

Fraunhofer Institute for Applied Polymer Research IAP

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Director: Prof. Dr. Alexander Böker

Our topics

We make materials fit for the future!

Bioeconomy and sustainability

Tapping sustainable raw materials for a circular economy



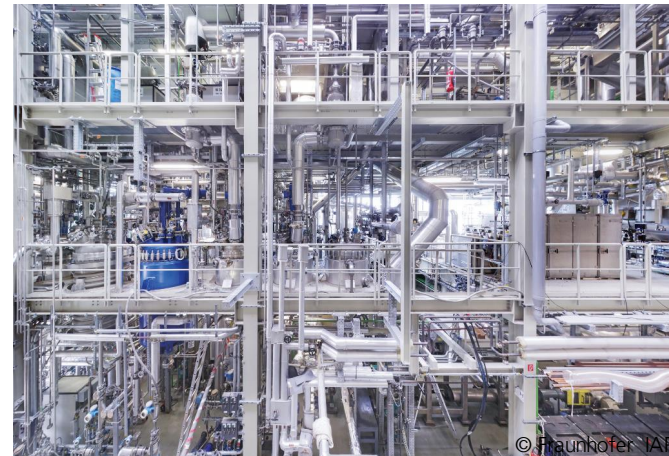
Health and quality of life

New active ingredients, products and processes for medicine, medical technology and cosmetics



Energy transition and mobility

Innovative materials for the energy transition and evolution of new mobility concepts



Industry and technology

Customized solutions from laboratory to industrial scale

Energy transition and mobility

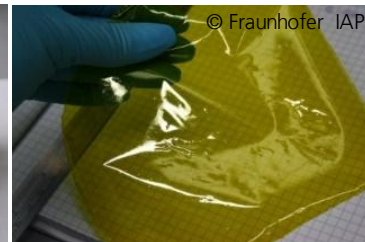
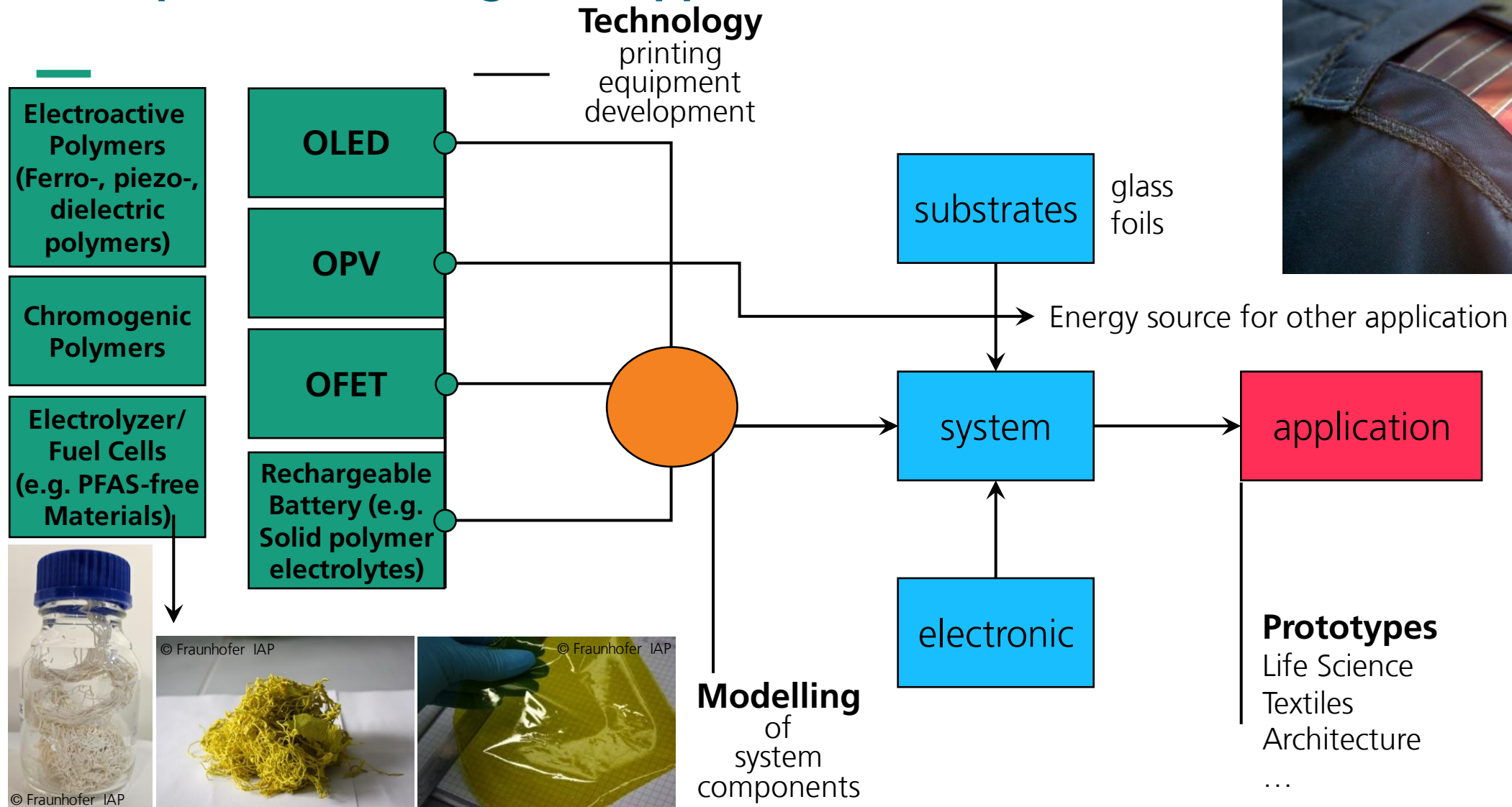


