Frenk Hulsebosch

APM Technology Vice President

APM Innovation: For Today's Needs and Tomorrow's Solutions

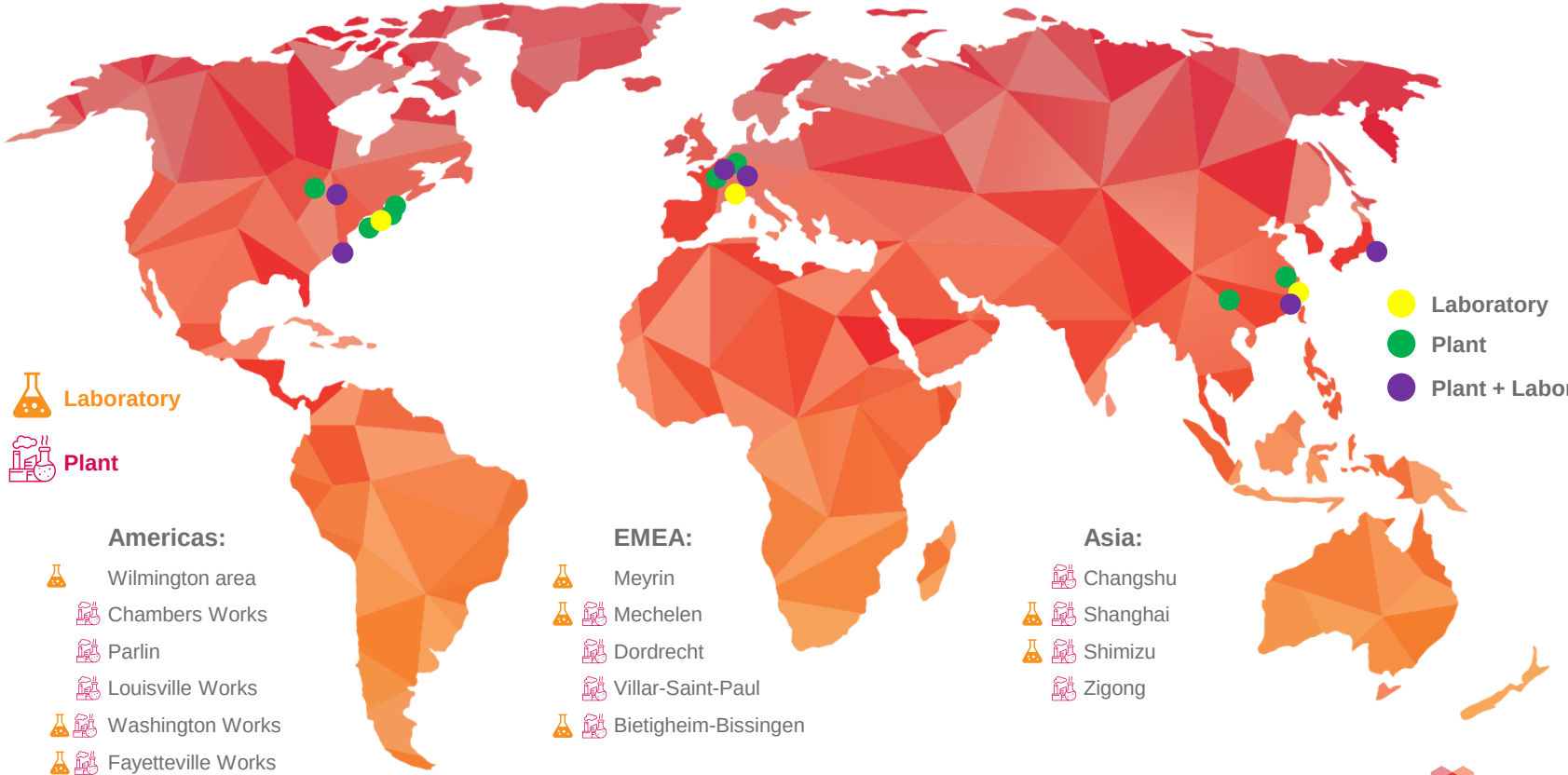
APM Innovation Focus

Regulatory Compliance & Sustainability

Base business opportunities

Significant Growth areas: Clean Energy & Advanced Electronics

Chemours APM Manufacturing & Laboratory Locations



Laboratory

Plant

Americas:

- Wilmington area
- Chambers Works
- Parlin
- Louisville Works
- Washington Works
- Fayetteville Works

EMEA:

