



WIRA SET

WISE Industrial Arena – Sustainable Electrochemical Technology

WISE Dialogue 2024

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redox.me
Centre for
Electrochemical Flow
Systems - CELFS

*Knut and Alice
Wallenberg
Foundation*



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WIRA-SET

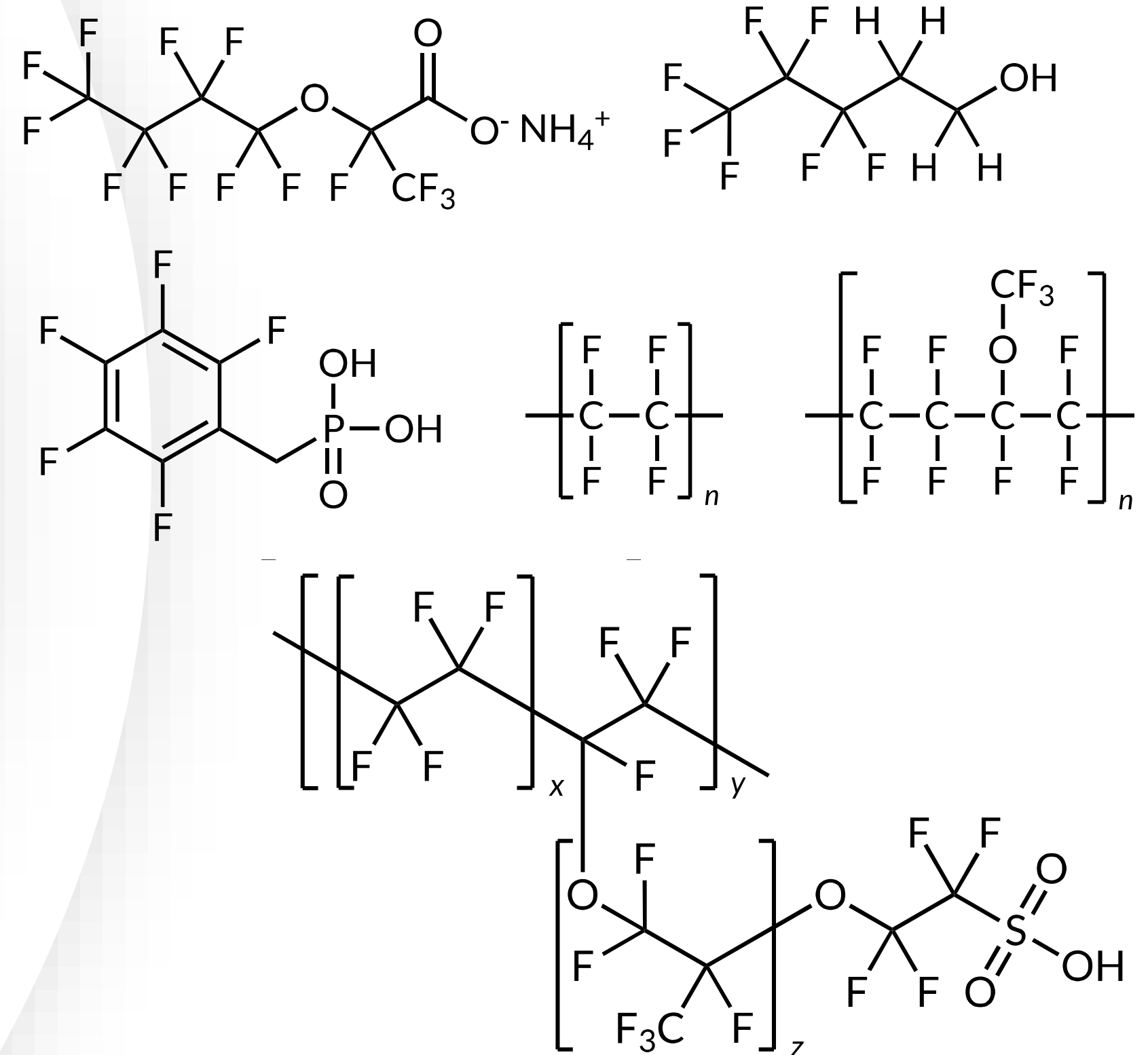
purpose

electrochemical technologies

Replacing PFAS

PFAS – PER and POLYFKUOROAKYL substances

- Per and polyfluoroalkyl substances contain perfluorocarbon moiety $-CF_3$, $-CF_2-$, $>CF-$
- Extremely stable (forever material)
- It is very dangerous to human health and the environment.
- **All PFAS will be, most probably, banned by 2027**



