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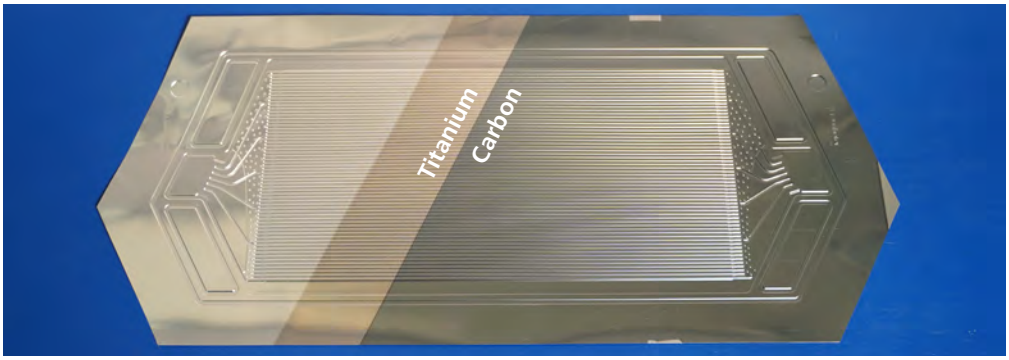
Fraunhofer Institute for
Organic Electronics, Electron Beam
and Plasma Technology FEP

Electron Beam and Plasma Technologies for Hydrogen

Applications – Facilities – Technologies



Bipolar plate with layers of Ti as corrosion protection and C as contact layer

Application examples

Vacuum-based, mostly plasma-assisted PVD/CVD technologies for coatings in fuel cells and beyond	▪ Thin film electrolyte for SOFC fuel cells and high-temperature electrolysis (HTE) ▪ Diffusion barriers for solid oxide fuel cells (e. g., doped CeO) ▪ Protective coatings for PEM stacks ▪ Deformable protective coatings for PEM BPP by R2R ▪ Ultrapure nano particle synthesis for PEM fuel cell applications ▪ Adjustable wetting on PVD-coated surfaces ▪ Thermal/environmental barrier coatings for H_2 turbine components
Electron beam (EB) surface treatment	▪ Sealings for fuel cells made from energetically curable polymers ▪ Thermal resistance enhancement of polymers
EB-sustained plasma-chemical synthesis	▪ Plasma-chemical synthesis of energy storage and green feedstock materials ▪ Mobile test rig for electron beam-based environmental technologies TABEA
Further relevant technology fields	▪ Active sensor materials ▪ Photo-microbiological H_2 production ▪ Cleaning challenges along the entire production chain of H_2 applications

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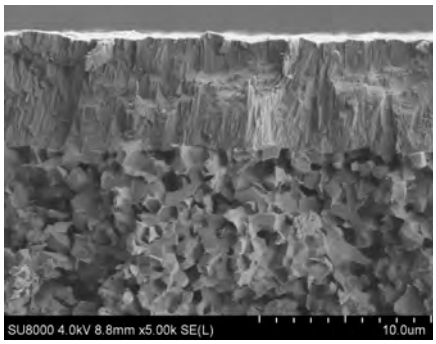
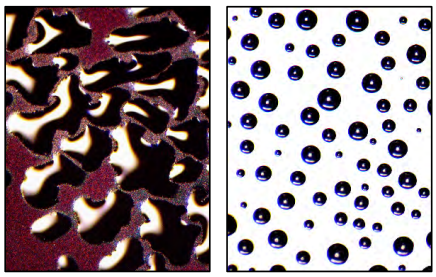
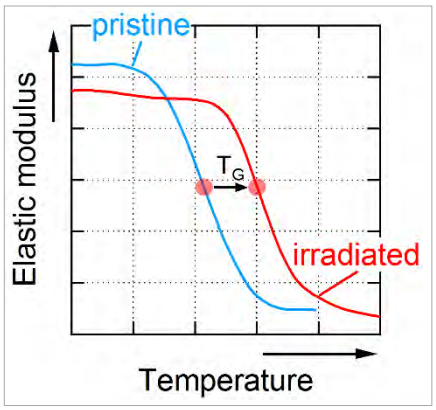
Applications



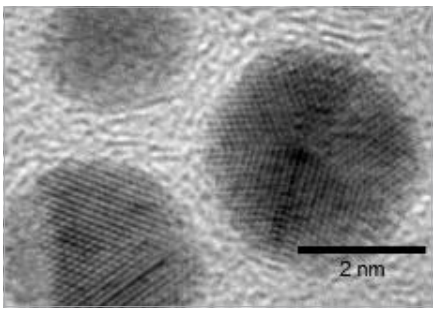
Thin film electrolyte for SOF/EC on porous substrate



Water microdrops on hydrophilic (left) and hydrophobic (right) surface



Electron beam curing of polymers



Ultra-pure nobel-metal nano-particles synthesized by in-vacuo condensation

Facilities

In-line vacuum coating equipment for sheets and metal strips MAXI

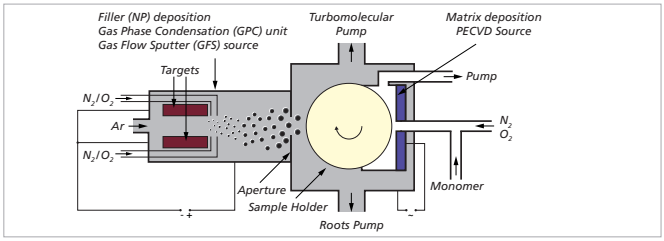
s.fhg.de/maxi-en

Mobile test rig for electron beam treatment of waste gases and waste water and for plasma-chemical synthesis TABEA

s.fhg.de/tabea-en

Roll-to-roll pilot wet coating and EB curing line atmoFlex

s.fhg.de/atmoflex-en



Vacuum coating equipment LB nano

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Our Offer

- Feasibility studies
- Process evaluation and upscaling
- Development and realization of customized technological key components for electron beam and plasma technologies
- Research and development on behalf of customers or as a project partner up to pilot scale

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