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Thermal analysis of nickel cobalt lithium manganese with varying nickel content used for lithium ion batteries

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Research Highlights

- The thermal behavior of $\text{Li}(\text{Ni}_x\text{Co}_y\text{Mn}_z)\text{O}_2$ (NCM) are investigated using C80 micro-calorimeter.
- Structural collapse of NCM during cycling is the key factor for heat generation.
- The NCM with high-nickel shows greater hazardous risks on lithium ion battery.

Abstract

Thermogenesis mechanism in the aspect of structural level and thermal hazard to the lithium ion battery are systematically analyzed for $\text{Li}(\text{Ni}_x\text{Co}_y\text{Mn}_z)\text{O}_2$ (NCM, $x=1/3, 0.5, 0.6, 0.8$). All the results confirmed by X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS), alternating current (AC) impedance and a C80 micro-calorimeter indicate that with the increase of nickel content, the structure of NCM materials tends

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