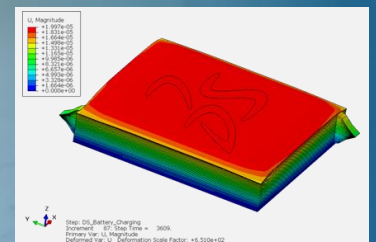


ELECTROCHEMICAL SIMULATION WITH ABAQUS FOR LI-ION BATTERIES

SIMULIA COURSE DESCRIPTION



Level: Advanced
Products: Abaqus
Disciplines: Structures

Audience
Simulation analysts whose work involves assessing the design and response of Li-ion batteries from a multiphysics perspective.

Why take this course?

This course introduces you to cell-level multiscale, multiphysics analysis that allows modeling and assessment of the electrochemical performance of Li-ion batteries based on porous electrode theory, the thermal effects from various losses (associated with the ionic diffusion, electrical conduction, entropy change and intercalation) and the mechanical effects due to lithiation-induced swelling in a fully coupled manner. The knowledge gained will allow you to further benefit from the capability by enabling optimization of cell design and performance with respect to a slew of parameters virtually. The lectures introduce and illustrate the key aspects, usage and the basic theory behind this advanced capability with examples while the workshops provide hands-on experience in setting up the complete model and performing the electrochemical analysis of a 3D cell.

What will you learn?

- Upon completion of this course you will be able to:
- Create geometry and meshing for modeling Li-ion batteries
 - Define material properties for Li-ion batteries
 - Perform battery electrochemical analyses
 - Define contact and constraints
 - Postprocess Li-ion battery analyses

Explore Your Learning Options

Live Sessions	Engage in Real-Time, interactive group workshops guided by experts. Learn and collaborate live in your preferred language and time zone.	Join a live session
On-Demand Learning	Access expert-designed courses anytime, anywhere. Perfect for independent learners looking to build skills on their schedule.	Start Learning Now
Private Training	Exclusive, tailor-made sessions designed to meet your team's unique goals with expert guidance.	Contact Us for Custom Training



Gain hands-on experience and master real-world workflows through guided, practical training sessions.

Apply nonlinear analysis techniques to simulate complex structural and multiphysics problems accurately.

– SIMULIA Training Expert Team

What You Need to Know Before Starting

This course is recommended for engineers with experience using Abaqus

Agenda for Virtual Live Sessions

Participate in hands-on, real-time workshops where you'll gain practical expertise. Here's what you'll cover:

[Join an Instructor Led Session](#)

Day 1

Lesson 1: Lithium-ion Battery Basics
Lesson 2: Porous Electrode Theory
Lesson 3: Geometry and Meshing
Workshop 1a: Flat jellyroll battery model - Geometry and Meshing
Workshop 1b: Flat jellyroll battery model - Geometry and Meshing using PCM
Lesson 4: Material and Section Properties
Workshop 2: Flat jellyroll battery model - Materials and Sections

Day 2

Lesson 5: Analysis Procedures
Lesson 6: Boundary Conditions and Loads
Workshop 3: Flat jellyroll battery model - Analysis Setup
Lesson 7: Constraints and Interactions
Workshop 4: Flat jellyroll battery model - Constraints and Interactions
Lesson 8: Output and Postprocessing
Workshop 5: Flat jellyroll battery model - Postprocessing

Additional Material

Appendix 1: Lithium Metal Surface Loading

Want to Learn More?

Expand your knowledge by exploring our [course Catalog](#) and browsing learning paths on [Eduspace](#), our dedicated e-learning platform.

Join the Community!

[Join the SIMULIA community](#) to connect, learn, and stay updated.



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Europe/Middle East/Africa
Dassault Systèmes
10, rue Marcel Dassault
CS 40501
78946 Vélizy-Villacoublay Cedex
France

Asia-Pacific
Dassault Systèmes
17F, Foxconn Building,
No. 1366, Lujiazui Ring Road
Pilot Free Trade Zone, Shanghai 200120
China

Americas
Dassault Systèmes
175 Wyman Street
Waltham, Massachusetts
02451-1223
USA

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