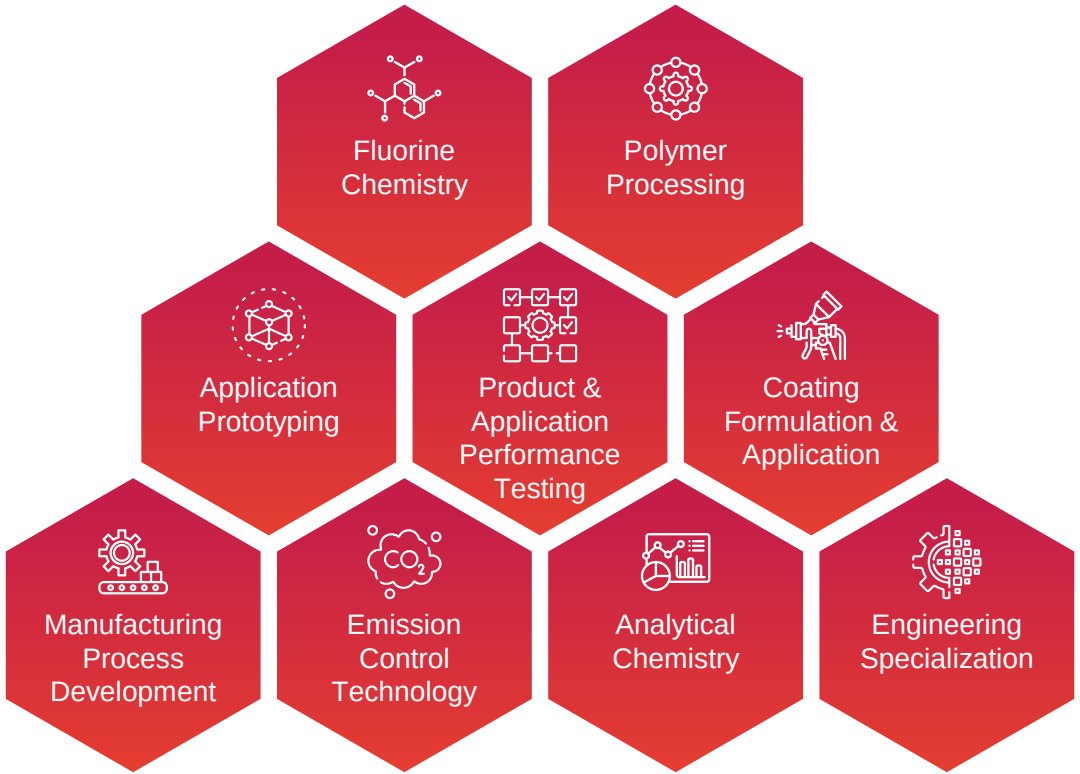
- Meyrin
- Mechelen
- Dordrecht
- Villar-Saint-Paul
- Bietigheim-Bissingen

Asia:

- Changshu
- Shanghai
- Shimizu
- Zigong

Chemours™

Chemours APM Innovation Capabilities



APM Innovation Focus

Regulatory Compliance & Sustainability

Base business opportunities

Significant Growth areas:
Clean Energy & Advanced Electronics

Innovation Programs for Regulatory Compliance & Sustainability

State-Of-The-Art Analytical Techniques

targeted, non-targeted analytes, detection levels

State-Of-The-Art Emission Controls

air, water, incineration

Raw Material Replacements

solvents, surfactants, additives

Circularity Programs

IXM membranes, PFA end of life

A Different Kind of Measurement Standard

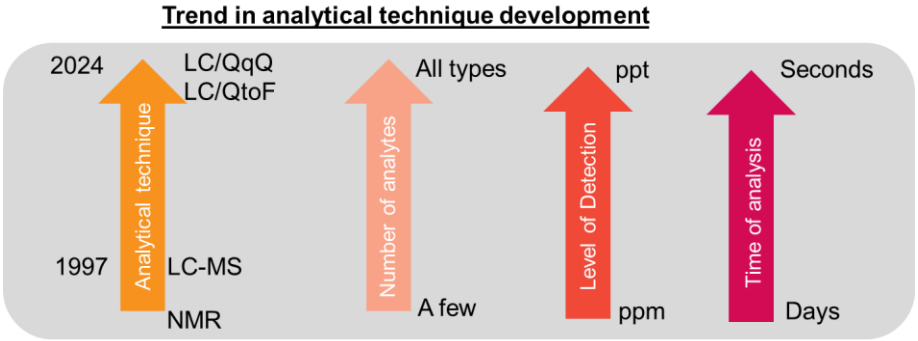
*We set the **most aggressive FOC reduction target in the world** and developed innovative technology and processes to achieve it. Our investments in measurement and testing push the boundaries of detection beyond what regulators are requiring today.*

Analytical Detection Capability

We developed and freely share sampling methods and authentic standards to enable reliable, validated, and reproducible measurements needed for meaningful emissions reduction. The byproducts from fluoropolymer manufacturing can only be completely identified through both **targeted and non-targeted analysis.**

NMR in 1968

LC-MS in 1997



2024 LC/QqQ targeted

2024 Orbitrap, LC-QToF Non-targeted

Chemours™

State-Of-The-Art Emission Controls

Thermal Oxidizer Fayetteville

Carbon Beds Air Dordrecht

Final Step GenX Removal from Wastewater Dordrecht

Raw Material Replacement: Approach to Alternative Polymerization Aid for PTFE Fine Powder

Key Objectives

1. Improve environmental footprint
2. Minimize unintended by-products
3. Meet processing and application needs
4. Become technically viable

120+ Alternatives Tested

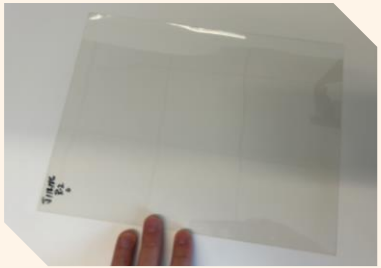
9 Viable Candidates Identified

	Synthesis/ Polymerization Analytical Testing	Performance Pilot Scale Feasibility	Scale-Up Sampling	Commercialization
TECHNOLOGY ROUTE A	50+ Candidates	3 Candidates		
TECHNOLOGY ROUTE B	50+ Candidates	5 Candidates	2 Candidates	
TECHNOLOGY ROUTE C	40+ Candidates	2 Candidates		

