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Lithium-ion Battery Safety by Prevention, Detection, and Control of Thermal Runaway

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- Chemical Engineering

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- Batteries
- Chemical Engineering
- Data Science
- Efficient Detection
- Sensors
- Stability
- Thermal Runaway

Thermal runaway occurs in batteries when conditions change resulting in an increase in temperature that can lead to the destruction of a battery. Currently, electronic circuits above batteries are used to detect external temperature in order to prevent overcharging or discharging. Although helpful, these circuits cannot predict and control onset of thermal runaway reliably, causing issues such as fires in cars, planes, or electronics. Other methods render batteries useless once they detect thermal runaway. There is a need for a technology that can detect and prevent thermal runaway reliably.

Researchers at Purdue University have developed a novel thermal sensing system that can be incorporated in lithium-ion battery designs to detect early onset of thermal runaway. This thermal sensing system can be placed at multiple locations in a battery without interfering with its operation. By implementing safety solutions to existing designs rather than developing new designs in rechargeable batteries, this technology has the potential to save costs by avoiding changes in current manufacturing and assembly lines.

Advantages:
-Detects and prevents thermal runaway
-Provides safe rechargeable power solutions
-Saves costs in manufacturing and assembly

Potential Applications:
-Lithium-ion batteries
-Automotive, electronics, and aerospace industries

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