

2022  
FINAL AGENDA

May 24-25, 2022 EDT

# CATHODE SUMMIT VIRTUAL



Featured Speakers: ▼

## Next-Generation Cathodes that Deliver Higher Energy Density at Lower Costs

**Cathode development** provides the largest opportunity for improving energy density and lowering costs of advanced lithium-ion battery cells. Improvements in cathode technology need to be made to match the energy density of anodes and get the most energy storage out of the battery. With current cathodes typically accounting for over a third of total battery cost, it is important to achieve these goals with a special focus on supply chain concerns. This virtual meeting will focus on the improvements being made to current cathode technology.



**Mark Hersam, PhD**  
Professor, Materials  
Science and Engineering,  
Northwestern University



**Miaofang Chi, PhD**  
Senior Research Scientist,  
Center for Nanophase Materials  
Sciences, Oak Ridge National  
Laboratory



**Boryann Liaw, PhD**  
Directorate Fellow, Energy  
Storage & Electric  
Transportation, Idaho National  
Laboratory



**Haegyeom Kim, PhD**  
Staff Scientist, Materials Sciences  
Division, Lawrence Berkeley  
National Laboratory

**SAVE \$200!**  
Register by March 4



#CET4Cathodes

[CambridgeEnerTech.com/Battery-Cathodes](https://CambridgeEnerTech.com/Battery-Cathodes)



## Coverage Will Include:

- NMC Cathodes
- Lithium Iron Phosphate Batteries
- Class 1- Layered Oxide Cathodes
- Improved Energy Density
- Electronic Conductivity
- Thermal Stability
- Cycle Stability
- Safety
- Computational Studies
- Ion Diffusion Mechanisms
- Equilibrium Cell Voltage Studies
- Cathode Surface Behavior



### ▶ **INTERACTIVE NETWORKING:**

live Q&A, roundtables, chat with exhibitors, sponsors, and fellow delegates

### ▶ **RESEARCH POSTERS:**

engage with researchers presenting the latest developments in battery cathodes

### ▶ **SPONSORED TALKS:**

by leading technology and service providers showcasing new offerings

### ▶ **INSPIRING KEYNOTE PRESENTATIONS:**

from world-renowned experts and visionaries



May 24-25, 2022 • All Times EDT

## TUESDAY, MAY 24

### MARKET ANALYSIS

#### 8:05 am Organizer's Remarks

Victoria Mosolgo, Conference Producer, Cambridge EnerTech

#### 8:10 Chairperson's Remarks

Kevin Shang, Analyst, Roskill

#### 8:15 Single-Crystal Nickel-Based Cathodes for Li-Ion Batteries: Technology Department and Market Analysis

Kevin Shang, Analyst, Roskill

Single-crystal cathode materials with layered structures have gained the spotlight as promising materials for high-performance Li-ion batteries. They provide remarkable performance and safety characteristics unmatched by traditional polycrystalline counterparts. The presentation will review the technology development of single-crystal nickel-based cathodes in the past 10 years. In addition, the session will show how the raw materials market has been affected by this technology.

#### 9:45 Session Break

### HIGH PERFORMANCE CATHODES

#### 10:15 Sponsored Presentation (Opportunity Available)

#### 10:45 Conformal Graphene-Coated Cathodes for High-Performance Lithium-Ion Batteries

Mark Hersam, PhD, Founder and President, Volexion, Inc.; Professor, Materials Science and Engineering, Northwestern University

#### 11:15 Electronic Structure Engineering – A Way to Modify the Cycling Performance of Layered Oxides

Karin Kleiner, PhD, Assistant Researcher & Chair, Technical Electrochemistry, Technical University of Munich

#### 11:45 Session Break

### LOW-COBALT AND COBALT-FREE CATHODES

#### 12:10 pm Chairperson's Remarks

Steve Sloop, PhD, President, OnTo Technology LLC

#### 1:15 Nickel/Cobalt-Free Li-Ion Battery Chemistries

Feng Lin, PhD, Associate Professor, Chemistry, Virginia Polytechnic Institute & State University

In this presentation, we will first discuss our recent progress in eliminating the use of cobalt in lithium-ion batteries. We will then highlight a new class of nickel/cobalt-free cathode materials with dual transition metal redox. As an immediate alternative to lithium-ion batteries, sodium-ion chemistry has notably gained momentum for some applications. Thus, we will close the presentation by showcasing our recent studies in sodium-ion batteries.

#### 1:45 Realizing Commercial Potential of Low-Co and Co-Free Cathodes through Designed Processing

Feng Wang, PhD, Materials Scientist, Energy & Photon Sciences Directorate, Brookhaven National Laboratory

#### 2:15 Session Break

### CATHODE ENGINEERING

#### 2:45 Low-Cost Materials with Cathode-Healing Technology

Steve Sloop, PhD, President, OnTo Technology LLC

#### 3:15 Breaking the Energy-Power Trade-Off with Multilayer Electrodes

Adrian Yao, Co-Founder & CTO, Enpower, Inc.

EnPower designs and manufactures multilayer electrodes that break away from the classic engineering trade-off between energy and power. Multilayer anodes with strategically designed porosity, tortuosity, and other profiles can facilitate rapid ion transport through the thickness of electrodes to balance the SOCs of materials and mitigate lithium plating. Multilayer electrodes improve fast-charge cycling, reduce DCIR, and increase discharge performance without adding cost to the unit cell.