Circularity Programs

IXM membranes

Collection & Separation



Cleaning & Processing

PFA Semicon

Collection & Separation

Cleaning & Processing

APM Innovation Focus

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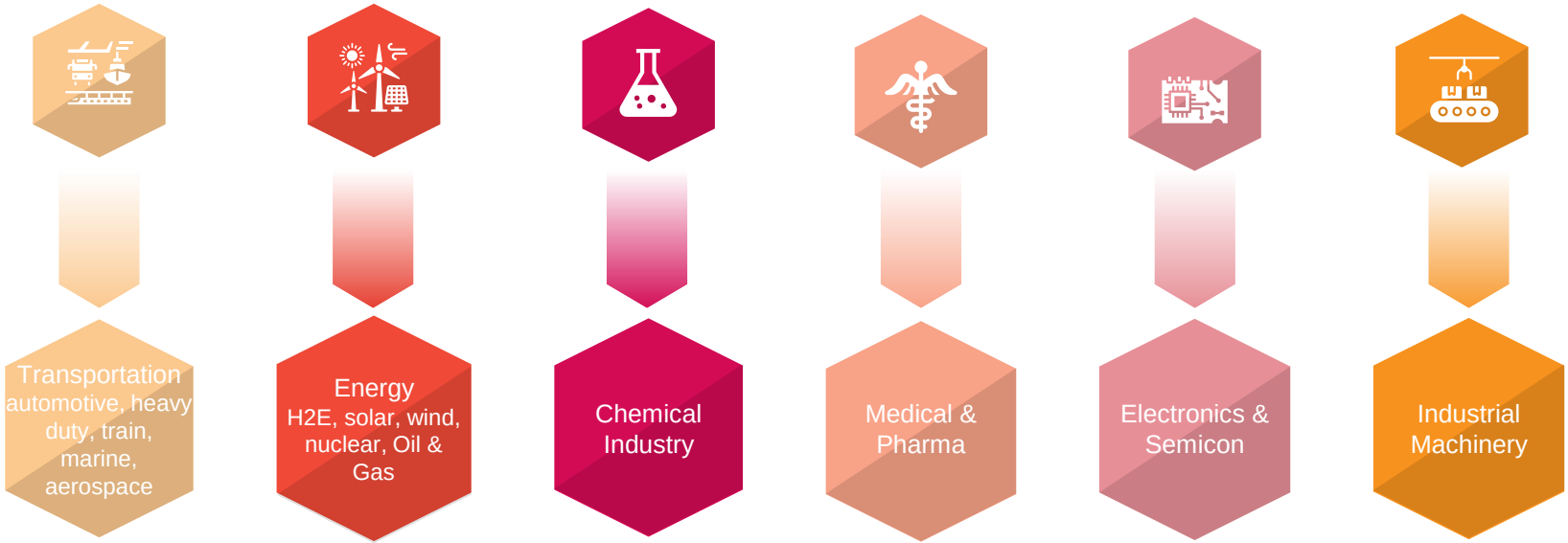
Base business opportunities

Significant Growth areas: Clean Energy & Advanced Electronics

Opportunities in Base Business

Customer/Application Specific – Existing and Modified Products



APM Innovation Focus

Regulatory Compliance & Sustainability

Base business opportunities

Significant Growth areas: Clean Energy & Advanced Electronics

Driving Growth Through Innovation: Differentiated Offerings with Exceptional Performance

CLEAN ENERGY

Hydrogen

EV Batteries

ADVANCED ELECTRONICS

Semicon

Electronics

Driving Growth Through Innovation: Differentiated Offerings with Exceptional Performance

