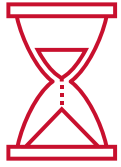


UiA Videre – Battery Technology Workshop

Overview of Workshop



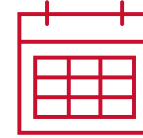
1 week



20 available
spaces



English



May 2023
Monday 8th to
Friday 12th



Campus
Grimstad

Why batteries?

Lithium-ion batteries are key enablers for the green shift, allowing the storage of energy from renewable sources like wind or photovoltaics for later use. The industry in Sørlandet is orienting towards battery manufacturing, covering a broad range of the battery value chain from material and battery production to system design and recycling. It is a unique

opportunity to utilize Norway's hydropower to establish the most sustainable battery value chain worldwide.

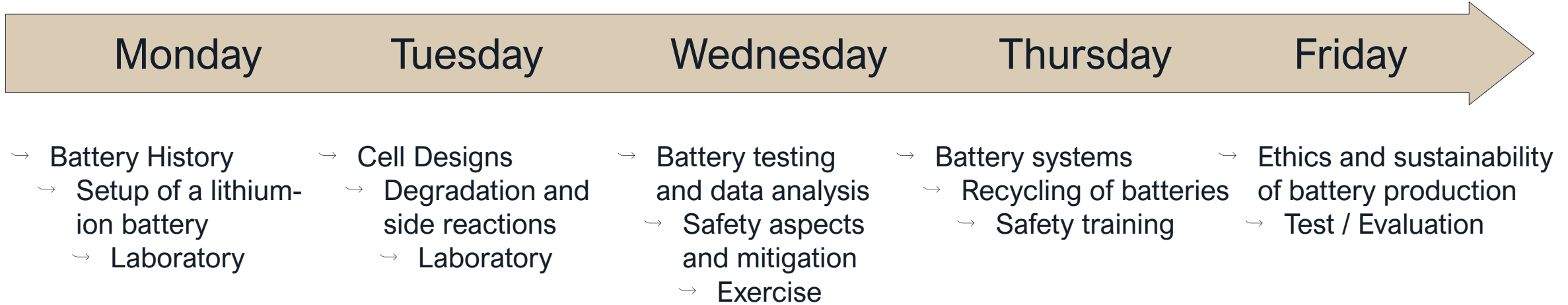
Who can participate?

This course is open for all battery enthusiasts. We will start from basics and dive into the details over the course of the workshop. A technical background will be advantageous.



UiA Videre – Battery Technology Workshop

Study Plan of Workshop



What to you learn?

- have an understanding how energy is stored electrochemically in batteries
- knowledge about function of battery components
- overview of lithium-ion degradation mechanisms
- first experience in making a lithium-ion battery in a laboratory scale
- first experience in data analysis of battery experiments
- overview of battery system operation
- ability to explain key battery performance indicators and their physical origins
- knowledge about battery recycling routines and approaches
- ethical aspects of raw material mining for batteries
- understanding how batteries can be produced sustainably in Europe and Norway

UiA Videre – Battery Technology Workshop

Study Plan of Workshop

Monday

Tuesday

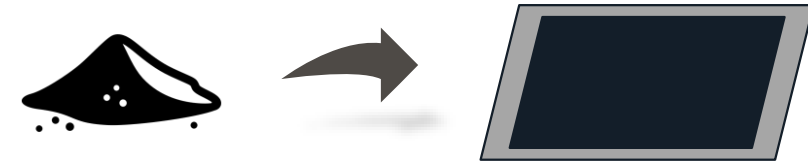
Wednesday

Thursday

Friday

Curriculum

- 08:30 Welcome at UiA
- 09:00 Course – Electrochemistry and Batteries
Introduction to electrochemical energy storage
Typical types of batteries and their working principle
- 11:30 Lunch Break
- 12:15 Course - Lithium-Ion Batteries
Working principle of lithium-ion batteries
Lithium-ion batteries vs. aqueous batteries
- 14:00 Laboratory – Making electrodes
- 16:00 Social Event
Cake and Discussion



“from material to electrode”

About the lecturer

Johannes Landesfeind works as an associate professor at the University of Agder and leads the Battery Coast strategy. His background is in physics, and he has experience from both academic and industrial research on lithium-ion batteries.



UiA Videre – Battery Technology Workshop

Study Plan of Workshop

Monday

Tuesday

Wednesday

Thursday

Friday

Curriculum

- 08:30 Course – Lithium-ion battery cells
Manufacturing of lithium-ion batteries
Different cell designs and their use-cases
- 10:00 Course – Degradation mechanisms
Side reactions in lithium-ion batteries
Capacity fade and resistance increase
- 11:30 Lunch Break
- 12:15 Laboratory – Making batteries
Characterization of electrodes from prev. day
Planning of battery design
Assembly of battery cells
- 16:00 End



“from electrode to cell”

About the lecturer

Johannes Landesfeind works as an associate professor at the University of Agder and leads the Battery Coast strategy. His background is in physics, and he has experience from both academic and industrial research on lithium-ion batteries.



