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BATT1002 - Lattice Constant and Crystallite Diameter Management for NCM Cathode Material

Introduction

With cathode material NCM, the lattice constant changes according to the composition, and electrical performance changes according to crystallite diameter. Because of these factors, lattice constant and crystallite diameter management is required to optimize this material. Using the EasyX plug-in for SmartLab Studio II software makes it possible to perform everything from measurement to results management with simple operations.

Crystal phase analysis

- **Analysis:** Processed materials
- **Analysis method:** Rietveld analysis
- **Use:** Quality assurance
- **Analyzed materials:** $\text{Li}(\text{Ni}_x\text{Co}_y\text{Mn}_z)\text{O}_2$, NCM

The screenshot displays the EasyX software interface. The top navigation bar includes 'Status', 'Measurement', 'Data Viewer', and 'Job Management'. The main window is divided into several sections:

- Sample list:** A table with 8 rows. The first row is highlighted in blue and labeled with a circled '1'. It contains 'Cement-1' and 'waiting for a job selection'. A circled '2' points to the 'Cement-1' entry in the second column.
- Measurement settings:** A panel on the right showing parameters for 'Cement-1' Quantitative Analysis. It includes fields for 'Sample name', 'Comment', and a 'Measurement settings' section with values for scan mode, customize, standard, spin, and measurement time.
- Phases:** A table with columns 'Phase Name' and 'Quantitative Value'. It lists 'Alite', 'Belite', 'Aluminate_Cub', 'Aluminate_Ortho', and 'Ferrite'.
- Start button:** A large green button labeled 'Start' at the bottom left, circled with a '3'.

At the bottom of the interface, the analysis template path is shown: `E:\DATA\YData2021\Cement_templ`.

Figure 1: EasyX measurement screen

Executed in three steps:

1. Select measurement sample
2. Select measurement analysis conditions
3. Press the Start button

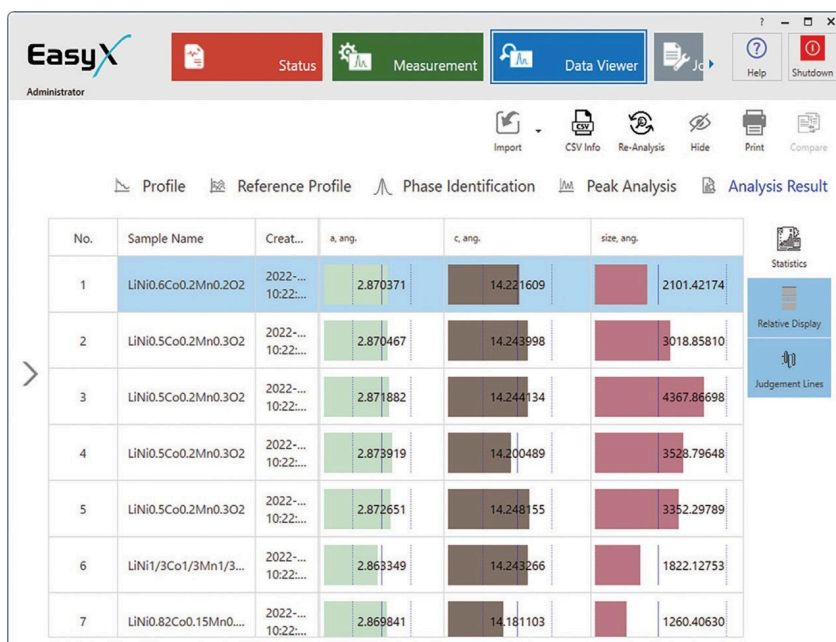


Figure 2: EasyX results display screen (Arbitrary items such as the lattice constant and crystallite diameter can be designated)

Conclusion

EasyX can be operated with ease even by people who lack familiarity with XRD. Measurement, analysis and results display can be managed and analyzed through the software.

Related products



MiniFlex XpC

Compact X-ray diffractometer for quality control of materials that is easy to use and is ideal for routine work