CLEAN ENERGY

Hydrogen

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ADVANCED ELECTRONICS

Semicon

Electronics

Illustrative APM Applications in Clean Energy

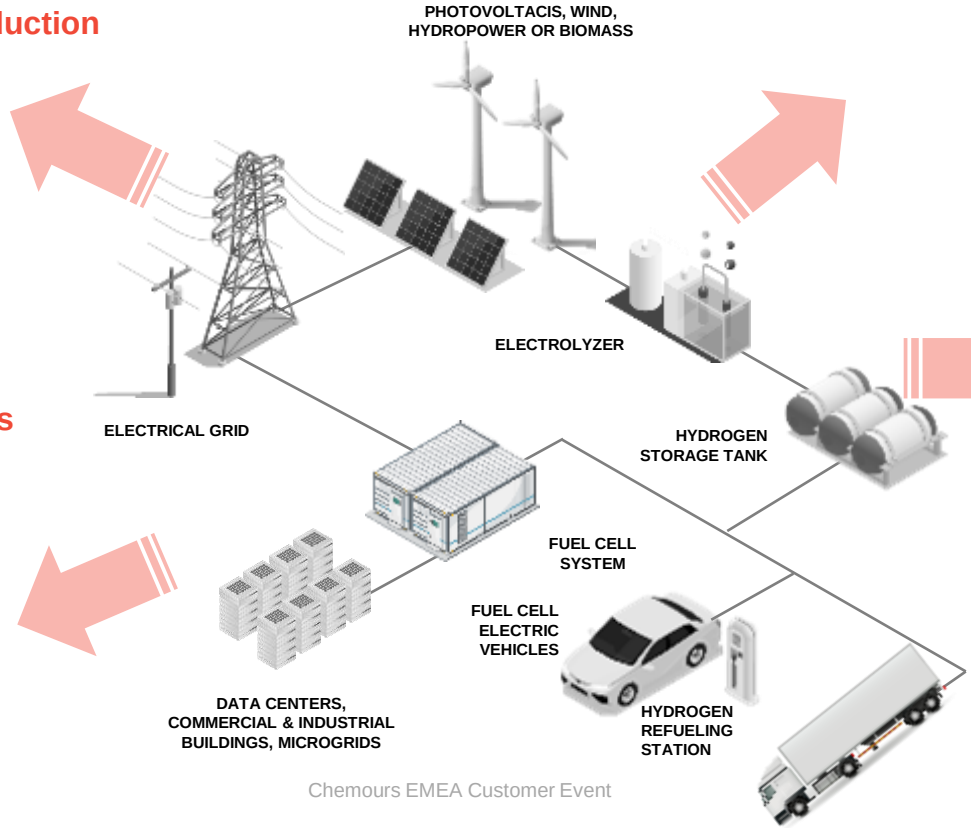
APM's suite of products while directly enabling water hydrolysis through our Nafion™ membranes also serve to support broader Hydrogen Economy and clean energy ventures

Renewable Energy Production

- Teflon™ used as release film to support production of composite turbine blades
- Viton™ used for sealing applications in control centers for offshore wind parks

Stationary & Mobility Fuel Cells & EV Batteries

- Nafion™ membranes used for PEM fuel cells
- Teflon™ used as a binder for dry process in EV batteries
- Viton™ / Teflon™ gaskets and seals to prevent leaks and environmental releases to reduce CO_2 emissions
- New JV: THE MOBILITY F.C. Membranes Company, established to expand into Hydrogen mobility technology



Hydrogen Production

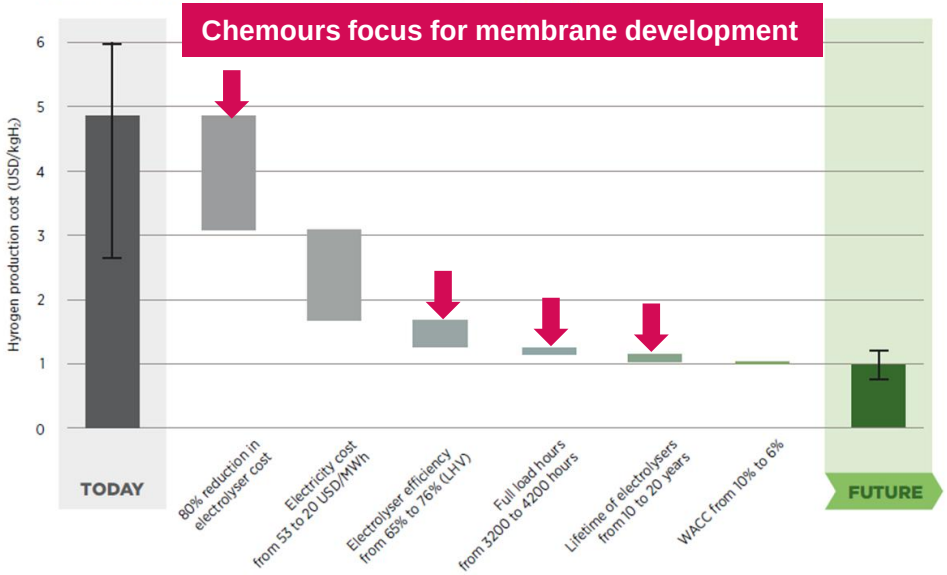
- Nafion™ membranes used for PEM water electrolyzers
- Teflon™ used as tubing fluid transfer in alkaline water electrolysis hydrogen production systems
- Teflon™ used as binder materials in the electrodes

Energy Storage

- Nafion™ membranes used for flow batteries
- Teflon™ used as binder materials in the electrodes
- Viton™ / Teflon™ gaskets and seals to prevent leaks and environmental releases to reduce CO_2 emissions

Key Driver: Hydrogen Cost Reduction

Figure 2 **Electricity and electrolysers: Potential to cut hydrogen costs by 80%**



Note: 'Today' captures best and average conditions. 'Average' signifies an investment of USD 770/kilowatt (kW), efficiency of 65% (lower heating value – LHV), an electricity price of USD 53/MWh, full load hours of 3 200 (onshore wind) and a weighted average cost of capital (WACC) of 10% (relatively high risk). 'Best' signifies investment of USD 130/kW, efficiency of 76% (LHV), electricity price of USD 20/MWh, full load hours of 4 200 (onshore wind) and a WACC of 6% (similar to renewable electricity today).