10,000+ compounds

Replacing PFAS



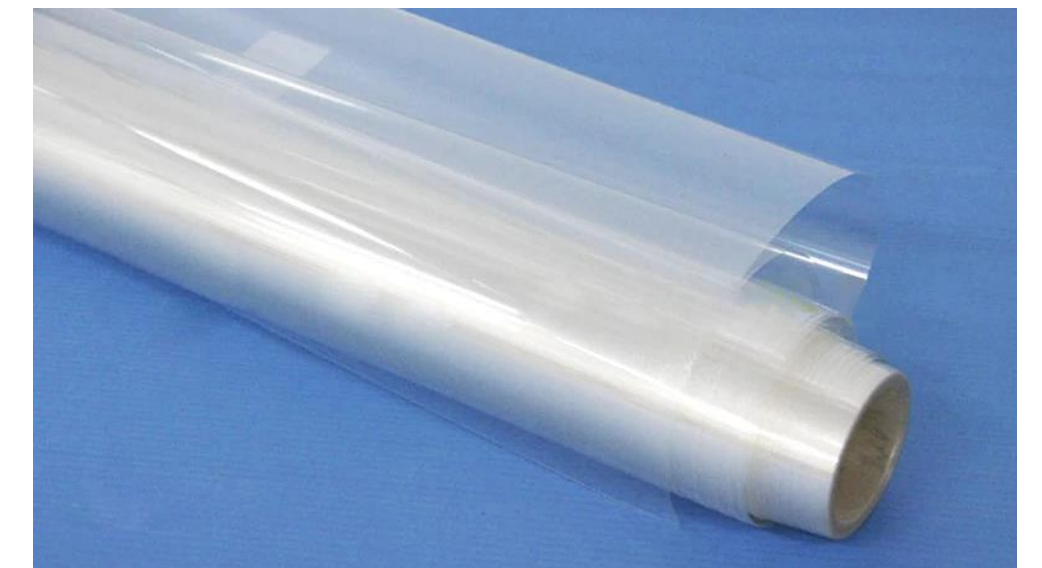
Firefighting Foams



Automotive Components



Food Packaging



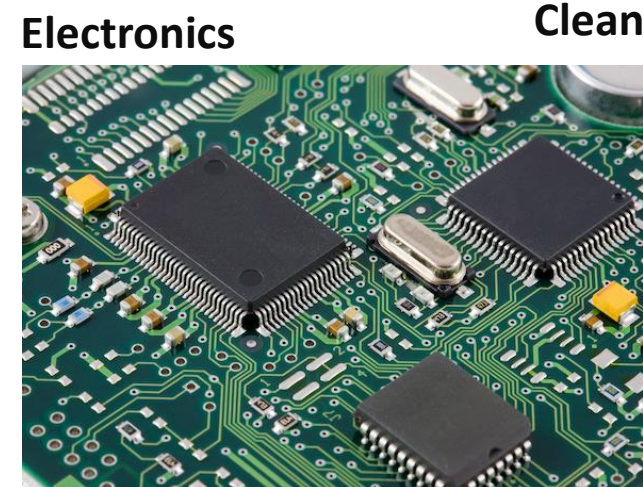
Ion-exchange membranes



Personal Care Products



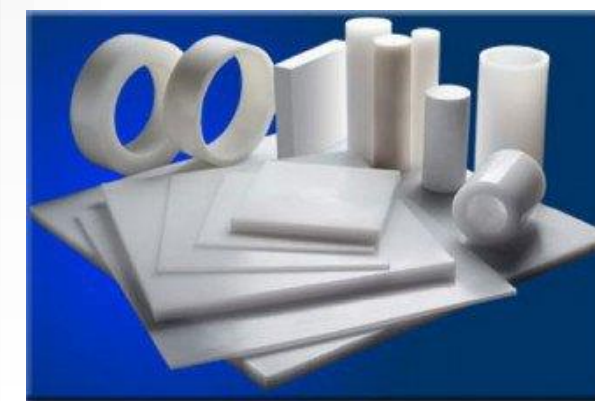
Cleaning Products



Stain-Resistant Fabrics



PTFE parts



FKM/FFKM sealing



PTFE tubing and fittings



Non-stick Cookware



Replacing PFAS



Firefighting Foams



Automotive Components



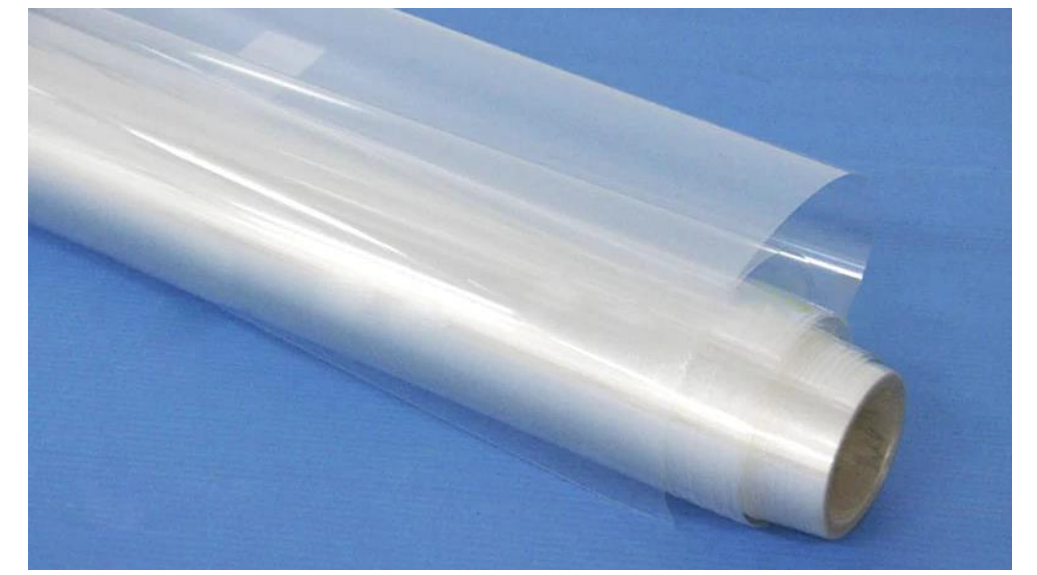
Food Packaging



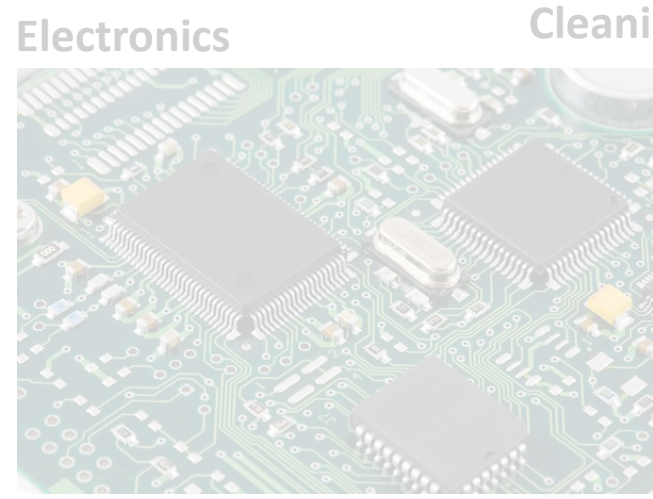
Personal Care Products



Cleaning Products



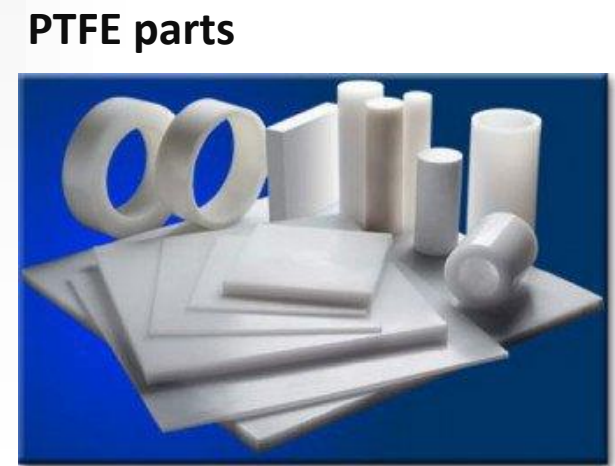
Ion-exchange membranes



Stain-Resistant Fabrics



Non-stick Cookware



PTFE parts



PTFE tubing and fittings

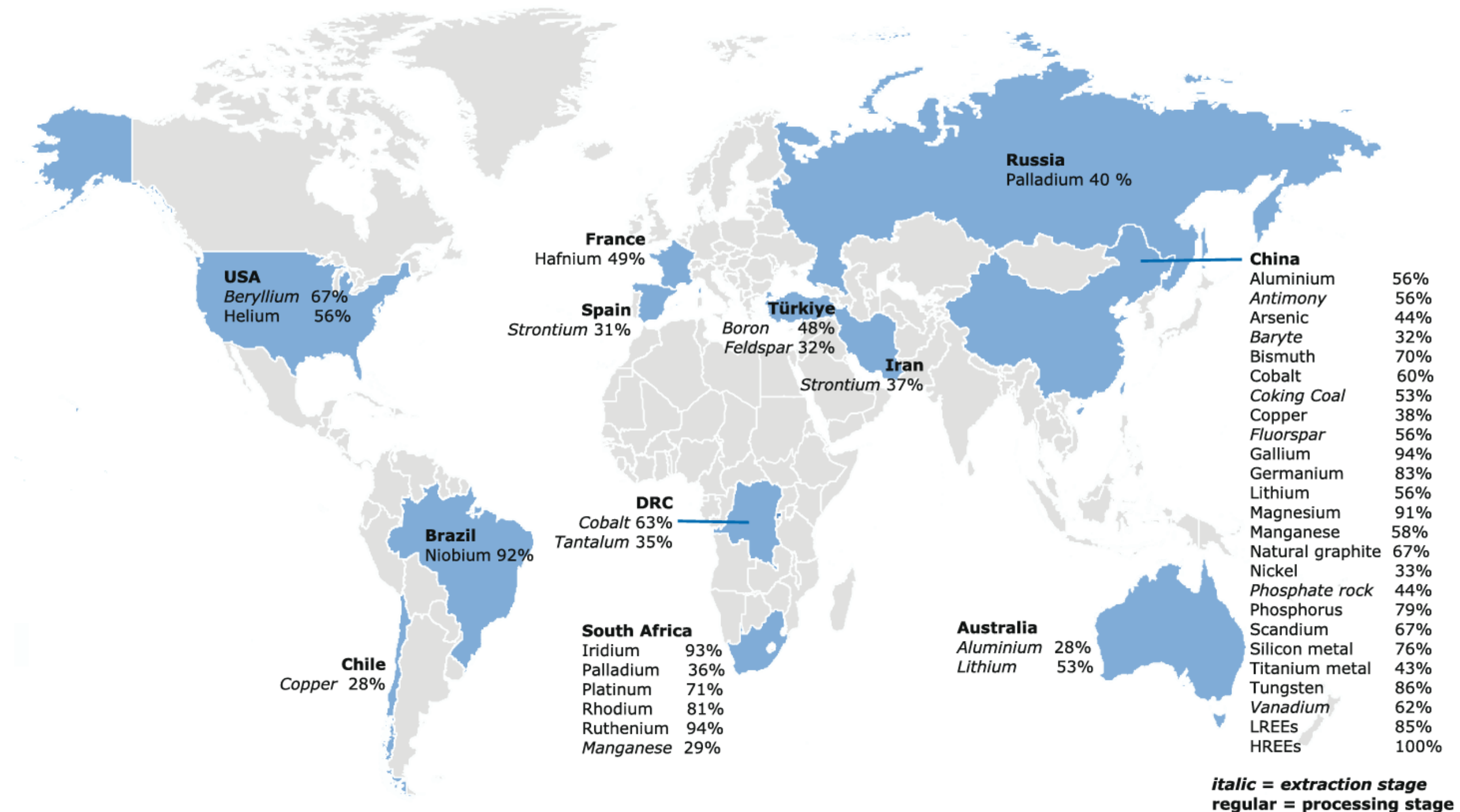


FKM/FFKM sealing

Replacing/minimizing CRM

CRM – Critical Raw Materials

- Economic Importance:** A raw material is considered economically important if it is crucial for the EU's economy and key sectors.
- Supply Risk:** A material is at a high supply risk if there are issues with its availability.



Replacing/minimizing CRM

Critical raw materials 2023			
Aluminium/Bauxite	Copper	Lithium	Scandium
Antimony	Feldspar	Magnesium	Silicon Metal
Arsenic	Fluorspar	Manganese	Strontium
Baryte	Gallium	Natural Graphite	Tantalum
Beryllium	Germanium	Nickel	Titanium
Bismuth	Hafnium	Niobium	Tungsten
Boron/Borate	Heavy Rare Earth Elements (HREE)	Phosphate Rock	Vanadium
Cobalt	Helium	Phosphorus	
Coking Coal	Light Rare Earth Elements (LREE)	Platinum Group Metals (PGM)	

Their unique properties, such as high electrical conductivity, electrocatalytic activity, and chemical stability, make them **irreplaceable** in many current and emerging electrochemical technologies.