The integration of innovative materials into components and products is a key to the energy transition and the evolution of new mobility concepts.

Examples:

- Renewable Energy (e.g. solid polymer electrolytes for rechargeable batteries; fuel/electrolysis cells: catalysts, membranes)
- Printed Electronics (e.g. energy-efficient displays, OLED/QD-LED; solar cells: OPV, perovskite)

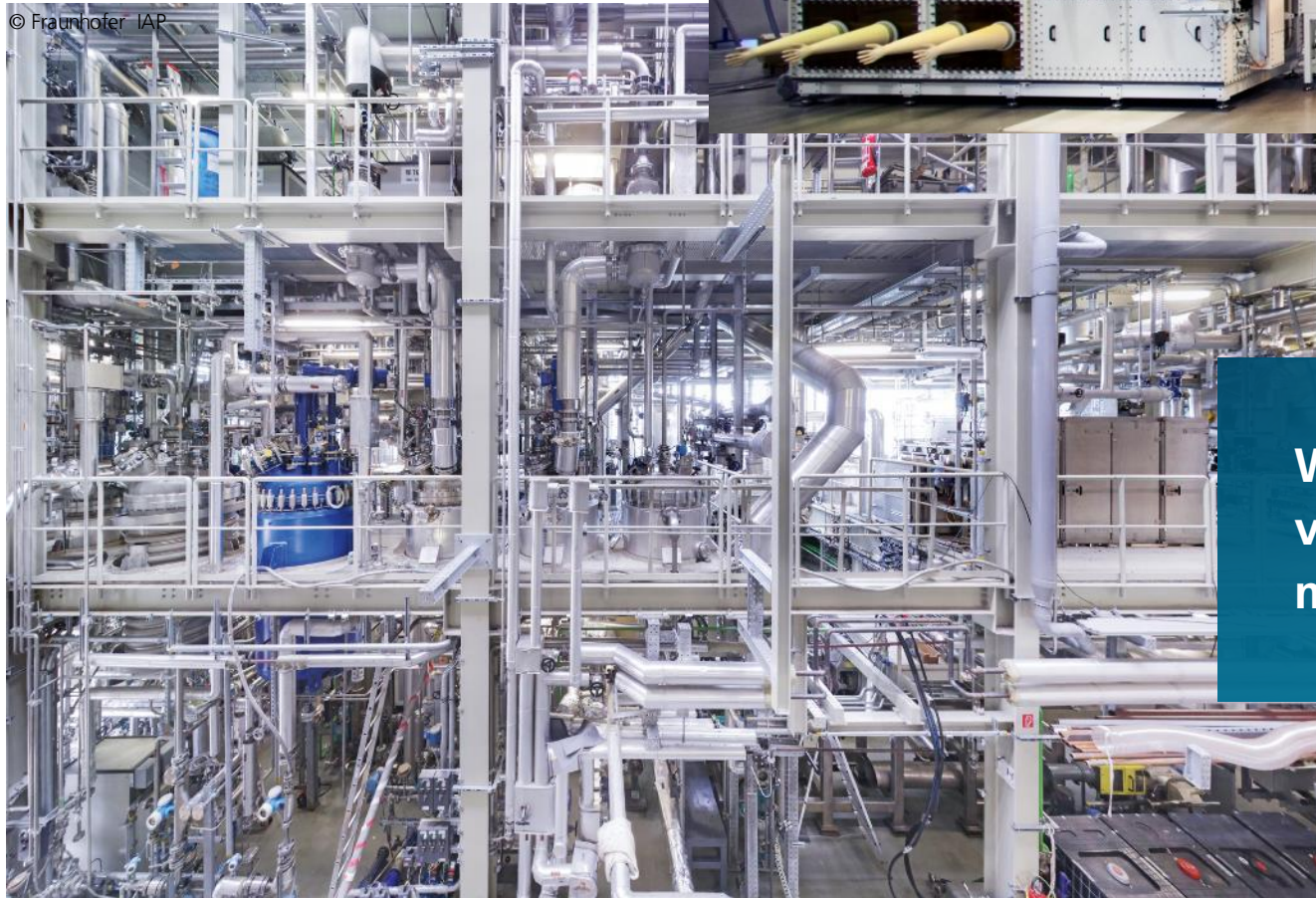
Examples for creating new applications – Case studies



