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Understanding Lithium Ion Battery hazards and assessing the Consequences

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ABSTRACT

The storing of electricity in lithium ion batteries is a rapidly growing area and a technology that is becoming increaingly necessary in our efforts to combat climate change. Whether it is in mobility or energy storage in large scale battery projects, the use of lithium ion batteries is becoming increasingly common in our society.

However, with the increased use of lithium ion in our lives, so have we seen an increase in the number of lithium ion battery related incidents. These systems typically have robust safety systems to prevent events from occuring. However, it is obvious that from house fires caused by small batteries in scooters and bicylces to large industrial fires at BESS sites around the globe, the incidents are happening with unfortuante regularity.

While we know that if damaged or operated poorly batteries can enter thermal runaway it has been difficult to accurately assess the consequences of these events. Tools and techniques have long been available to assess fires and explosions caused by flammable gases, liquids and even solid explosives, however, due to the unique mechanism of thermal runaway, these tools cannot always be appled to battery fires and explosions. Until recnetly tools specifically devleoped for assessing lithium ion thermal runaway events have not existed, this has resulted in many lithium ion projects being installed without a robust understanding of the hazards that may be present.

Now new tools and techniques are changing and improving our ability to model the consequences of thermal runaway events. This paper will speak generally to lithium ion battery hazards, the mechanims of thermal runway, what causes it and and why it is so difficult to control. More importantly this paper will presnt methods for better assessing the consequences of thermal runway in order to better control them.

KEY WORDS

Lithium Ion, Battery, BESS, Thermal Runaway, Consequence Assessment, Fire, Explosion

BIOGRAPHY

Derek is the Team Lead for Gexcon Australia. He is a Fellow with Engineering Australia and has been working in process safety for over 25 years. Derek has worked in many aspects of process safety including consulting for companies such as Gexcon and Worley as well as operational process safety for companies such as ConocoPhillips and Santos.

Derek leads a team of engineers in Gexcon's Australian office. Gexcon assists companies understand and manage their process safety risks in a range of industries. In Australia Gexcon provides services to hazardous industries including oil and gas, mining, CCUS, hydrogen and batteries.

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