Based on IRENA analysis

Making the breakthrough: Green hydrogen policies and technology costs (irena.org)

Membrane Development Areas

- Higher Efficiency
- High durability / Longer lifetime
- Lower catalyst usage
- Enable automated scale-up

Clean Energy – Hydrogen Economy

New product platforms, customer/applications existing and modified products

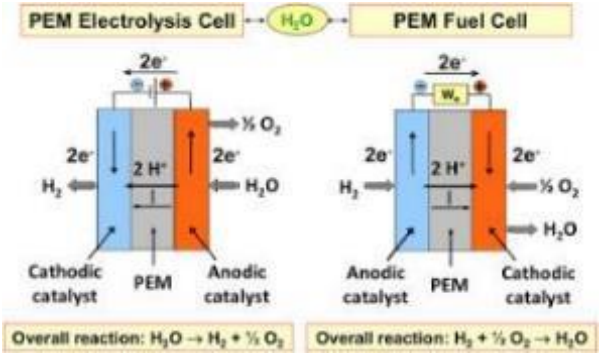
WATER ELECTROLYSIS

FUEL CELL

Nafion™ Membranes & Dispersions

Teflon™ Tubings Coatings

Viton™ Seals Gaskets



THE MOBILITY F.C. MEMBRANES COMPANY

Chemours™

Driving Growth Through Innovation: Differentiated Offerings with Exceptional Performance

CLEAN ENERGY

Hydrogen

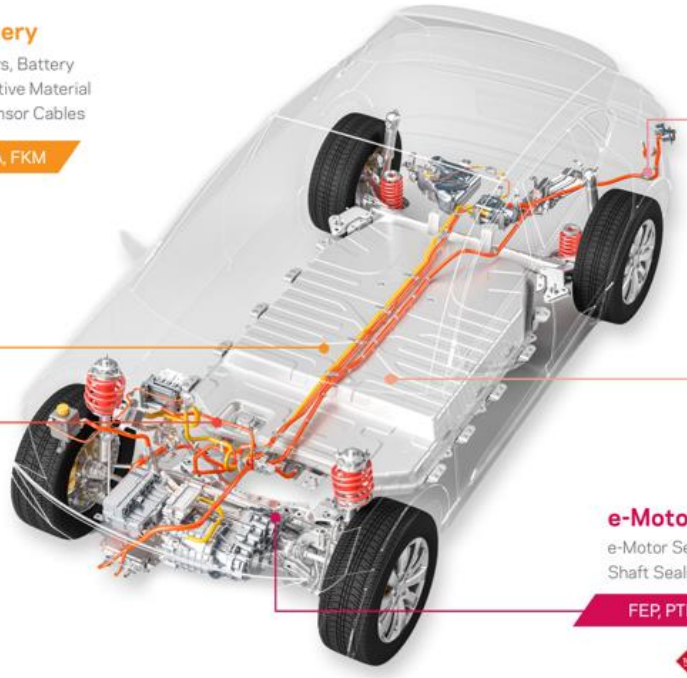
EV Batteries

ADVANCED ELECTRONICS

Semicon

Electronics

Chemours Products in Electric Vehicles



Lithium-Ion Battery

Battery Electrode Binders, Battery Cell Gaskets, Battery Active Material Equipment Coatings, Sensor Cables

PTFE, ETFE, FEP, PFA, FKM

Teflon™ Coatings
Teflon™ Fluoropolymers
Viton™ Fluoroelastomers
Tefzel™ Resins

Noise, Vibration, & Harshness

Interior or Exterior Materials, Charging Port Latches and Cable Connectors

PFPE

Krytox™ Lubricants

Vehicle Thermal Management

Refrigerants for Air Conditioning and Heat Pumps, Immersion cooling fluids for Batteries, Charging Stations, Power Electronics

