Application Note BATT1031

View on rigaku.com

BATT1031: Operando measurement using a coin cell

Introduction

Operando measurements of lithium-ion batteries are generally performed on large X-ray diffractometers due to limitations in attachment size and the optics used. By preparing coin cell samples with an X-ray window, operando measurements can be performed on a variety of instruments.

Phase transition analysis

- **Analysis:** Whole battery
- **Use:** Improving battery performance
- **Analyzed materials:** Coin cell (Cathode NCM, anode Li, separator, electrolyte solution)
- **Analysis method:** Operando measurement

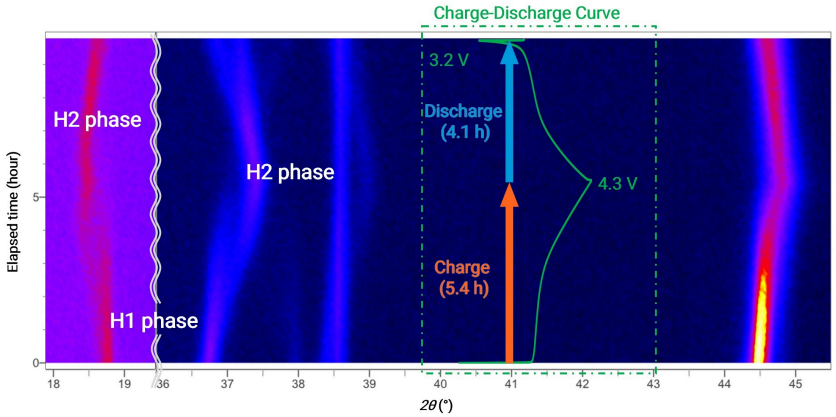

Figure 1: Elapsed time vs. 2θ (color: intensity) and charge-discharge curve

Conclusion

The operando measurement clearly observed the crystallographic changes in the cathode material due to charging and discharging. The discontinuous and continuous changes in peak positions are attributed to the phase transition from H1 to H2 phase of NCM and the change in lattice constant.

Related products

MiniFlex

Sixth-generation general purpose benchtop XRD system for phase ID and phase quantification