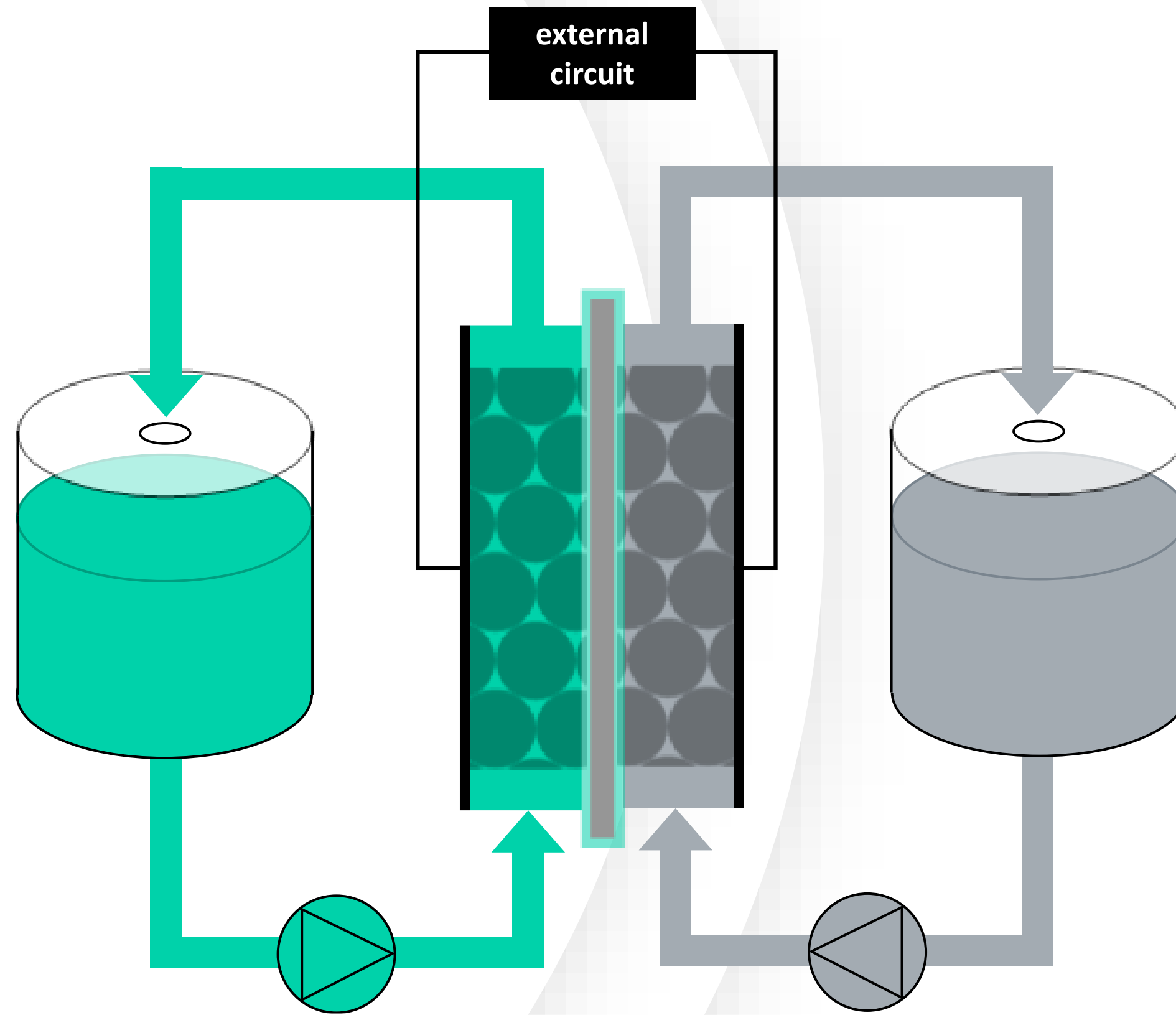
WIRA-SET scope

electrochemical flow systems

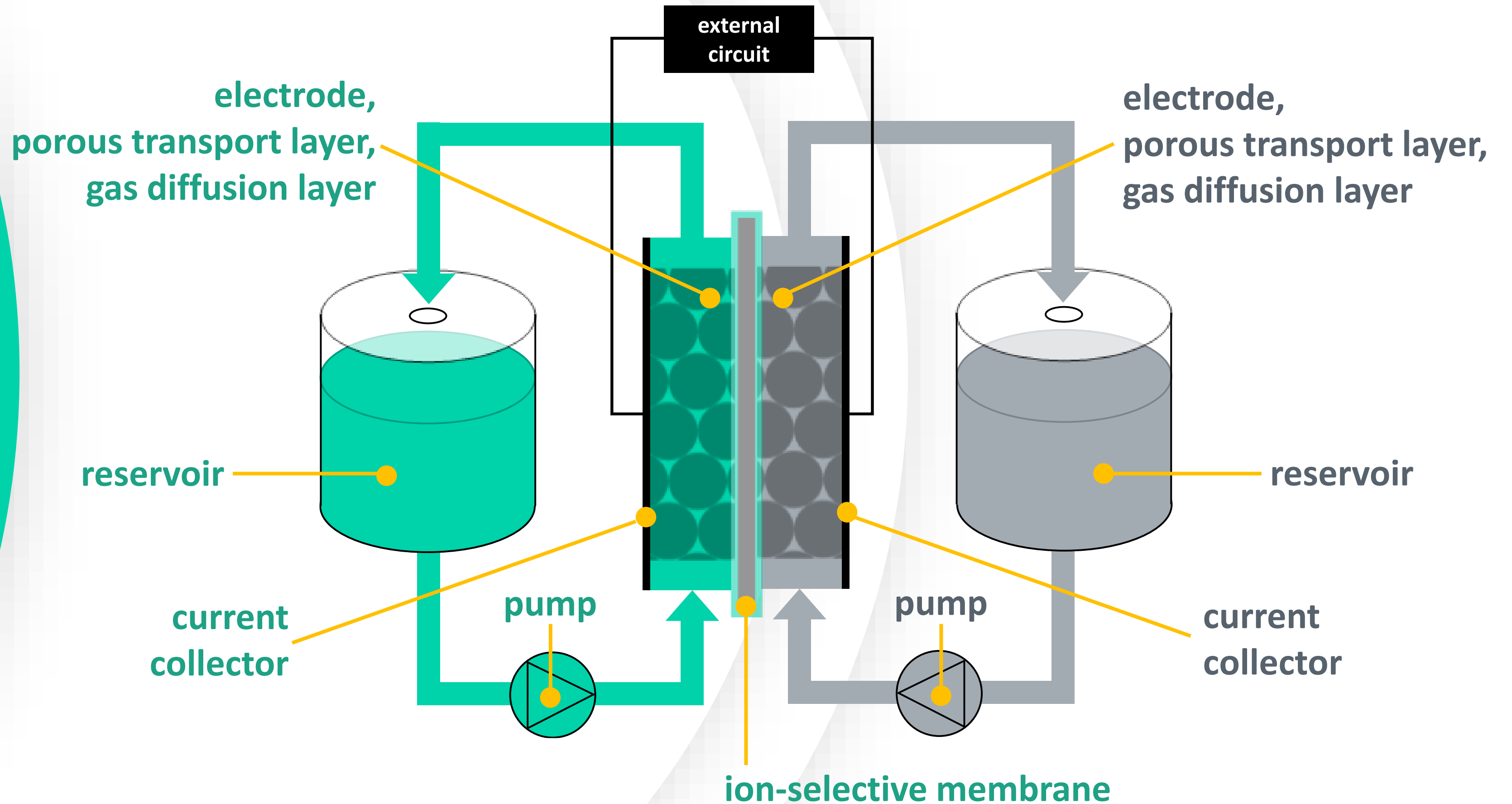
Technology scale-up