HFO

Opteon™

Electrical Systems

High Voltage Power Cables, Busbar Insulation, Transformer Wire Insulation

ETFE, FEP, PFA, FKM

Teflon™ Coatings
Teflon™ Fluoropolymers
Viton™ Fluoroelastomers
Tefzel™ Resins

e-Motor & e-Axle

e-Motor Seals & O-rings, e-Motor Shaft Seals, Sensor Cables

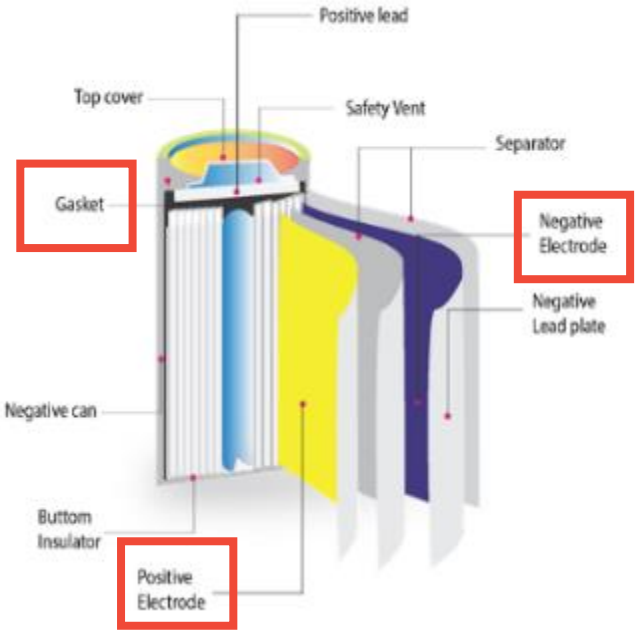
FEP, PTFE, PFA, FKM, ETFE

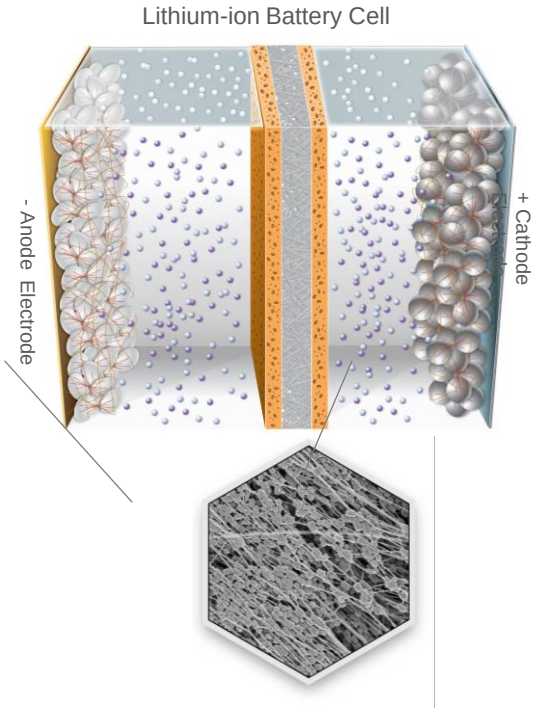
Teflon™ Fluoropolymers
Viton™ Fluoroelastomers
Tefzel™ Resins

Chemours™

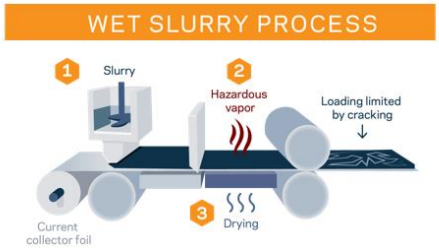
Clean Energy – Electric Vehicles

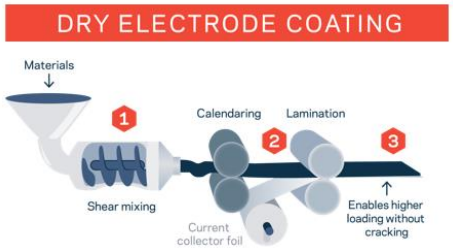
New product platforms, customer/applications existing and modified products

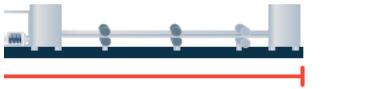




Dry Electrode Coating reduces manufacturing footprint by up to 75% and eliminated solvent recovery







75% Shorter than Wet Slurry Line

Cost Reduction

Sustainability

Performance

Chemours Battery Innovation Center

Driving Growth Through Innovation: Differentiated Offerings with Exceptional Performance

CLEAN ENERGY

Hydrogen

EV Batteries

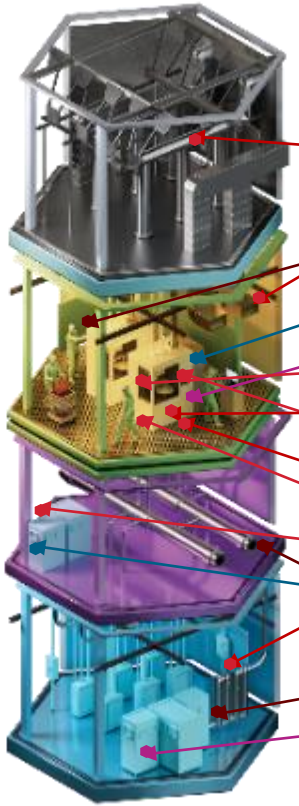
ADVANCED ELECTRONICS

Semicon

Electronics

Advanced Electronics – Semicon

New product platforms, customer/applications, existing and modified products



Teflon™ Krytox™ Nafion™ Viton™

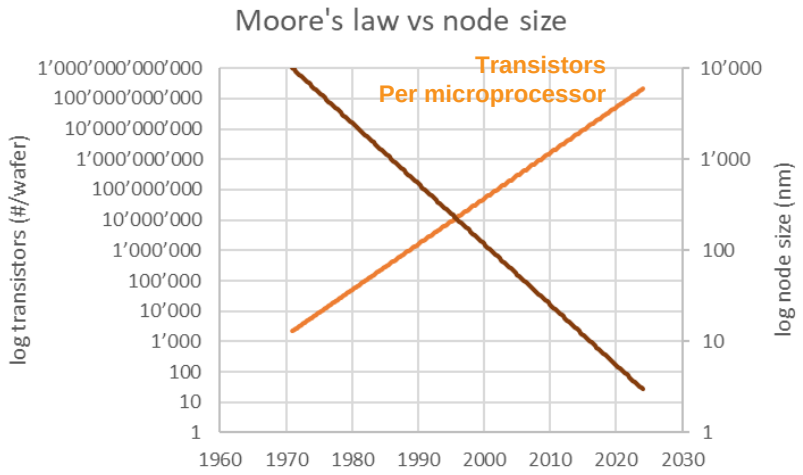
- Teflon™ coatings in exhaust duct systems
- Viton™ FKM chamber seals
- Krytox™ high performance greases for robotic systems
- Nafion™ ion exchange membranes for ECD
- Teflon™ AF optical coatings
- Teflon™ coatings for in-tool components
- Teflon™ FEP cable insulation
- Teflon™ PFA, PTFE in fluid handling & tank lining
- Teflon™ PFA, PTFE for gas and liquid filtration
- Krytox™ vacuum pump oils
- Viton™ gaskets and O-rings
- Nafion™ membranes for chemical production (e.g. TMAH)

