

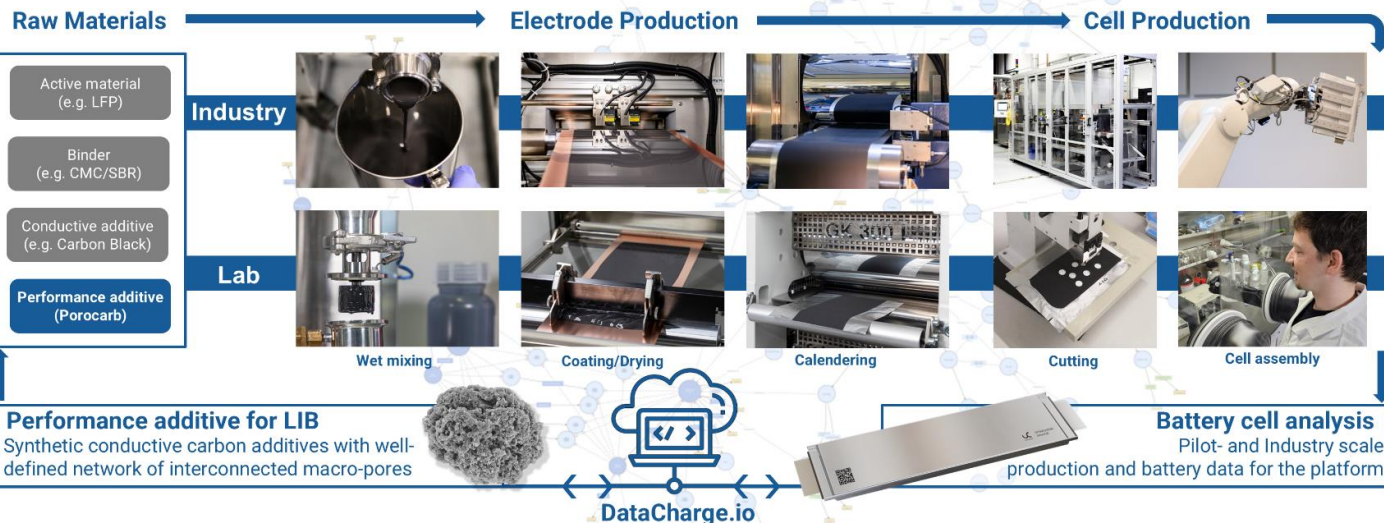
DaMaStE: Data-based management of raw material and process influences on the structure and properties of electrode materials for lithium-ion batteries

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Project overview

The goal is to select, improve, and develop carbon additives using digital models and coded knowledge, and serve as a template for application to other battery raw materials. Raw material and cell manufacturers as well as academic institutions collect extensive data and develop a digital platform, DataCharge.io, for efficient information exchange and joint evaluation. DaMaStE introduces a federated approach to digital material development that guarantees data sovereignty and data protection.

DataCharge.io: Production process from raw material to cell in one platform



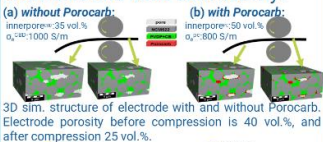
Platform backend development

Based on our platform management ontology the existing backend was completely reworked to use a graph database and incorporate a federated database architecture. Furthermore, additional data upload workflows for bulk data upload via our Python API were developed and tested using industry data.

Material development

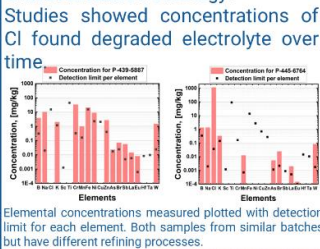
Pore structure analysis

GeoDict applied to understand the effects of Porocarb on electrodes' electronic and ionic conductivity.



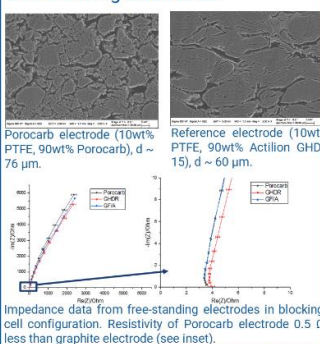
Trace element analysis

Instrumental Neutron Activation Analysis (INAA) detects trace elements in PPM concentrations. New characterization methods added to Battery Production and Characterization Ontology. Studies showed concentrations of Cl found degraded electrolyte over time.

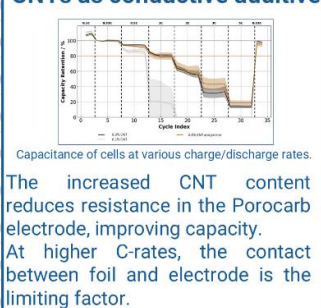


Ionic conductivity

SE micrograph of cross-section from free standing electrodes:

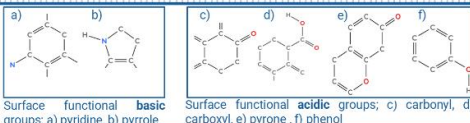


CNTs as conductive additive



Outlook

Surface of Porocarb to be functionalized with different groups containing oxygen, hydroxide and nitrogen via reaction with urea, lithium hydroxide or Hummer's reagent to reduce the electrical and ionic resistivity of Porocarb as determined in the project.



Partners

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