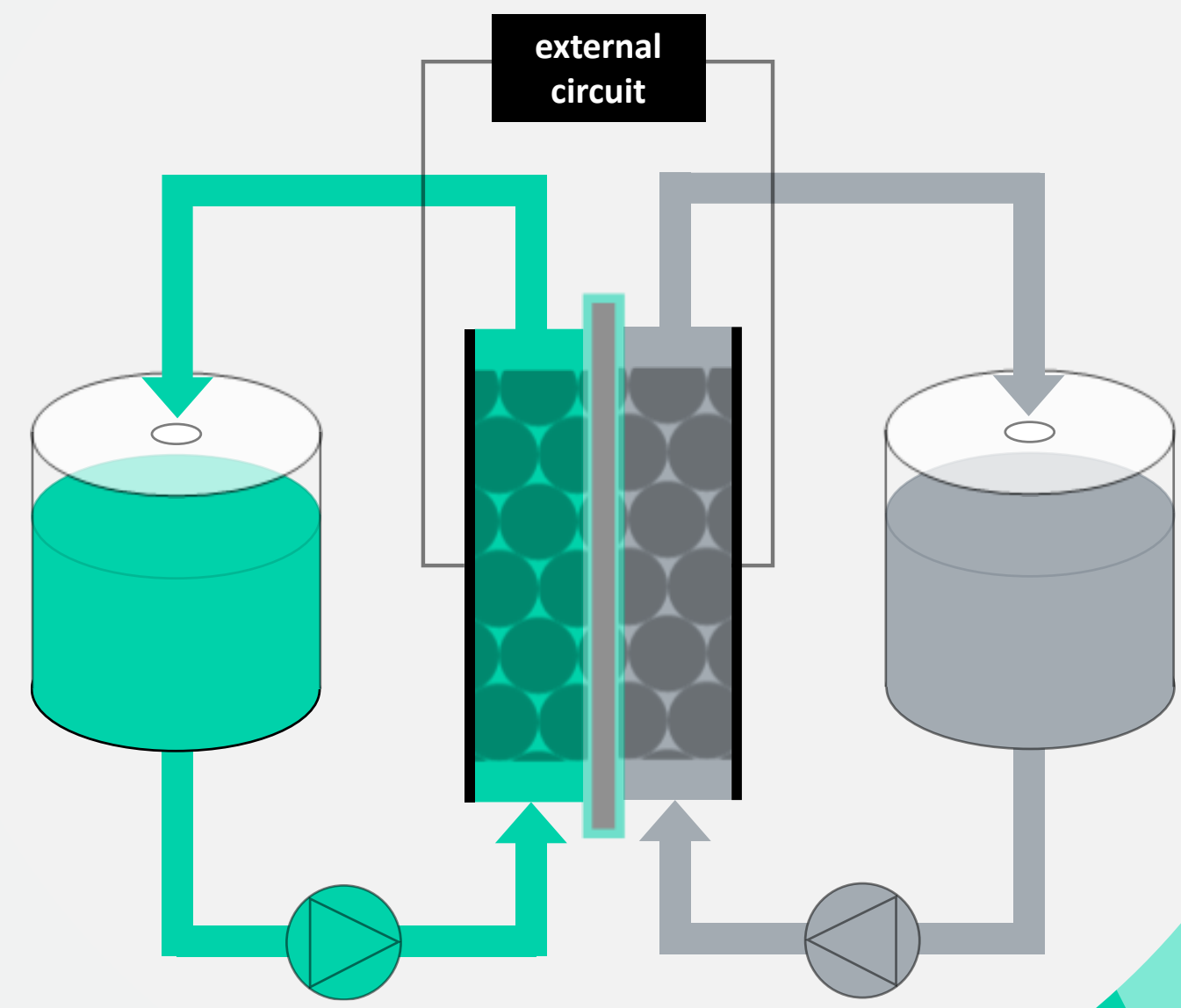
Electrochemical Flow System



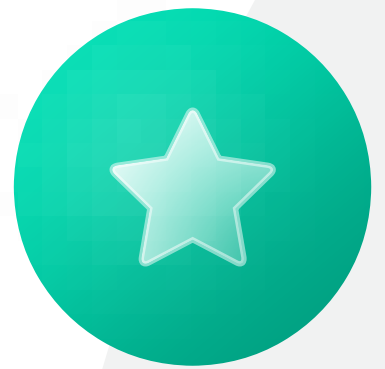
Electrochemical Flow System



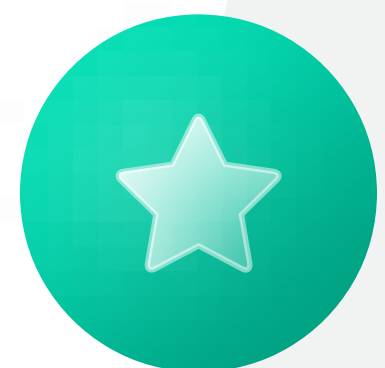
