

UNDERWRITERS LABORATORIES®

Battery Safety Science Symposium

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Session III

Empirical and Modeling Studies: New Insights

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NSERC/Tesla Canada Inc. Industrial Research Chair



Accelerating Rate Calorimetry Studies of the reactivity of Ni-rich positive electrode materials with electrolyte at elevated temperature

Nickel-rich positive electrode materials present challenges for the safety of Li-ion batteries. Not only do they lead to cells with higher stored energy in the first place, they are more reactive with electrolytes at elevated temperatures than materials with lower Ni content. In this presentation, we will describe how accelerating rate calorimetry can be used to rank the relative reactivity of positive electrode materials with electrolyte. We will then discuss the factors that lead to the high reactivity of Ni-rich materials and give a few strategies for reducing this reactivity.

About the speaker

Jeff Dahn was born in Bridgeport, Conn. in 1957 and emigrated with his family to Nova Scotia, Canada in 1970. He obtained his B.Sc. in Physics from Dalhousie University (1978) and his Ph.D. from the University of British Columbia in 1982. Dahn then worked at the National Research Council of Canada ('82-'85) and at Moli Energy Limited ('85-'90) before taking up a faculty position in the Physics Department at Simon Fraser University in 1990. He returned to Dalhousie University in 1996. He has worked on lithium and lithium-ion batteries for 43 years.



During his years at Simon Fraser University ('90-'96) he collaborated strongly with the R+D team at NEC/Moli Energy Canada (Now E-One/Moli Energy Canada). Dahn then became the NSERC/3M Canada Industrial Research Chair in Materials for Advanced Batteries at Dalhousie University in 1996. In 2016, Dahn began a 5-year partnership with Tesla which will be extended till 2026. Dahn is the co-author of over 730 refereed journal papers and 73 inventions with patents issued or filed.

Dahn has received National and International awards including: Battery Division Research Award (The Electrochemical Society - 1996); Fellow of the Royal Society of Canada (2001); the "Technology Award" from the ECS Battery Division in 2011, the Governor General's Innovation Award (2016) and the Gerhard Herzberg Gold Medal in Science and Engineering (Canada's top science award) in 2017. He was named an Officer of the Order of Canada in 2020.