New product introduced

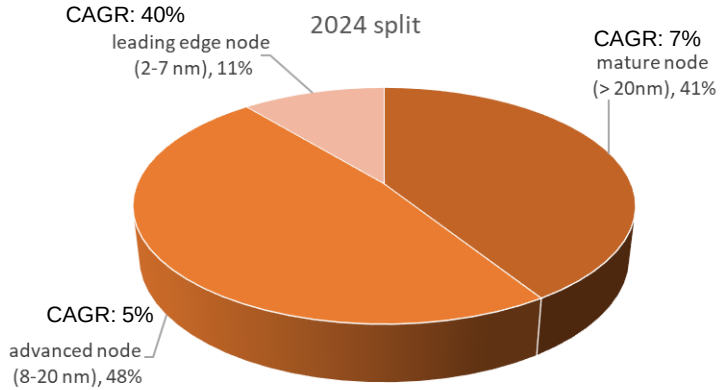
New product in development

Chemours™

Node Size Drives Purity



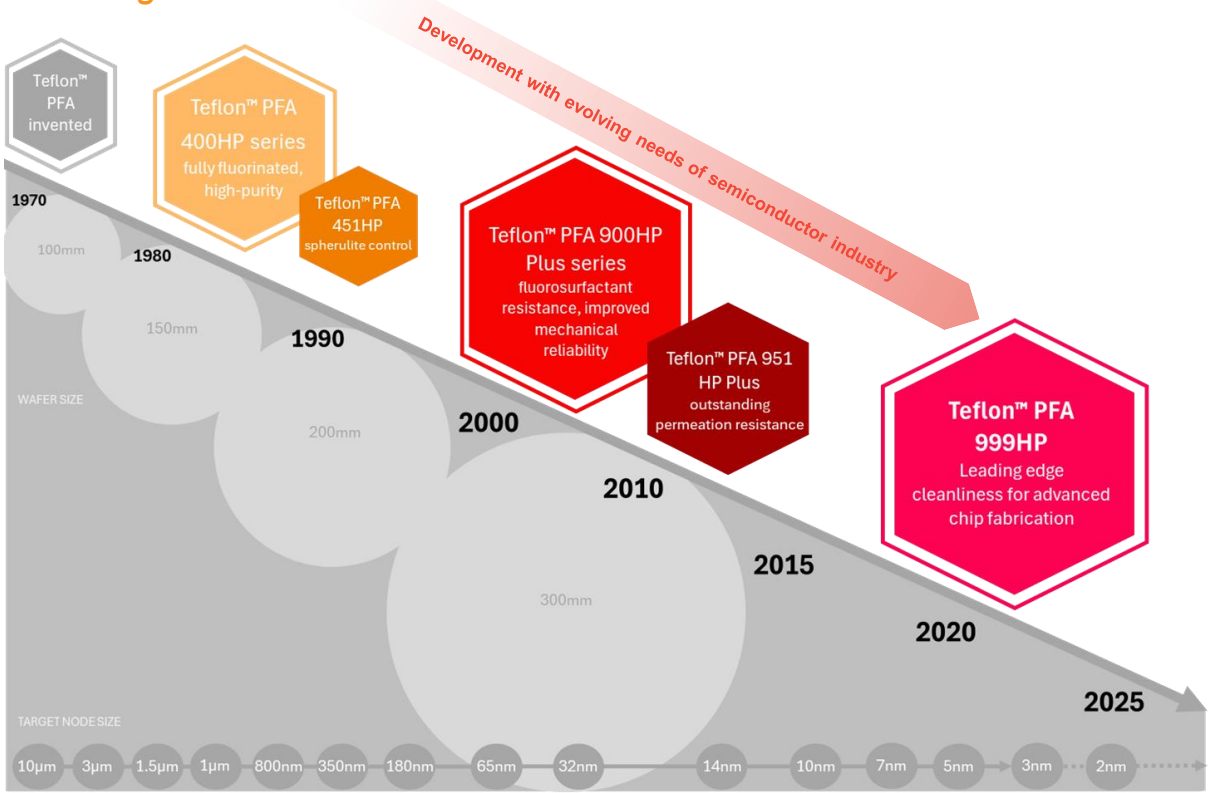
Global wafer capacity in different nodes



Source: Moore's law – Wikipedia
Moore's law: The number of transistors per microprocessor (ourworldindata.org)

Teflon™ PFA Fluoroplastic Resins

Enabling the advancement of Moore's Law since 1973



For over 50 years, the development of our Teflon™ PFA product line has evolved with the demanding needs of the semiconductor industry and will continue to develop the materials needed to meet the challenges of the future.

