Challenges for Porous Transport Layers in Water Electrolysis

Advanced Materials to unlock the H_2 revolution

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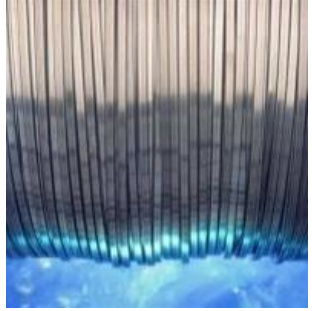



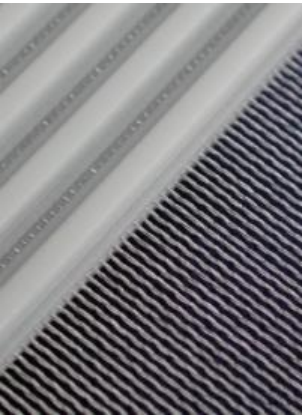
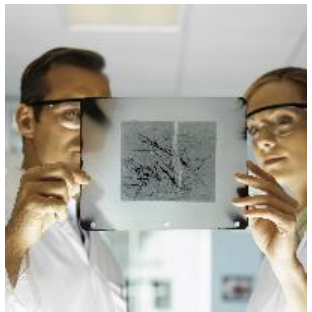
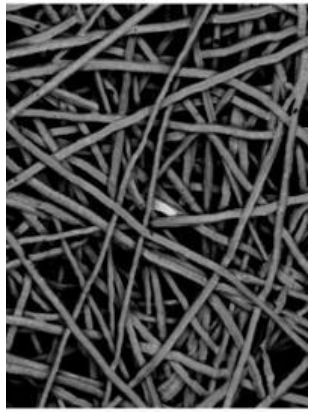

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Bekaert Group in a nutshell

- Founded in 1880 by Leo Bekaert
- Transforming steel wire and applying coating are our core competences
- More than 27 000 employees worldwide
- Customers in 120 countries
- Global top 250 automotive supplier
- Euronext listed (BEKB)