Industry and technology



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We are your competent partner along the value chain: from innovative materials to market-relevant prototypes.



Biopolymers

Prof. Dr. Johannes Ganster

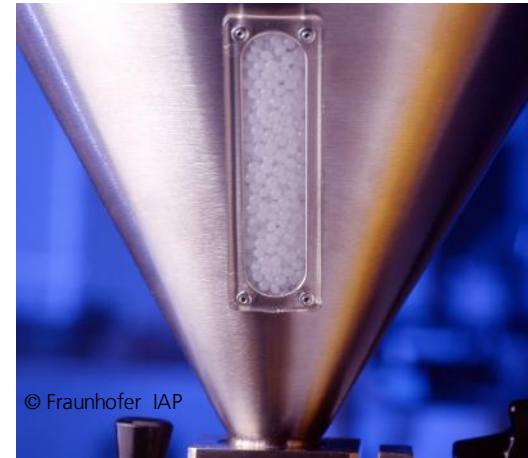
Biopolymers (cellulose, starch, lignin), bio-based plastics (PLA, PHA, PA), blends, composite, (carbon) fibers, films, nonwovens, injection molded parts, etc.



Functional polymer systems

Dr. Armin Wedel

Materials with special optical, electrical and thermal properties, displays, solar cells, energy stores, sensors, actuators



Synthesis and polymer technology

Dr. Thorsten Pretsch

Polymer synthesis and process development, microencapsulation and polysaccharide chemistry, membranes and functional films, shape memory polymers



Life Science and bioprocesses

Prof. Dr. Ruben R. Rosencrantz

Biofunctionalizations, biotechnological processes, protein conjugates, 3D bioprinting, materials for medical applications

Fraunhofer IAP

Research divisions



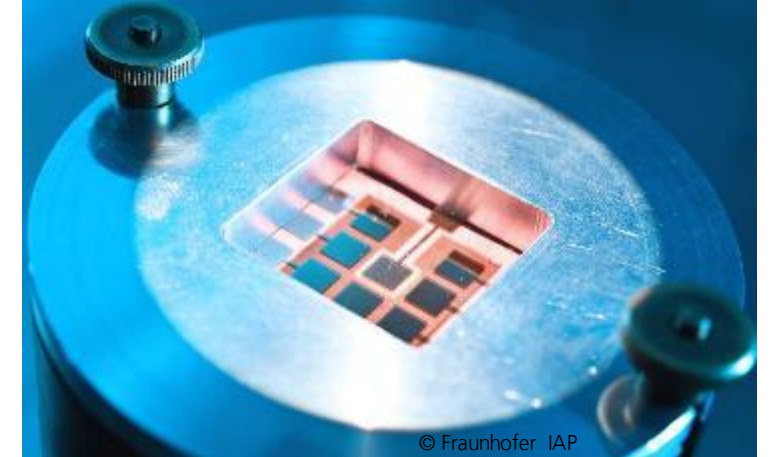
Pilot plant center PAZ Prof. Dr.-Ing. Michael Bartke

