



LI-ION TAMER®



## CRITICAL PROTECTION FOR CRITICAL COMPONENTS

### Benefits

- ▶ Small footprint
- ▶ Provide earliest warning of battery failure
- ▶ Can be implemented at any integration point in lithium ion battery systems
  - Direct BMS implementation (board mountable monitor)
  - Module implementation
  - Rack or Pack implementation
  - Room level implementation
- ▶ Enables prevention of thermal runaway events
- ▶ Extra layer of safety for peace of mind



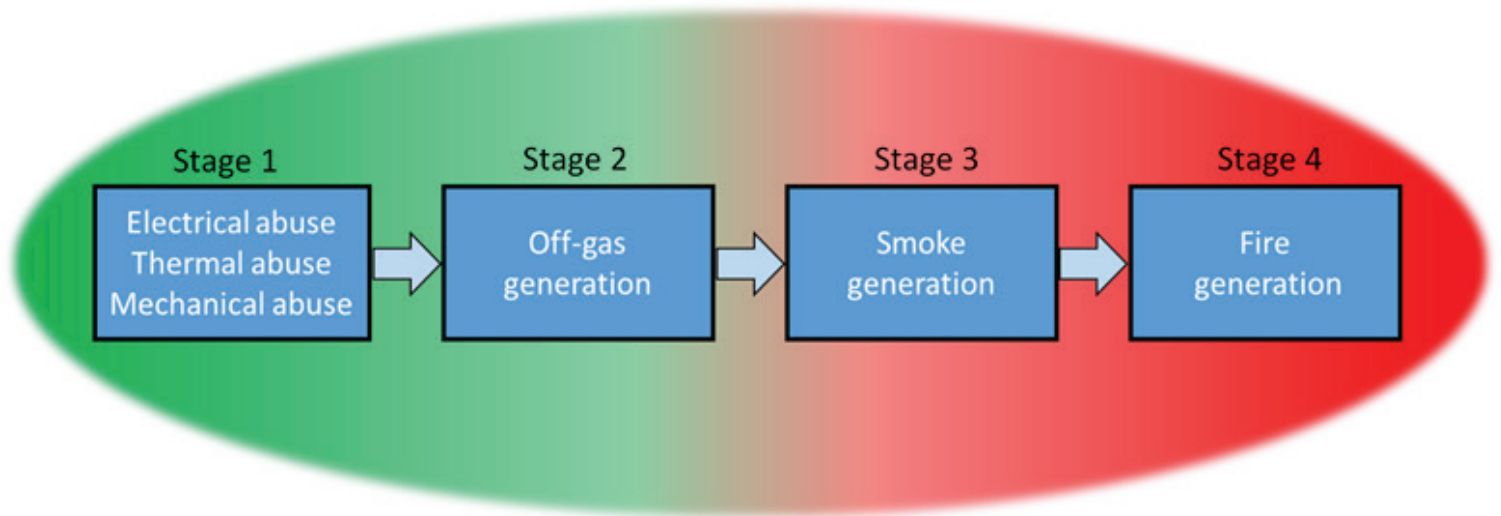
### Early Detection Enables Event Prevention

Li-ion batteries can experience catastrophic failures, an issue that has been well documented in the media recently. Many precautions are taken to minimize the devastation of a battery failure, but what if you could prevent the failure from happening in the first place?

Nexceris has developed technology that can monitor the batteries in your module and alert you at the first sign of a battery failure. This early warning signal alerts you minutes before thermal runaway actually occurs, providing you crucial time to avoid an event.

— Product development supported by DNV GL, FAA, US DOE, and US Navy —

# STAGES OF A LITHIUM ION BATTERY FAILURE



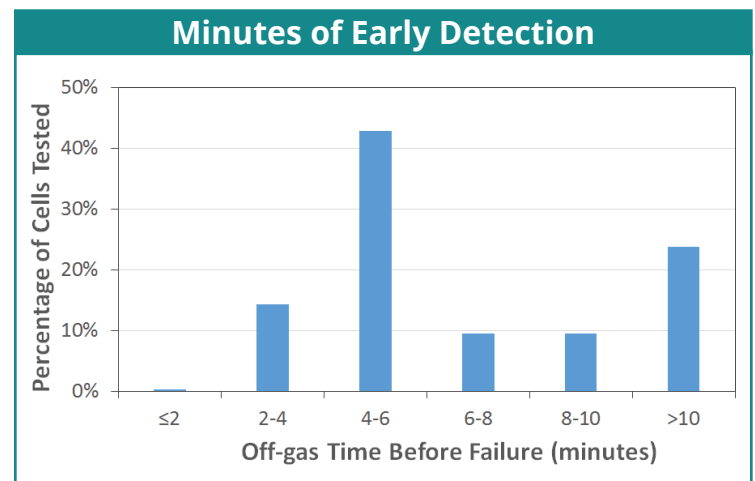
**Stage 1:** A battery failure is initiated when abuse occurs. The amount of time between this stage and the next ranges from a few seconds to several hours, depending on the specific cell format, cell chemistry and on the type and intensity of abuse.

**Stage 2:** The next stage of a battery failure is an off-gassing event, which is detectable by the Li-ion Tamer<sup>®</sup> off-gas monitor.

**Stage 3 & 4:** These stages are often simultaneous and occur when the battery is in fully developed thermal runaway.

## Characteristics

	Typical Value	Units
<b>Characteristics:</b>		
Voltage input	3-14	VDC
Power consumption	20-30	mW
Target gases	Lithium-ion battery electrolyte solvents	n/a
Off-gas indication	Analog voltage	VDC
Off-gas indication (optional)	Relay contact	NO/NC
Response time	< 2	s
Physical Size	25 x 35	mm
<b>Environmental Conditions:</b>		
Ambient temperature	5 - 80	°C
Relative humidity	5 - 95	%R.H.



- ▶ Off-gas monitoring provides an early indication of battery failures
- ▶ Allows for preventative action to be taken
- ▶ Multiple use/application scenarios

## CONTACT



**Nick Frank**, Product Engineer  
 Phone: 614.842.6606 x 138  
 Email: n.frank@nexceris.com

