



Defining optimized cooling requirements for products containing selected lithium-ion cells

Using selected usage profiles for experimental and simulative investigations

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Chair for Electrochemical Energy Conversion
and Storage Systems

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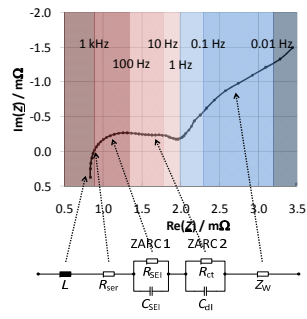


Univ.-Prof. Dr. rer. nat.
Dirk Uwe Sauer

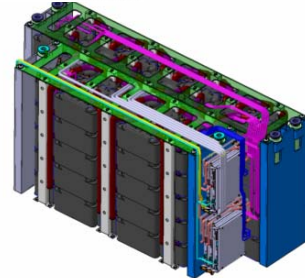
Section Modeling, Analytics & Life Time Prognosis

Section Battery System Design and Vehicle Integration

Section Grid Integration and Storage System Analysis

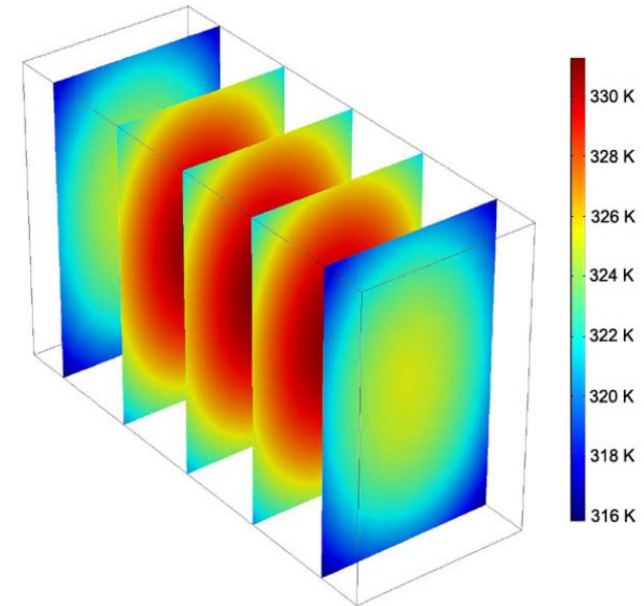


e performance
Forschungsprojekt



Motivation: Temperature strongly affects aging behavior and performance of lithium-ion batteries.

- Battery packs often require cell temperature control for cells to operate in their optimal temperature range
- Significant temperature gradients can occur inside the cells and module during battery pack operation
- **Problem:** Little is known about the actual effects of these gradients on aging and performance
- **Consequences of poor cell temperature control:**
Product uses unnecessary big battery/cooling system, insufficient performance, fast battery aging (requires frequent battery exchanges)