Electrochemical Flow System



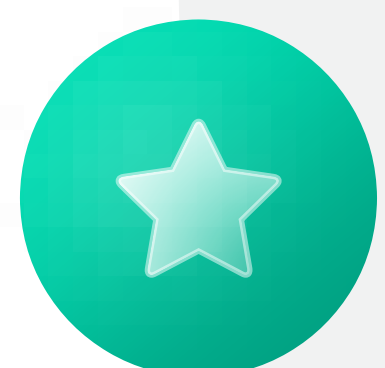
Different electrode materials



Different flow field designs and transport layers



Different current collector materials

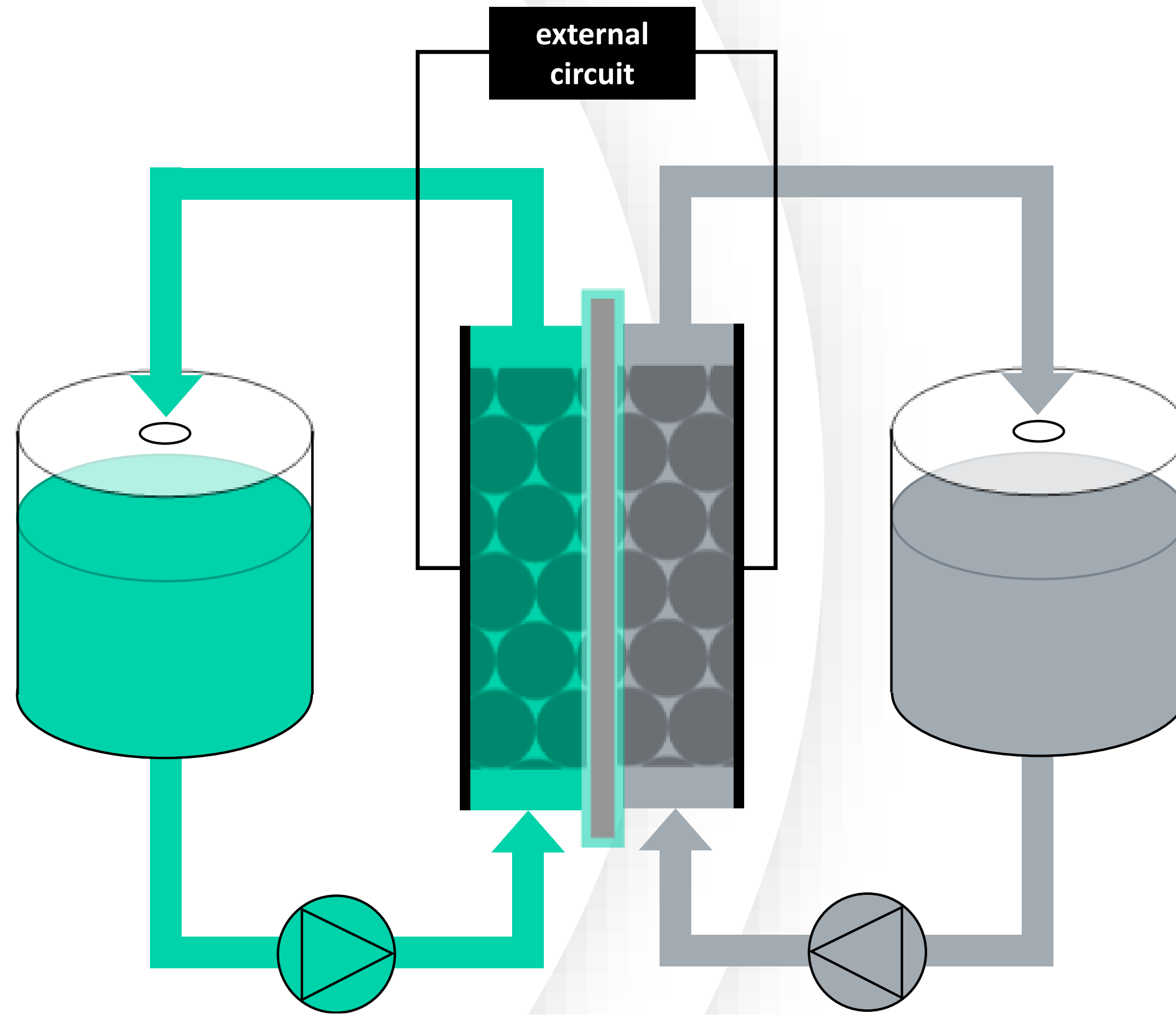


Different operational conditions and procedures

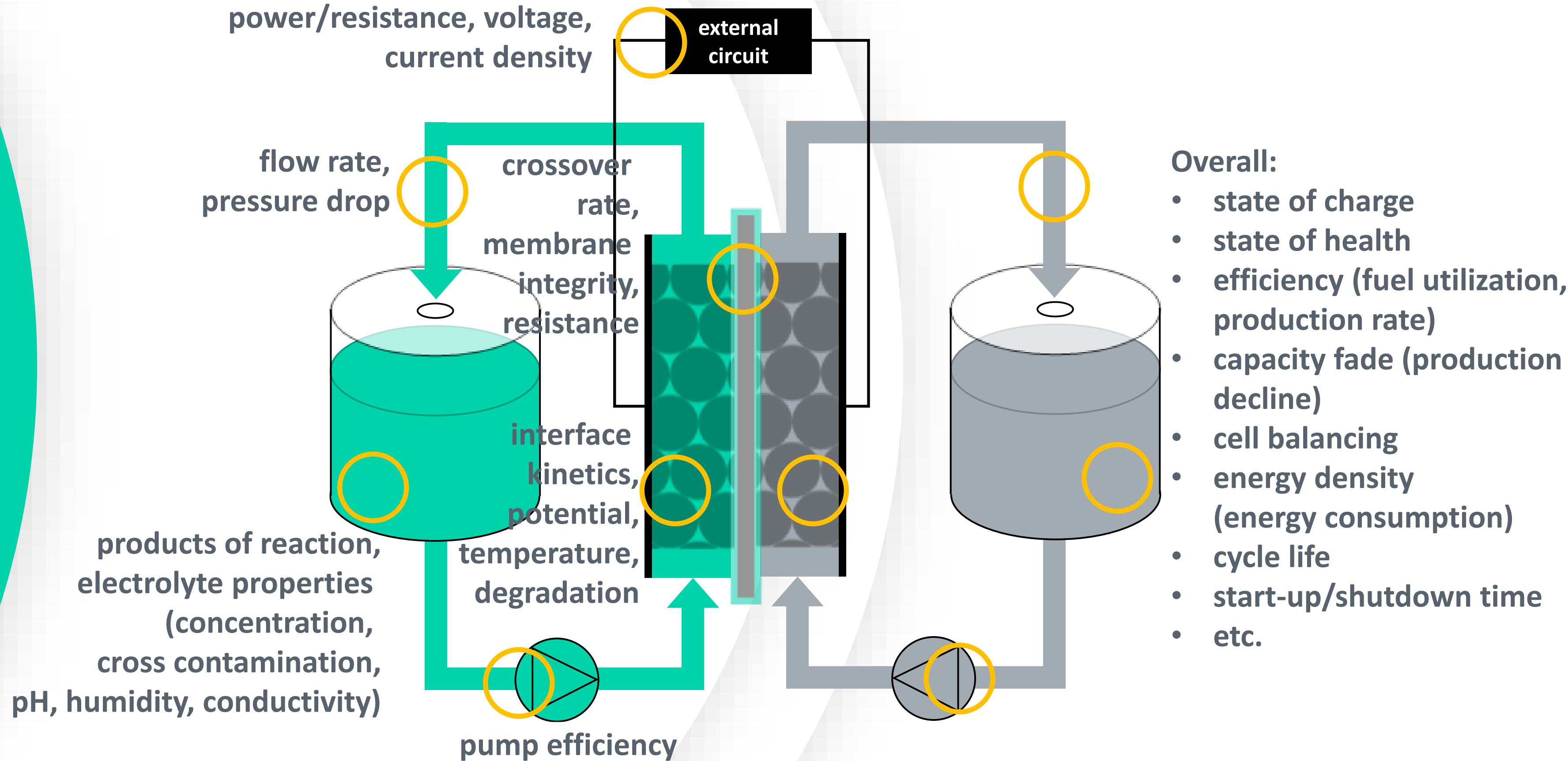


