Application Note BATT1016

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BATT1016 - XRD Measurement During Charge/Discharge Using Laminated Cell Batteries

Introduction

With operando measurement, in which XRD measurement is conducted while charging/discharging, crystal phase transition behavior during charge/discharge can be ascertained. This can be used to clarify charging/discharging mechanisms and estimate battery capacity deterioration. Additionally, since measurement of laminated cell batteries is generally conducted using the transmission method, information about both positive and negative electrodes can be observed.

Phase transition analysis

- **Analysis:** Whole battery
- **Analysis method:** Rietveld analysis, operando measurement
- **Use:** Improving battery performance
- **Analyzed materials:** Laminated cell batteries (Cathode NCM, anode C, separator, electrolyte solution)
- **Instrument:** SmartLab

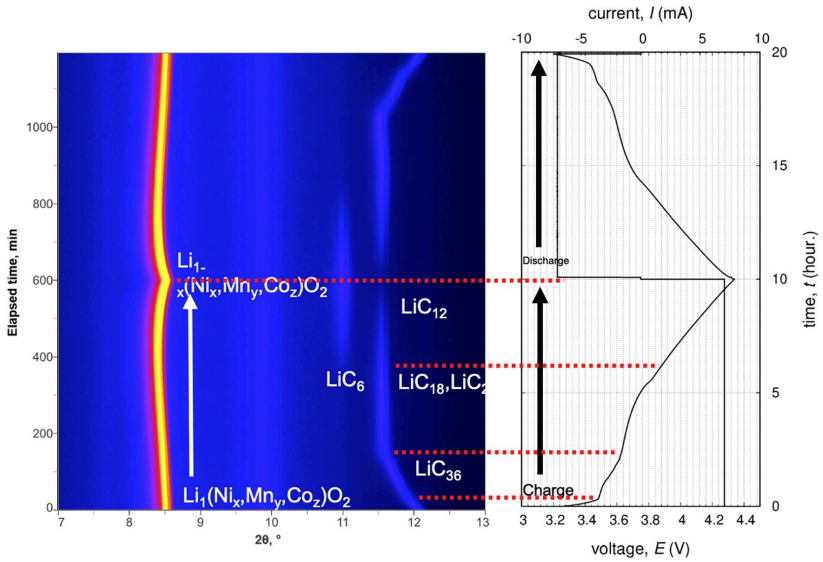

Figure 1: Observations of change in lattice constant
(elapsed time vs 2θ (left) and charge/discharge profile (right), NCM)
and observations of changes in crystalline structure (C)

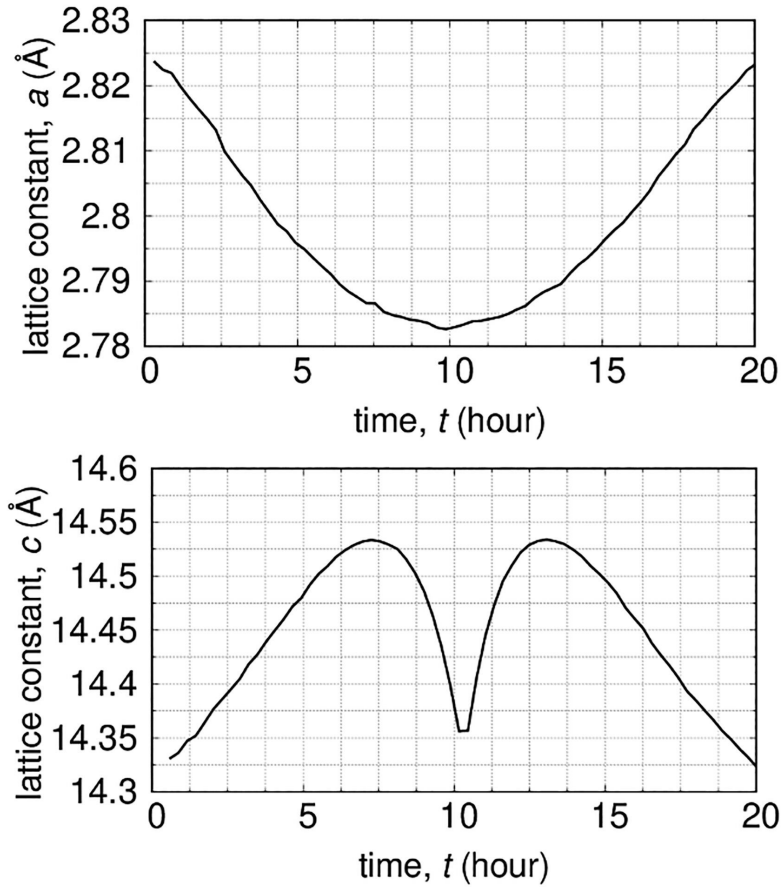

Figure 2: Change in a-axis and c-axis for NCM

Conclusion

Changes in the lattice constant upon charging/discharging were successfully observed with operando measurement using laminated cell batteries.

Related products

SmartLab

Advanced state-of-the-art high-resolution XRD system powe
red by Guidance expert system software