## APPLICATION NOTE | LITHIUM-ION BATTERIES

Particle sizes reduction to 5-10 micron average has been shown to improve charge time and battery cycle life. The typical applications for this process include high power, high-density energy storage, where high charge and high discharge rates are required. The industries benefiting from this process are hybrid automobiles, dry cell batteries, solar energy storage and electrodes.

### **The Solution**

Since every new project requires on site trials, regardless of tolling or mill purchase being the clients' ultimate goal, Jet Pulverizer has been able to harness and re-create ideal particle size reduction over the years. Once a certain spec has been achieved, the Jet Pulverizer team will either become the production scale toll manufacturer, or develop a mill and deliver the knowledge to its client.

Jet Pulverizer has years of experience working with special compounds that are difficult to handle. LTO and LCO are abrasive, requiring abrasion resistant surfaces such as silicon carbide or 99.5% pure alumina lined mills, to ensure high purity and near zero contamination in the grinding process and an extremely tight size distribution for material consistency in the end product. Jet Pulverizer provides support for both research and commercial scale requirements, with a complete test grinding service to provide milled samples and document your process development efforts.

### **The Impact**

Jet Pulverizer has been able to place itself as a critical solution provider within its Lithium Battery clients' value chain. Its value proposition lies in its experience in both in-house jet milling, and its delivery of custom designed, highly engineered Miicron-Master® Jet Mills for our intellectual protection (IP) sensitive clients.



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