A product portfolio that spans the world

A world market and technology leader in steel wire transformation and coatings

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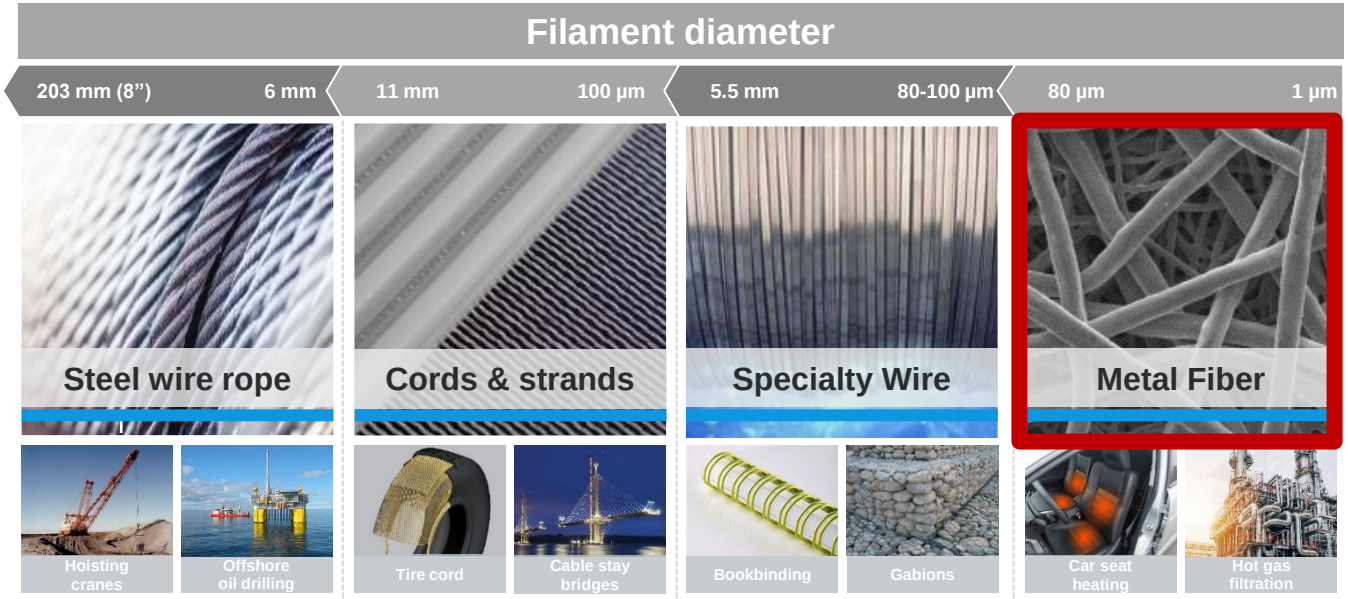
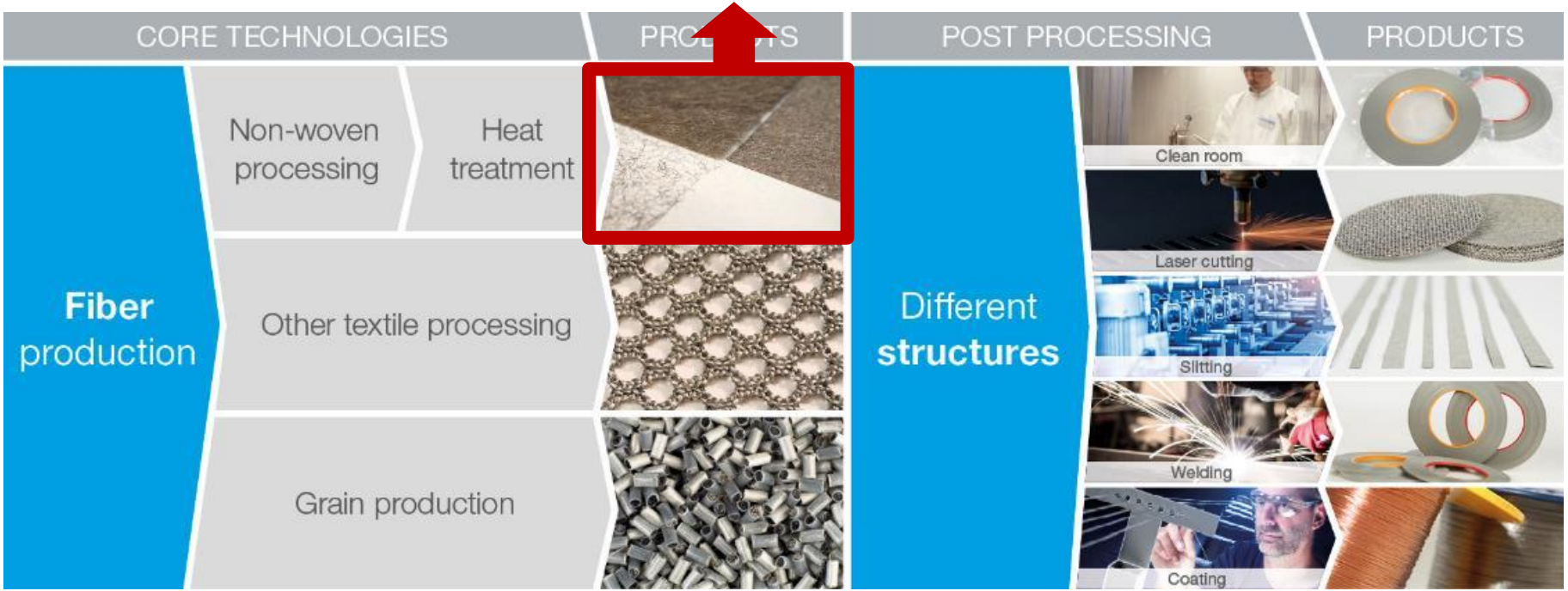


- Diameter portfolio: **1 µm to 203 mm**
- Diameter of a human hair: **80 µm**
- “We can transform a 4 meter piece of wire rod to **a fiber that spans around the world**”

Metal fibers and derived products

Focus on sintered metal fibers

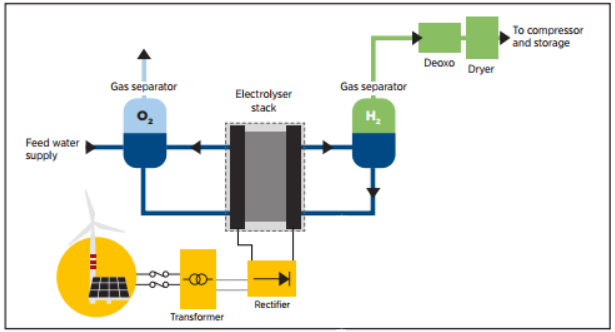
Sintered metal fibers can be used as
Porous Transport Layers (PTL) in water electrolyzers



