## Non-Flammable Batteries: Electrolyte Design for Harsh Temperatures

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## **Extended Abstract**

Developing electrolytes that maintain high performance over a wide temperature range is crucial for the advancement of rechargeable batteries in practical applications. This talk focuses on creating non-flammable organic electrolytes for lithium-ion batteries (LIBs) and safe aqueous electrolytes for zinc-ion batteries (ZIBs to enhance safety and efficiency in extreme temperatures. By adjusting electrolyte structures, incorporating non-flammable components, and modifying cation solvation structures, we aim to enhance temperature adaptability and safety. Advanced temperature-dependent spectroscopic techniques, such as Fourier-transform infrared (FTIR) spectroscopy, along with in-situ monitoring strategies, are utilized to investigate interfacial reactions. These methods offer valuable insights into electrolyte behavior at different temperatures, guiding future research towards developing electrolytes that are both safe and optimized for real-world applications in various thermal conditions.