#### 3:45 Close of Day

## WEDNESDAY, MAY 25

### CATHODE MATERIALS

#### 8:50 am Organizer's Remarks

Victoria Mosolgo, Conference Producer, Cambridge EnerTech

#### 8:55 Chairperson's Remarks

Boryann Liaw, PhD, Directorate Fellow, Energy Storage & Electric Transportation, Idaho National Laboratory

#### 9:00 Qualify Cathode Material Utilization

Boryann Liaw, PhD, Directorate Fellow, Energy Storage & Electric Transportation, Idaho National Laboratory

A quantitative method to qualify the utilization of cathode material using Li inventory track will be presented. This methodology can provide more in-depth insight than the conventional capacity-based testing and empirical comparison. The method has a cross-platform capability to compare impacts from cathode formulation, fabrication parameterization, and duty cycle.

#### 10:30 Poster & Networking Session via Toucan

#### 11:15 Safety Considerations for Advanced Cathode Materials

Nicholas Faenza, PhD, Managing Engineer, Materials and Corrosion Engineering, Exponent

In addition to cost, performance, and scalability, the hazards and risks presented by advanced cathode materials will govern their implementation in consumer, commercial, and niche applications. This talk will investigate some of the unique challenges presented by the next-generation of cathode materials and the methods for developing a better understanding of these risks and hazards.

#### 11:45 Advanced Battery Failure Characterization Techniques

Hernan Sanchez Casalongue, PhD, Senior Managing Scientist, Battery and Consumer Electronics, Exponent

The design of the battery pack can mean the difference between a controlled, expected outcome and a propagating thermal runaway event involving multiple cells and resulting in severe consequences. Fractional Thermal Runaway Calorimetry (FTRC) was developed to directly quantify the energy released during a battery thermal runaway event within the cell body, ejecta, and vent gases. Studies utilizing Exponent's FTRC instrument will display risk mitigation strategies for battery pack designs.

#### 12:15 pm Sponsored Presentation (Opportunity Available)

#### 12:45 Session Break



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## PROCESSING

### 1:40 Chairperson's Remarks

*Anil Mane, PhD, Principal Materials Science Engineer, Applied Materials Division, Argonne National Laboratory*

### 1:45 Understanding Interface Stability of Solid-State Batteries using Scanning Transmission Electron Microscopy

*Miaofang Chi, PhD, Senior Research Scientist, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory*

Solid-state batteries hold the promise of safer, cheaper, and longer-lasting batteries. Its largest bottleneck lies in their interfaces. In this talk, I will show several examples of elucidating the interface stability and the dendrite growth mechanism in model solid electrolytes and demonstrate the power of utilizing a suite of scanning transmission electron microscopy techniques to probe features critical to the function of interfaces in solid-state batteries.

### 2:15 Precursors of Vapor Processing of Cathodes

*Anil Mane, PhD, Principal Materials Science Engineer, Applied Materials Division, Argonne National Laboratory*

Atomic layer deposition (ALD)-chemical vapor deposition (CVD) precursors can play very important roles in modification of the cathode materials in a variety of manners such as barrier coating, functional coating, uniform doping, and surface cleaning. In this presentation we will present some of the recent work on this topic.

### 2:45 Session Break

### 3:15 Beyond Li-Ions: Toward Low-Cost Rechargeable Battery Systems

*Haeyeom Kim, PhD, Staff Scientist, Materials Sciences Division, Lawrence Berkeley National Laboratory*

### 5:15 Close of Conference





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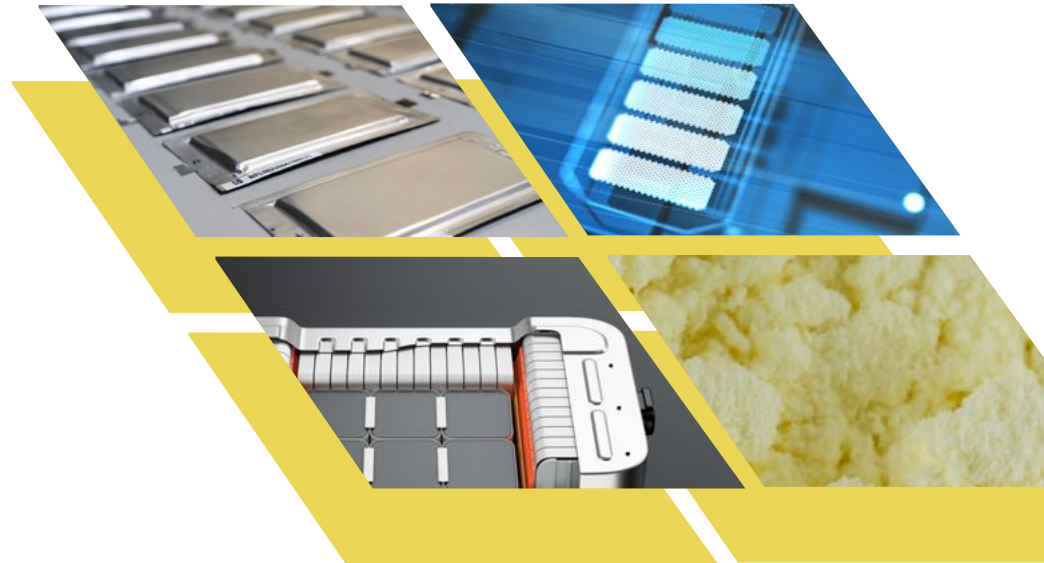
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## PRESENT A VIRTUAL POSTER & SAVE \$50\*

Cambridge EnerTech encourages attendees to gain further exposure by presenting their work in the virtual poster sessions. To ensure your poster presentation is scheduled and included in the conference materials, your submission must be received, and your registration paid in full by April 29, 2022.

*Poster Presentations will be held LIVE ONLINE.*

*Posters will be available in real-time only. Posters will not be available on-demand.*

Special requirements for poster presentation and materials. Please see [website](#) for more information.

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