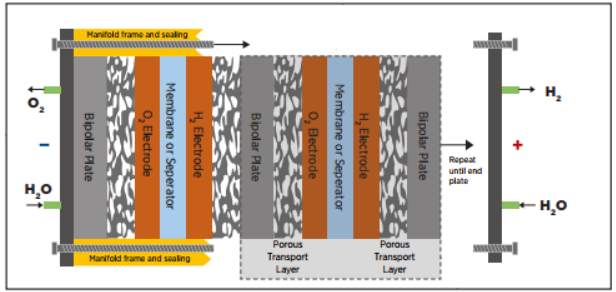
Sintered metal fiber as porous transport layer in water electrolysis

Focus on PEM water electrolysis

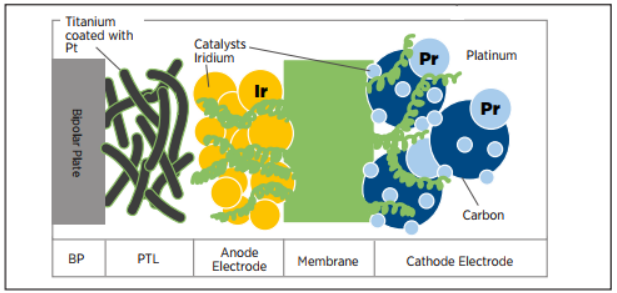
SYSTEM LEVEL



STACK LEVEL



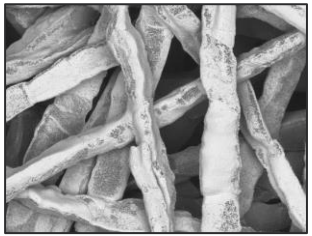
CELL LEVEL



Requirements for Porous Transport Layers

- Flow for gases (H_2, O_2) and liquids (H_2O)
- Electrically conductive
- Tuned interface with catalyst and bipolar plate
- Durable / high corrosion resistance

Bekaert solution: Sintered titanium fiber (optional Pt coating) for PEM water electrolysis



Source: IRENA (2020) - Green hydrogen cost reduction, scaling up electrolyzers to meet the 1,5°C climate goal

Your trusted partner in upscaling

- 20+ year track record in PTL’s for PEM electrolysis
- GW scale PTL production footprint
- We co-develop the PTL for your cell design

R&I challenges for next generation PTL in PEM water electrolysis

Bekaert perspective

PTL R&I challenges relate to
1. reduction PGM levels
2. reduction CAPEX
3. increasing efficiency

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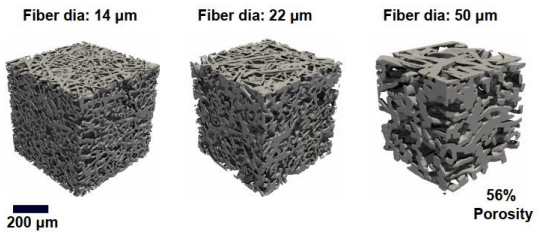
PTL's for thin membranes and low Ir loading

- Mechanical support of membranes
- Optimzed electrical connection with catalyst

Need for fine PTL structure contacting CCM



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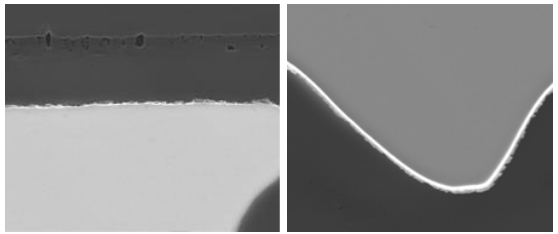
Protective durable coatings in PEM WE

- Minimal contact resistance
- Minimal performance degradation over life

Need for reduced Pt loading on sintered Ti fiber



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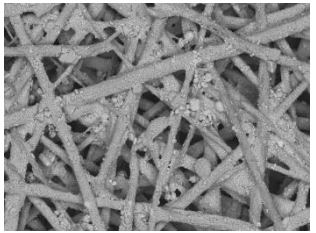
PTL's for AEM water electrolysis

- Wide development effort
- Non-PGM catalysts

Sintered Ni/316L fiber (comparable to PEM), main change is coating of PTL instead of membrane



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