Driving Growth Through Innovation: Differentiated Offerings with Exceptional Performance

CLEAN ENERGY

Hydrogen

EV Batteries

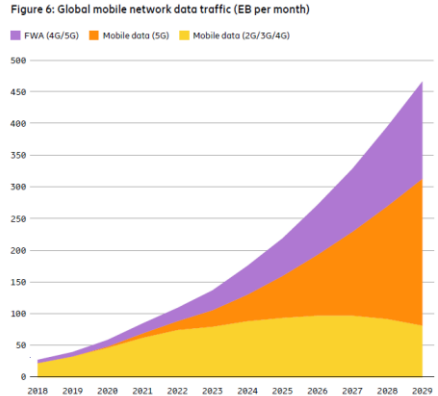
ADVANCED ELECTRONICS

Semicon

Electronics

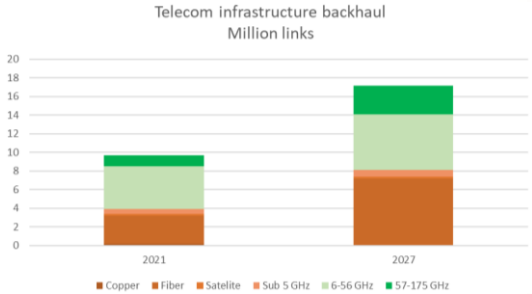
Demand for Data Requires Upgrades to Infrastructure & New Materials

Across Infrastructure: More Data at Higher Speed



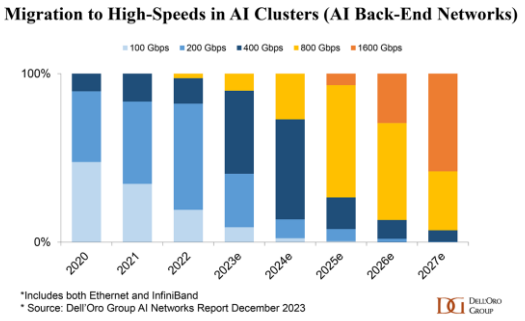
Mobile: Increase 5G

Source: Ericsson mobility report Jun'24



Telecom: Increase Frequency

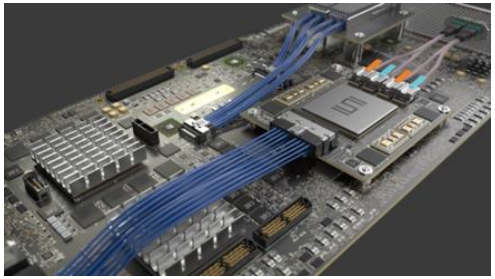
Source: data extracted from GSMA wireless backhaul spectrum report Dec'21

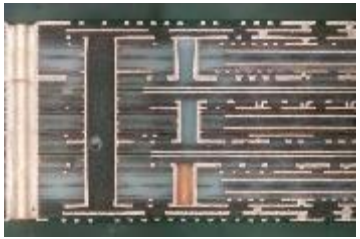


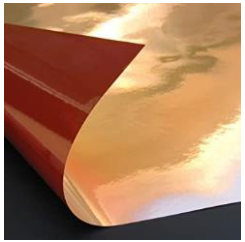
Data Centers: Increase Speed

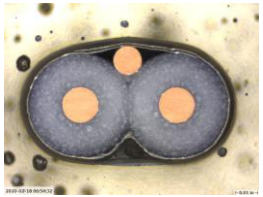
Source: Del'oro Dec'23

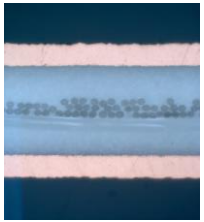
High Speed/High Frequency Applications

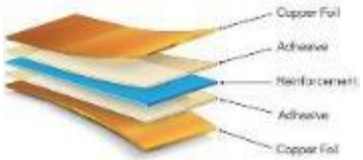


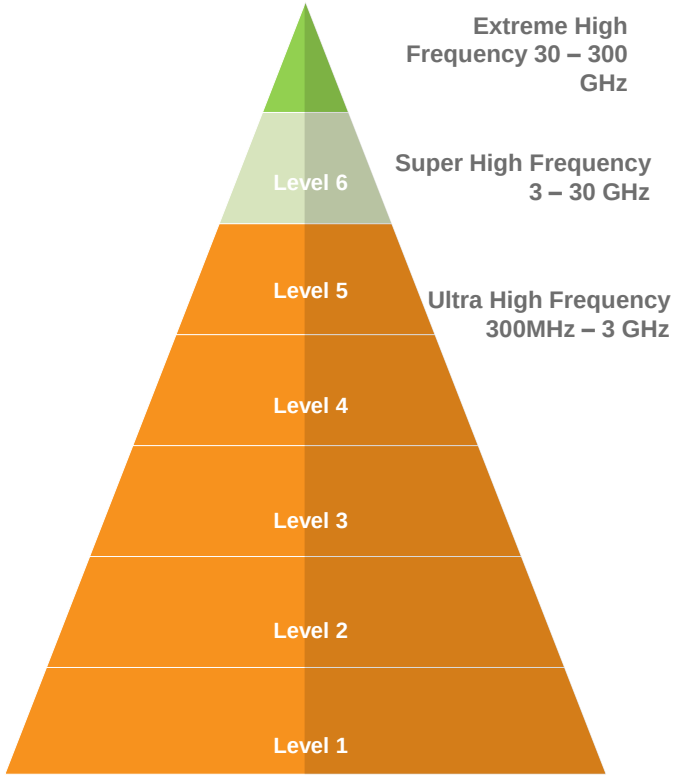












Thank You!

Chemours™