

MAT-DAY Presentation | 17 September 2026

ACR Materials GmbH

Next-Generation Gas Diffusion Electrodes for Affordable, Clean Hydrogen Fuel Cells

Deeptech · TRL 4–5

Roll-to-Roll · PFAS-free

Reduce 60% Platinum

Speaker: Dr. Fei-Fan Cai (CEO)



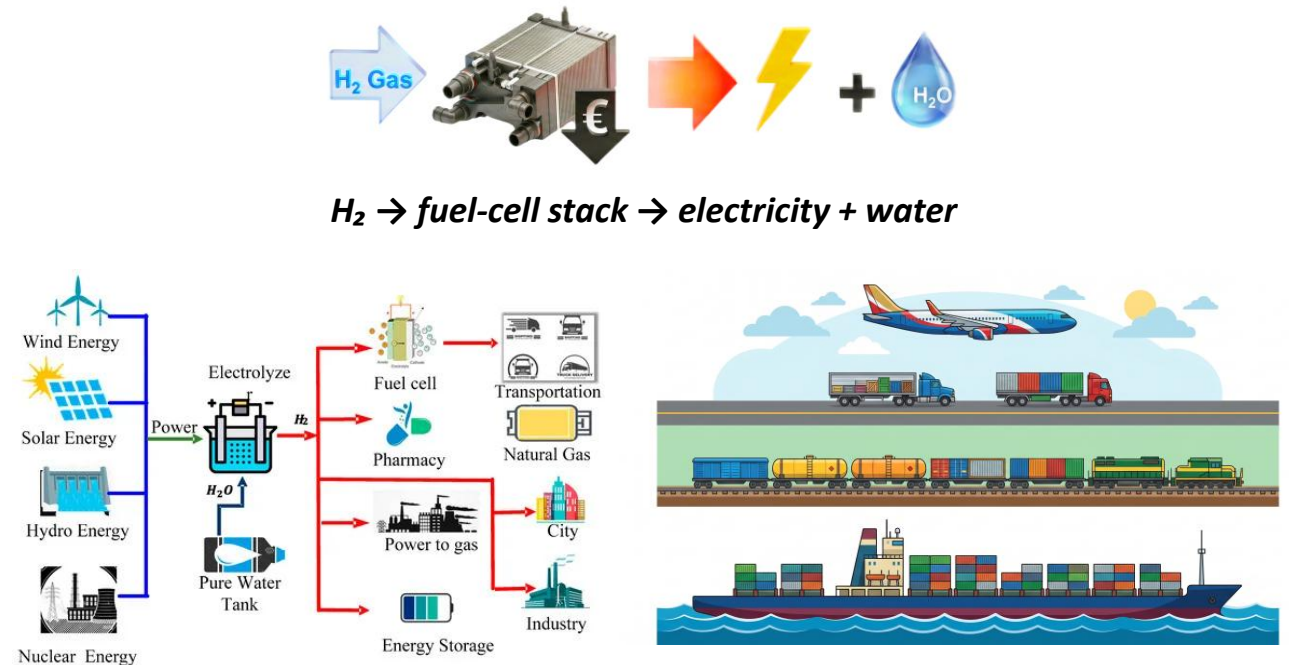
Hydrogen already moves people and freight today

But Hydrogen Fuel cells are still too costly to scale...

Already on the road: Vienna's hydrogen bus fleet



From renewables to real-world applications



What hinders their extensive use?

Proton-Exchange Membrane Fuel Cells (PEMFCs) are still too expensive and inefficient because of their Gas Diffusion Electrodes (GDE).