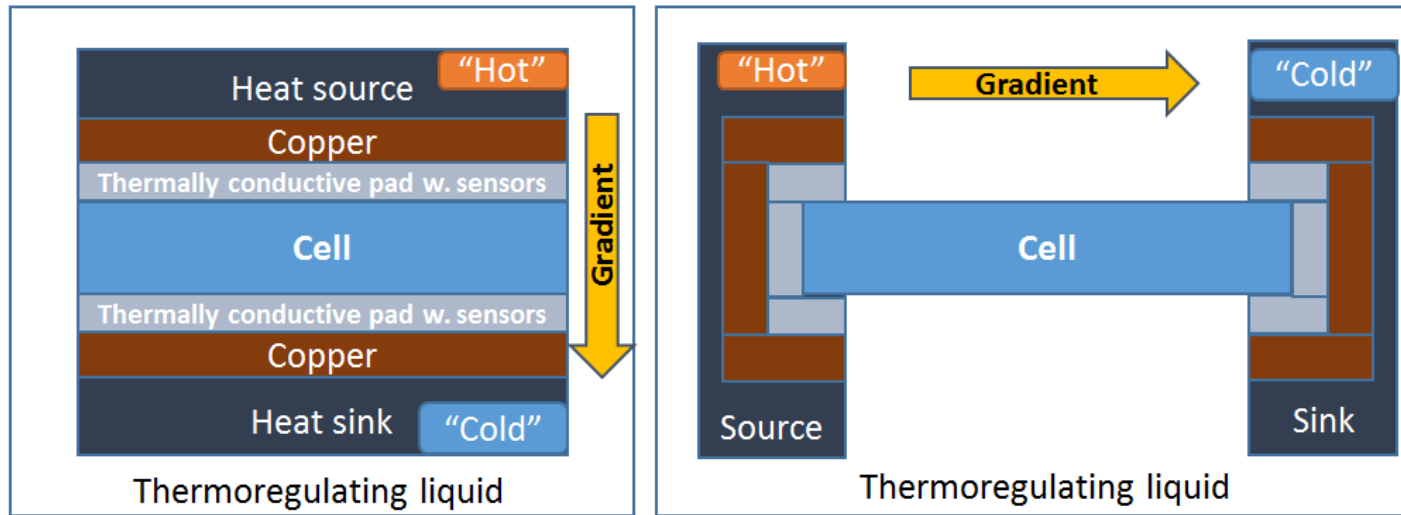
Source: <http://lunainc.com/>



It either doesn't work well or it produces unnecessary costs!

Scope of the intended research project (1)

1. Creating defined temperature gradients within battery cells under specific boundary conditions

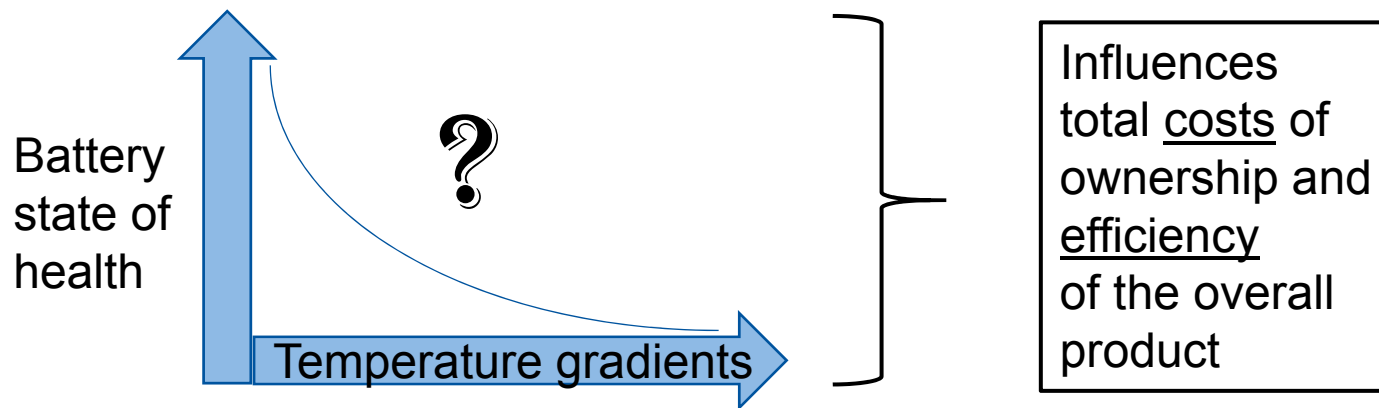


2. Measuring the resulting temperature gradients under different specific boundary conditions
3. Analyzing the resulting effects on performance and cell aging

		Measurement-Variables				
		Adapt Products and Processes	Invest in Research and Development	Leverage the Strengths of Your	Combine Resources and Capabilities	Engage in Policy Dialogues with Stakeholders
Measurement-Results	Market Information					
	Regulatory Environment					
	Physical Infrastructure					
	Knowledge and Skills					
	Access to Financial Services					

Scope of the intended research project (2)

4. Creating and validating of simulation models for temperature gradients within individual cells under defined boundary conditions
5. Concluding the dependency of battery state of health on temperature gradients under defined boundary conditions



5. Down the road: Defining optimized cooling requirements for products containing lithium ion battery packs with a defined usage profile

Thank you for your attention

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