Programme de Formation

Parameterization techniques for the Doyle-Fuller-Newman (DFN) electrochemical Li-ion cell model

Organisation

Durée : 31 heures et 30 minutes

Mode d'organisation : Présentiel

Contenu pédagogique

Public visé

R&D engineers in Li-ion cell development or applications based on Li-ion cells.

Objectifs pédagogiques

Perform lab tests that are specific to some parameters of the DFN model

Analyze harvested data to determine the parameter values

Input parameters into the DFN and validate against dedicated tests on the Li-ion cell.

Description

The course combines concise theoretical sessions with instructor-led laboratory demonstrations and hands-on data analysis activities. Participants first gain an understanding of the laboratory tests used to determine key parameters of the Doyle–Fuller–Newman (DFN) model through demonstrations carried out by the instructors. They then analyse the experimental data using dedicated software tools (Python, Excel and, where appropriate, MATLAB) to identify and calculate the relevant model parameters. Finally, participants integrate the extracted parameters into the DFN model and assess its validity by comparing simulation results with experimental data obtained from dedicated lithium-ion cell characterisation tests. Continuous interaction with the instructors and practical exercises ensure the progressive acquisition of the targeted skills.

Prérequis

Engineers or Scientists with a Bachelor degree or above, in one of the following fields:
Chemistry, ChemE, Electrochemistry, Physical Chemistry, Electrical Engineering, Energy Engineering

Modalités pédagogiques

The course is limited to 12 participants. Practical sessions may be organised into smaller groups, with a maximum of 6 participants per group.

The course will be delivered in person, from Monday 1:30 p.m. to Friday 5:00 p.m., and comprises 10.5 hours of theoretical teaching and 21 hours of practical laboratory work and data analysis.

Moyens et supports pédagogiques

Learning resources provided to participants: no printed course materials will be supplied. Participants will receive PDF handouts covering the theoretical content, laboratory practicals and data analysis sessions.

Where appropriate, software tools (such as Excel spreadsheets, and MATLAB, Scilab, Python or Jupyter scripts) used for data analysis will also be provided.

Equipment used during the course:

- Consumables for the fabrication of laboratory cells
- Potentiostats (for electrochemical testing of cells) and frequency response analysers
- Glove boxes
- Scanning Electron Microscope (SEM)
- Helium pycnometer

Participants will not carry out the laboratory experiments themselves; the practical demonstrations will be performed by the instructors.

Participants are required to bring their own laptop with the following software installed:

- Python and Visual Studio Code
- Microsoft Excel
- MATLAB (optional)

Modalités d'évaluation et de suivi

Ongoing formative assessments throughout the course. A certificate of cmpletion is issued at the end of the training

Informations sur l'admission

L'admission à cette formation ne fait l'objet d'aucun examen, test ou sélection préalable ; l'inscription est validée après réception du dossier complet et confirmation par l'organisme de formation.

Informations sur l'accessibilité

Notre organisme s'engage à garantir l'accessibilité de ses formations à distance et en présentiel aux personnes en situation de handicap. Un référent handicap est mobilisable afin d'analyser les besoins spécifiques et de mettre en place, lorsque cela est possible, les adaptations pédagogiques, techniques ou organisationnelles nécessaires.