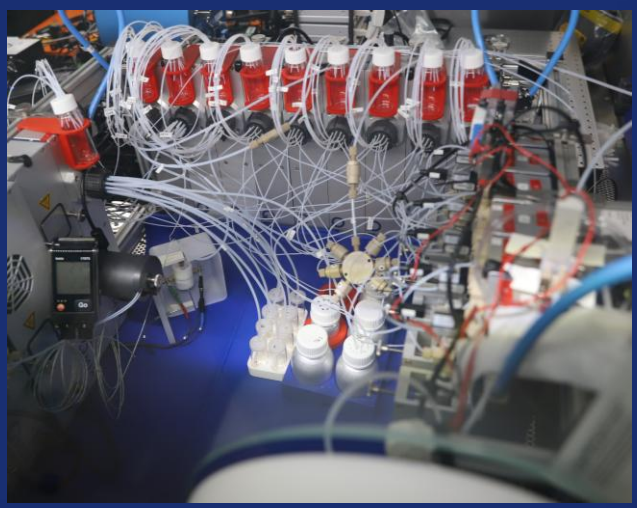
Autonomous Synthesis and Analysis of Battery electrolytes (ASAB)

POLiS
Post Lithium Storage
Cluster of Excellence



Description

- A setup for the automated formulation and analysis of liquid battery electrolytes
- Formulations created based on stock solutions
- Measurements of density, viscosity, and ionic conductivity can be triggered and the respective data can be retrieved automatically

Publications

[1] Vogler, M. *et al.* Brokering between tenants for an international materials acceleration platform. *Matter* **6**, 2647–2665 (2023).

[2] Vogler, M., Steensen, S. K. *et al.* Autonomous Battery Optimization by Deploying Distributed Experiments and Simulations. *Adv. Energy Mater.* **14**, 2403263 (2024).

Specifications

- **Components**
  - 6 syringe pumps (10 mL each)
  - 10 eleven-port valves
  - 1 UV-vis module
  - 1 two-electrode electrochemical cell (manufactured in-house)
  - Heating and cooling modules
- **Commercial control software**
  - Cetoni Elements (for the pumps, valves, UV-vis module, heating and cooling modules only)
- **Minimum volume of stock solution** 5 mL

Further information

- Tubing connections between all the components and to the densimeter, viscometer and NMR instrument
- Automatic operation is enabled by manufacturer SDKs, APIs used in the ASAB software
- Can be included in autonomous workflows using FINALES
- The pumping of highly viscous fluids, crystallization or fluids containing particles are to be avoided

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