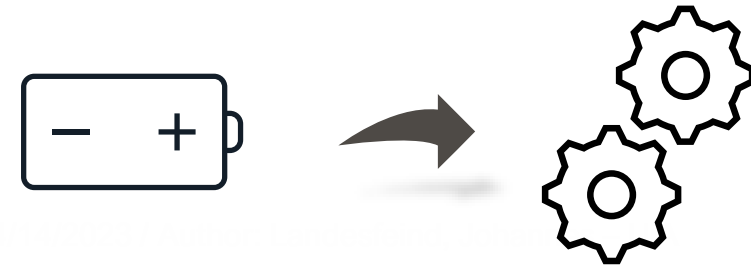
UiA Videre – Battery Technology Workshop

Study Plan of Workshop



Curriculum

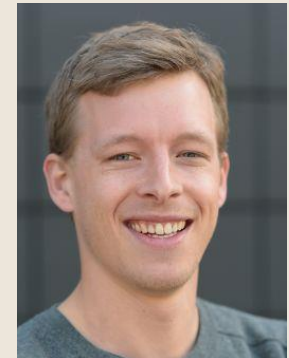
- 08:30 Course – Advanced Characterization Techniques
Material characterization and link to battery aging
Capacity fade and resistance increase
- 10:00 Laboratory – Data Analysis
Analyzing the battery experiments
Extraction of key performance indicators
- 11:30 Lunch Break
- 12:15 Course – Safety of Lithium-ion Batteries
Hazards of battery components
Dangers of handling lithium-ion batteries
- 14:30 Exercise – Extrapolate from Lab to Real Life
- 16:00 Social Event / Tapas and Drink Mixing Event with
Battery Coast Industry and Academia



“from cell to operation”

About the lecturer

Gunstein Skomedal works at Vianode and has a 20% associate professor position at the University of Agder. His background is in material science. Since joining Vianode he has built up intensive knowledge about material production for lithium-ion batteries.



UiA Videre – Battery Technology Workshop

Study Plan of Workshop

Monday

Tuesday

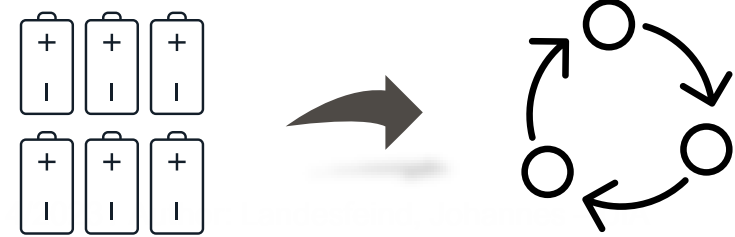
Wednesday

Thursday

Friday

Curriculum

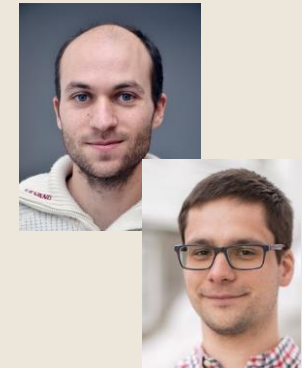
- 08:30 Course – Battery Systems I
Understanding the application
Operation control and safety limits
State of charge and state of health
- 10:00 Course – Battery Systems II
Energy density on pack vs. material level
Pack designs for different applications
- 11:30 Lunch Break
- 12:15 Course – Battery Recycling
- 14:00 Demonstration – Lithium-ion battery fire
with Grimstad fire brigade
- 16:00 End



“battery systems and recycling”

About the lecturer

Bernhard Fäßler works as an application engineer at Stadler, manufacturing electric trains and has a 20% researcher position at the University of Agder. Martin Choux is an associate professor in the mechatronics section of the University of Agder and works on the automated recycling of batteries.



UiA Videre – Battery Technology Workshop

Study Plan of Workshop

Monday

Tuesday

Wednesday

Thursday

Friday

Curriculum

- 08:30 Course – Sustainable Value Chains
Understanding circular battery value chains, life cycle analysis (LCA) and emissions from battery technologies.
- 11:30 Lunch Break
- 12:15 Course – Ethical and Social Aspects of Battery Production
Raw material sourcing, global development and value chains. Geopolitics of batteries and EU policy responses.
- 15:00 Concluding Notes, Feedback
- 15:30 End



“Battery economy and ethics”

About the lecturers

Benedikte Wrålsen works at the University of Agder and teaches on life cycle assessment and works at Morrow Batteries as a LCA specialist. Vita Laterza is an associate professor at the University of Agder in the Department of Global Development and Planning.

