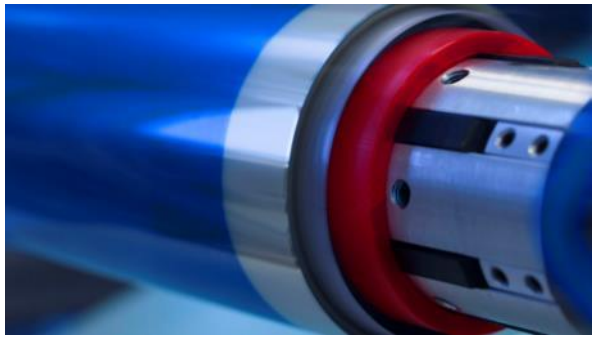
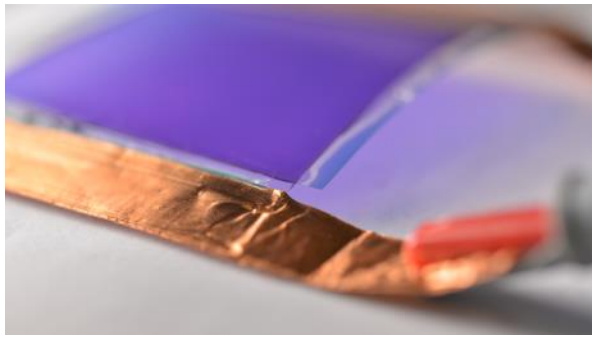
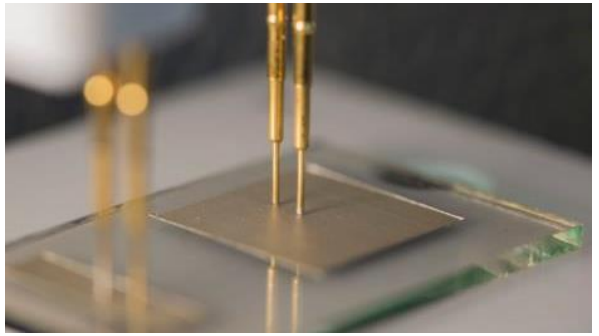
PROPOSAL
COMPOSITE ELECTROLYTES FOR SOLID-STATE BATTERIES

Dr. Guinevere Giffin, Fraunhofer Institute for Silicate Research ISC

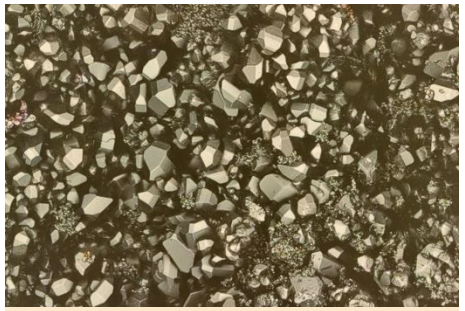


Fraunhofer ISC

Fraunhofer R&D Center Electromobility Bavaria @Fraunhofer ISC
Who we are

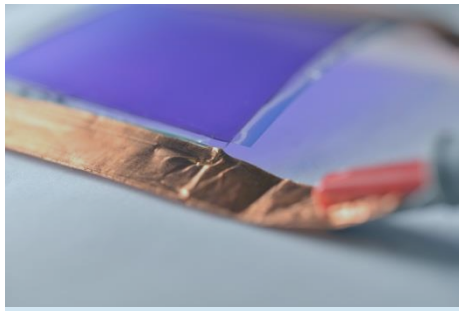
Lithium-ion technology

- Upgraded/novel active materials
- Polymer & ceramic electrolytes (Gen4)
- Components
- Design f. recycling