Process development, polymer synthesis, scale transfer and generation of sample quantities up to the ton scale



Polymer materials and composites PYCO Prof. Dr.-Ing. Holger Seidlitz

Polymer-based lightweight construction along the value chain - customized materials, design and construction, manufacturing technologies, testing



Center for Applied Nanotechnology CAN Prof. Dr. Methap Ösazlan

Quantum materials, nanomedical applications, home/personal care, nanoscale energy and structural materials

Topics / Offer

Possible topics for future projects:

- Functional materials and devices
 - Display technology (OLEDs and other technologies)
 - Energy harvesting (photovoltaics and converters)
 - Nanomaterials and quantum dots
 - Processing and encapsulation processes/ technologies
- Polymers and electronics
 - Materials for organic electronics (OLED, OPV and OFET)
 - Materials for batteries, electrolyzer, sensors and actuators
 - Biocompatible materials, Nanomaterials
- Chromogenic polymers
 - Thermochromic, thermotropic, photochromic, piezochromic
 - Thermoplastics, thermosets, elastomers, films, coatings, hydrogels, casting resins
- Sensors and Actuators
 - Electrets, piezoelectrics and electroactive polymer transducers
 - Polymer foams and composites, electrode systems

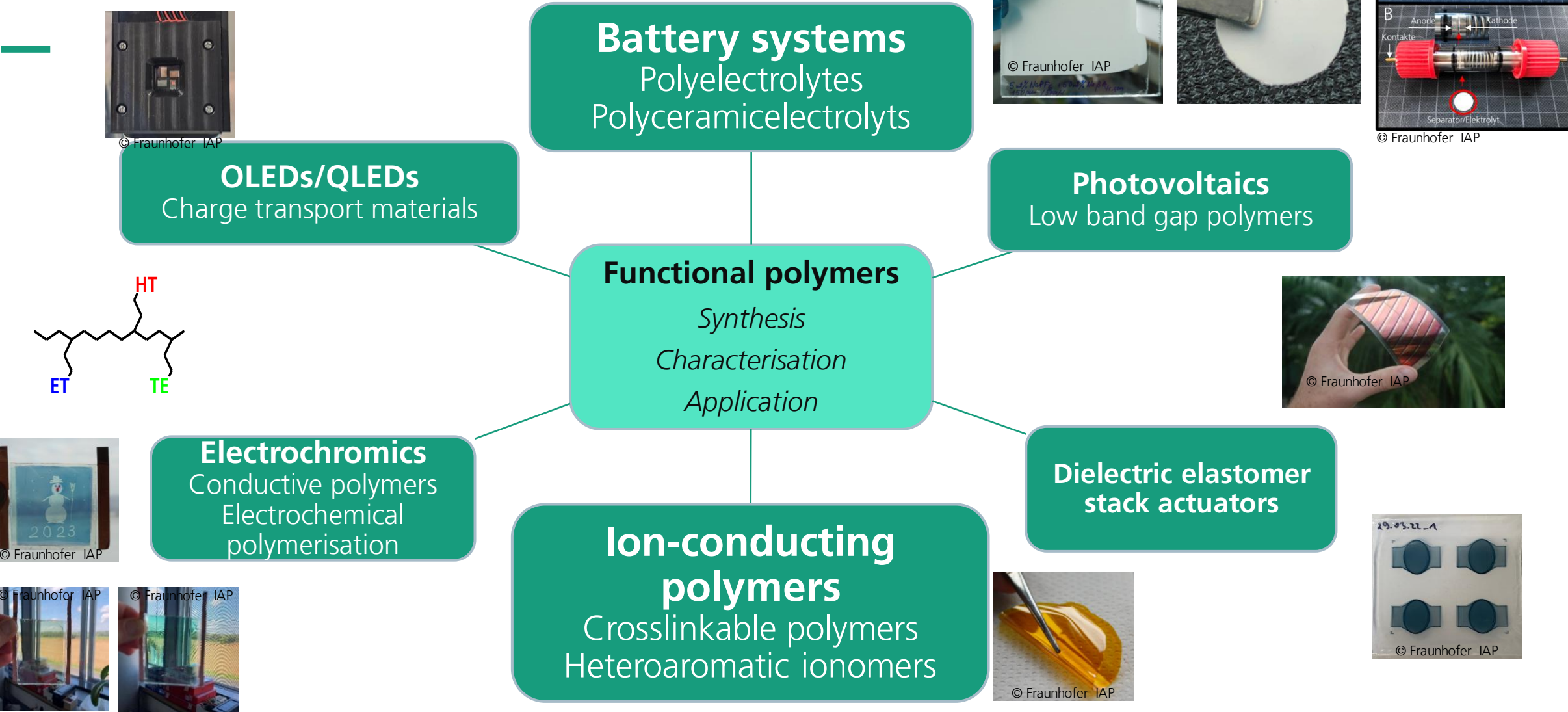
What we offer...