Why GDEs hold the industry back:

>50%

of PEMFC cost is the two GDEs
in every single cell

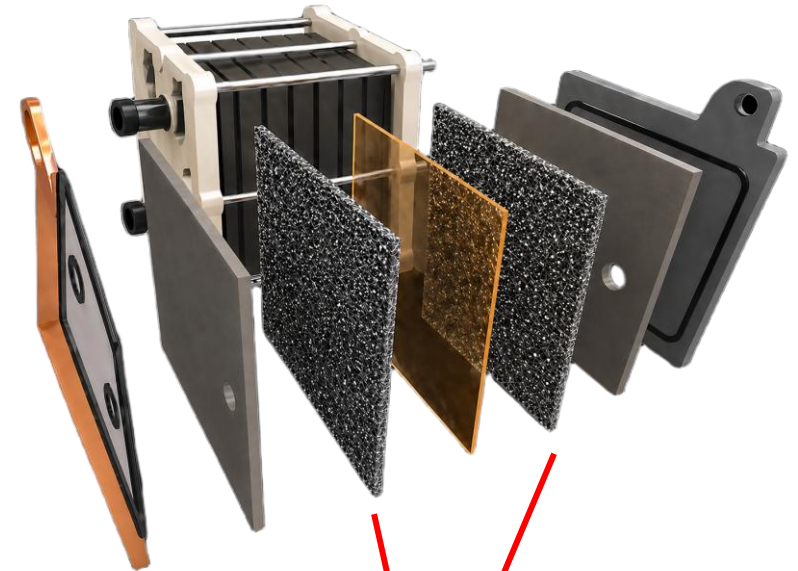
~90%

of GDE cost is the
platinum catalyst

≈75 m²

GDE area per **200 kW truck**
(2 per cell × 400–600 cells)

- **Pt** is a scarce, critical raw material
- **No green, PFAS-free roll-to-roll process** available today
- **Low durability** and **reduced long-term performance** in real-world conditions



Gas Diffusion Electrode (GDE)

Our revolutionised GDE technology

We grow **catalytic nanoparticles** inside a **porous carbon structure**:
A continuous, green roll-to-roll route to high-performance, low-platinum electrodes.

1

Carbonized Nano-Fibrous Matrix

Porous, conductive nano-fiber scaffold: better gas diffusion and water management, longer life, and far less catalyst needed.

2

In-situ catalytic nanoparticles via CTS

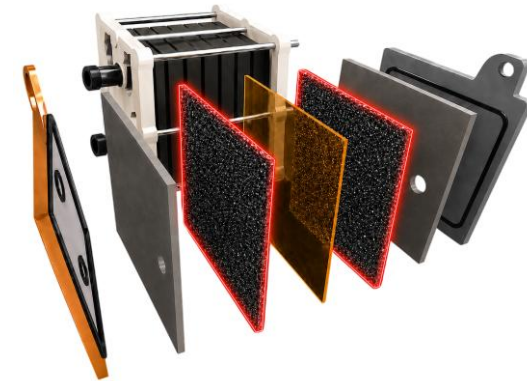
Our technology grows tunable alloy nanoparticles (NPs) throughout the whole matrix, not just on the surface.

3

Continuous Roll-to-Roll, PFAS-free

Scalable, fluorine- and binder-free fabrication: lower cost, lower Pt, recyclable, industry-ready.

PEMFC stack with our GDE highlighted



One continuous roll-to-roll process



What ACR's GDEs deliver in the field

Every lab result upstream translates directly into a cheaper, more efficient fuel cell downstream — this is what changes for an OEM customer switching to ACR GDEs:

–60%

platinum loading, via alloy / HEA nanoparticles

–54%

GDE material cost vs. state-of-the-art

–30%

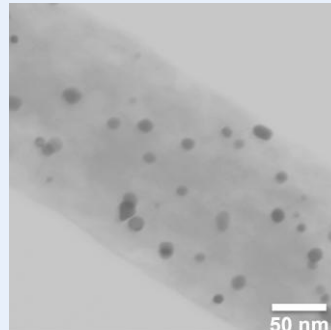
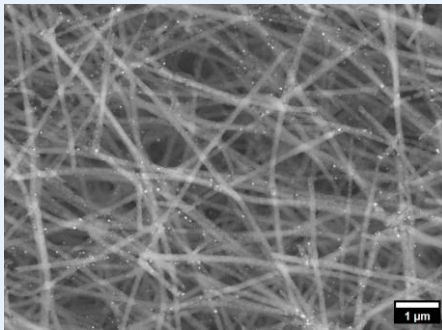
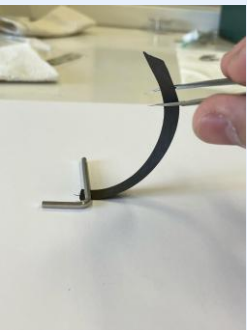
finished PEMFC system cost

+15%

fuel-cell efficiency, lab-benchmarked

Catalyst across the matrix

Catalytic nanoparticles, uniformly grown on the fiber network, not surface-only, so less platinum does more!

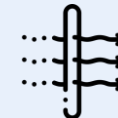


Broadest tuning range

Composition, porosity, conductivity, gas permeability, water repellency and surface area, all set in one process.



Surface area
& porosity



Gas
permeability



Conductivity



Composition



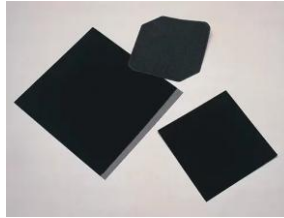
Water
repellency

How ACR earns revenue from its GDEs

1 · Direct Product Sales

Sell GDEs directly to fuel-cell OEMs, from R&D samples to bulk industrial supply.

► **Supply EU Market**



Pricing tiers

Pricing tier	Price per m ²	Target customers
Retail (usually sold with 25 cm ²)	€75,000	Retail customers
R&D pricing	€70,000	Research / pilot customers
Bulk discount ≥500 m ² (truck)	€150	Industrial: truck application
Bulk discount ≥500 m ² (stationary)	€1,400	Industrial: stationary power

A 200 kW truck needs ≈ 75 m² of GDE

2 · Technology Licensing of Production Processes

License the CTS process (3–10% of GDE value);
Technology transfer / consulting / co-development.

► **Expand Overseas Markets**



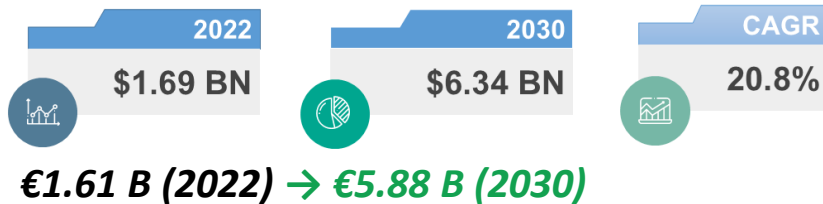
Potential customers

- EKPO Fuel Cell Technologies GmbH (Germany)
- Nedstack Fuel Cell Technology BV (Netherlands)
- SFC Energy AG (Germany)
- Ballard Power Systems Europe (Denmark)
- Nuvera Europe (Italy)

⋮

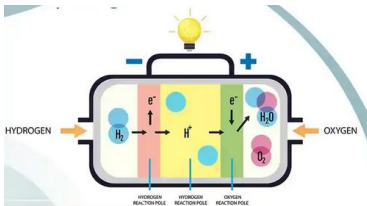
A growing €5.9 B GDE market

Global GDE Market



Europe Fuel Cell Market

Regional Forecast (2025 – 2034)



(≈ 625,000 m², > €90 M/year)

- In 2023, 14,500 FCVs were sold, requiring ≥ 10 million GDEs annually.
- Fraunhofer: global PEMFC production will reach 300 million/year by 2030.
- Europe fuel-cell market: **\$1.28 B → \$3.4 B** (CAGR 10.9%) · PEMFC 50.1%

