

Measurement of the heat capacity of a full battery

INTRODUCTION

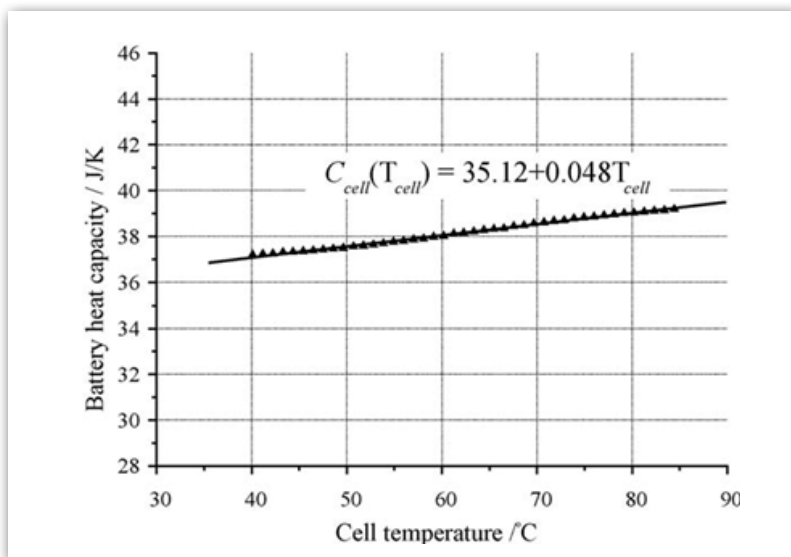
Heat capacity measurements of a battery, together with additional measurements of heat source factors and heat transfer coefficients using other techniques, makes the calculation of the battery's temperature rise possible as well as to compare calculations with measured values.

EXPERIMENTAL

- Sample holder: Standard calorimetric cell made of stainless steel.
- Sample : A commercially available, cylindrical lithium-ion battery.
- Method: A temperature ramp from 20 to 90°C at 0.4°C/min.

RESULTS AND CONCLUSION

The heat capacity of the cell can be approximated by a linear function of temperature $C_{cell} (J/K) = 35.12 + 0.048T (°C)$. Thanks to the CALVET measurements and the application of this method, the authors were able to plot the battery's heat capacity against temperature over the tested range and observe that the variation was almost linear.



Kazuo Onda et al, Journal of Power Sources 158 (2006) 535–542

INSTRUMENT

CALVET

Ambient to 300°C



- **HIGHEST HEAT MEASUREMENT ACCURACY**
3D sensor based on thermocouples with Joule effect calibration.
- **ISOTHERMAL OR TEMPERATURE SCANNING MODES**
for increased flexibility and replication of real life conditions
- **CONVENIENT INTERCHANGEABLE CRUCIBLES AND CELLS**
to perform even the most demanding experiments using one instrument :
 - high pressure (1000bar) and high vacuum
 - pressure measurement and control
 - mixing/stirring experiments.
- **EXTERNAL COUPLING CAPABILITY**
designed to increase your research options including manometry, BET instrumentation, gas analyzers, humidity controllers and gas panels