- Industry-related research and services – developing solutions for industrial challenges at the material level through to the technology level
- Covering entire value chains from designed and optimized materials through to upscaling to a commercialization-ready prototype

We solve your challenges!
Interested? Contact us!

Department:
Polymers and Electronics

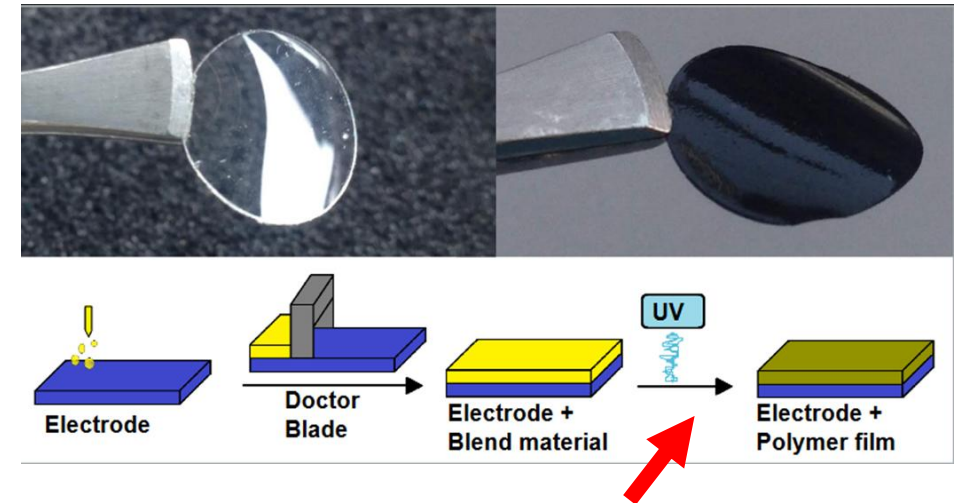
Head of Department: Dr. Benjamin Heyne



Alternative battery systems

Combined with inorganic solid electrolyte + electrolyte salts + initiator

- Research in All-solid-state **Sodium-Ion-batteries**
 - Reproduced results:
 - Ionic conductivities $\sim 10^{-5}$ S/cm @RT
 - Latest results:
 - Ionic conductivities $\sim 10^{-4}$ S/cm @RT



Curing was done with UV- or also thermal- initiated radical polymerisation

Another field of research - Amorphous Polymer System

- Research in rechargeable **Zinc-Air-batteries**
 - Ionic conductivities $\sim 10^{-4}$ S/cm @RT
- First coin cell tests including our materials with project partners



Offer / Search

What we offer...

- Synthesis, modification, characterization and processing of functional monomers and polymers
- Membrane / Separator / Solid Polymer Electrolyte Development according to process specifications
- Bio-based carbon fiber/ powder for modification / optimization of GDLs
- Catalyst coated membranes: From colloidal synthesis to processed CCM / MEA / Catalysts for electrodes
- Testing of materials on system level

Possible topics for future projects:

- Green hydrogen/ battery systems - Ion-conductive materials/ membranes/ CCMs/ GDLs
- Membranes for energy and hydrogen utilization
- Noble metal reduced catalysts for electro catalysis

Collaborations:

- Sustainable material development for special applications
- Processing of materials
- Scale up on a laboratory scale (gram) → industry scale (ton)
- Development of non-commercial membrane / separator
- Pore size and porosity modification
- Improvement of chemical and mechanical stability
- Development of novel noble metal reduced catalysts

Interested? Contact us!

Contact

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Thank you for your attention!