ACR's market opportunity

≈ 250,000 trucks/yr ≈ **€2.8 B GDE/yr.** At 1% share:

€28 M

Direct GDE sales

€2.1 M

Tech. licensing (7.5%)

Per-system GDE value

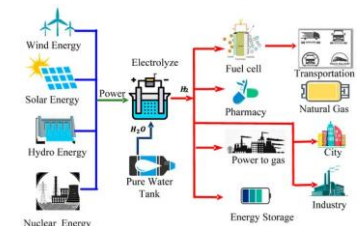
Heavy-duty transport

500–1,000+ cells
62.5–125+ m² GDE
≈ **€15k / system**



Stationary power systems

up to 500 cells
up to 62.5 m² GDE
≈ **€70k / system**



Two secured grants, a non-dilutive path

Public funding attracted up to now

FFG Energieforschung GARFIELD



SECURED

€450,000 ACR share · €1.0 M consortium · 36 months · start Oct 2025

- Advanced GDE development: Pt ↓ 60%, efficiency ↑ ≥ 15%
- Cut GDE cost ≥ 54% & PEMFC cost ≥ 30%; > 25,000 h stability
- LCA, fluorine- & binder-free, recyclable by design

Collaborators:



aws PreSeed Deep Tech



SECURED

€267,000 · 18 months · start Jan 2026

- Upscaling of CTS machinery, from lab-scale to bench / pilot scale
- High-throughput CTS system; target size ≥ 10 cm × 10 cm
- Intellectual-property management & protection strategy

Drives ACR Materials from validated lab results toward first pilot-scale GDE production.

Private: Founder capital + reserve €110,000 · share capital €10,000 (Dr. Fei-Fan Cai 63.25% / Adam Elbataioui 36.75%)

New funding need & use of money

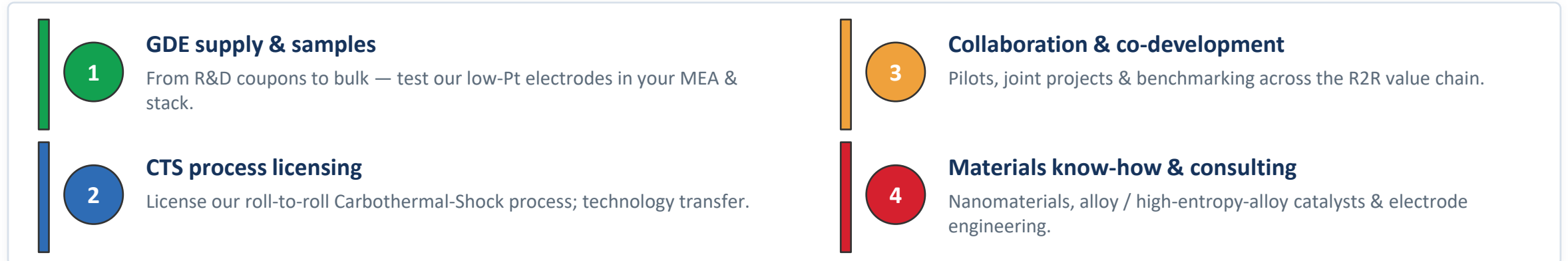
- Pilot production line
- Lab setup & equipment
- Personnel: Engineer/ Operator/ CSO
- IP & patents: 2 planned filings

What ACR brings to the industry



Beyond GDE layers for fuel cells & electrolyzers, we are open to exploring more applications of growing catalytic nanoparticles **uniformly throughout** a carbonized matrix.

HOW WE WORK WITH YOU



FOUNDING TEAM & RESPONSIBILITIES



Dr. Fei-Fan Cai

Co-Founder & CEO

Vision & funding · process & equipment design · project management & EU grants



Adam Elbataioui, M.Sc.

Co-Founder & CTO

Nanomaterials & electrochemistry · catalyst and electrode development



The planet doesn't wait. Neither do we.

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