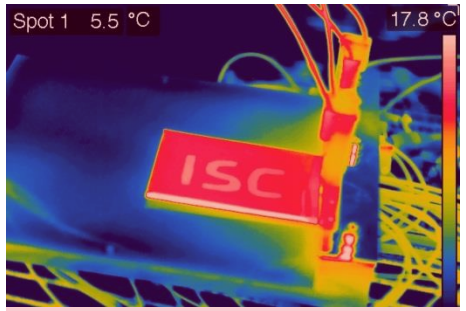
Lead-acid-technology

- Lead electrodes
- Active material development
- Laboratory cells
- Testing & Post mortem analysis



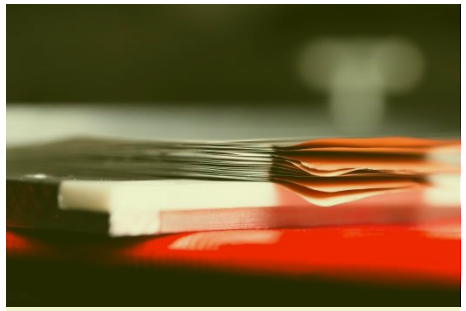
Electrochromic systems

- Organic & inorganic films
- Process development
- Large scale
- Cost efficient



Analytics

- Electrochemical tests
- Controlled ageing
- Failure cause
- Post-Mortem
- Interface



Process development

- Solid-state-cell concepts (Gen4)
- Semi-automatic electrode & cell manufacturing
- Recycling

- 40 employees, > 4,5 Mio. € annual budget
- Active members in BATTERY2030+, EBA, EMIRI, European Lithium Institute, BEPA

Fraunhofer ISC

Selected projects
ASTRABAT – All Solid-sTate Reliable BATtery for 2025

- Project Profile
  - LC-BAT-1-2019, GA **#875029**
  - 01/2020 – 06/2023
  - Budget: € 7 817 567
  - Partner (selection): CEA, **Fraunhofer ISC,** Umicore, Nanomakers, Leclanche, PSA
- Project Description
  - **Development of solid state cell technologies**
  - 1200 mAh/l, 10 Ah, 500 cycles
- Our Role
  - **Materials development and optimization**
  - **Improved cell design**
  - **Polymer electrolyte evaluation**

ASTRABAT

Fraunhofer ISC

Selected projects
BIG-MAP – Battery Interface Genome – Materials Acceleration Platform

- Project profile
  - H2020-EU.1.2, LC-BAT-12-2020
  - Budget: € 19 997 812,50
  - 09/2020 – 08/2023
  - Partner (selection): 34 partners from 15 countries,
    DTU, Fraunhofer ISC, CNRS, CEA, Cambridge, Oxford, BASF, Northvolt …
- Project Description
  - Development of a cell digital twin / battery interface genome
  - Methodology to accelerate the discovery of sustainable battery chemistries and technologies
- Our Role
  - Demonstration of autonomous synthesis processes for advanced battery materials and cells
  - Test cases
    - Modular synthesis robotics for inorganic and organic protective coatings
    - Synthesis and combinatorial formulation of protective coatings, additives and salts

Composite Electrolytes for Solid-State Batteries

- Topic 4: Functional materials or Topic 2: Innovative surfaces, coatings and interfaces
- Scope: Development of inorganic-organic composite electrolytes for Gen 4 solid state batteries
  - Polymer-in-inorganic electrolytes
  - Improve interface properties, stability and processability in electrodes or as free-standing membranes through the use of ionically-conductive polymer as interface, protective layer and/or binder
  - Investigation of processing parameters into cell components
- Looking for partners with competence in
  - Inorganic Electrolytes
  - Interface analysis
  - Development of membranes and components
  - Polymer synthesis

Thank you

Dr. Guinevere Giffin
Fraunhofer R&D Center Electromobility
Fraunhofer Institute for Silicate Research ISC

Neunerplatz 2 | 97082 Würzburg
Phone +49 931 4100-519
Guinevere.giffin@isc.fraunhofer.de
www.fzeb.fraunhofer.de

Fraunhofer ISC