Typically, a non-symmetrical hardware

What can we measure/observe?



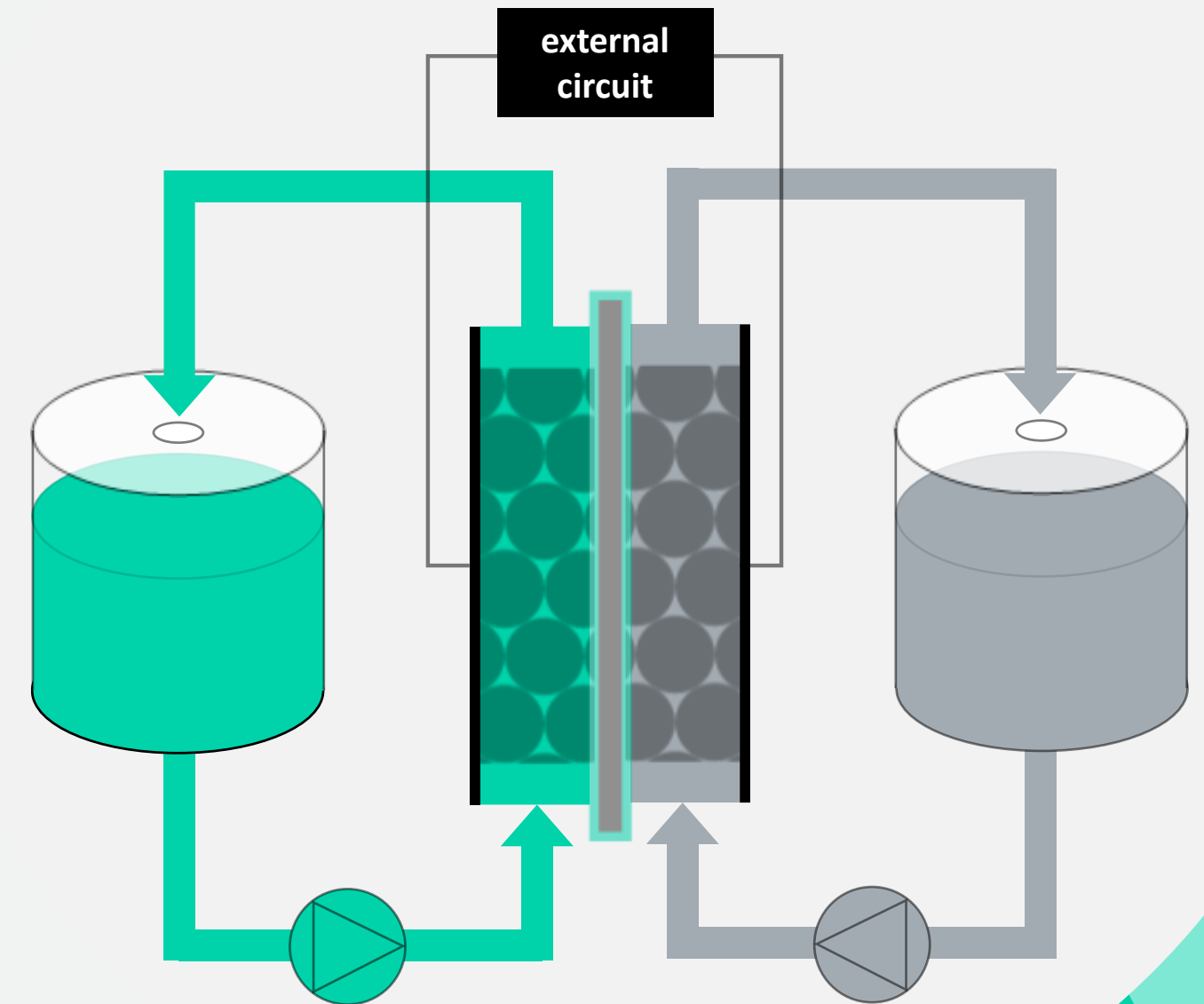
What can we measure/observe?



Why do we monitor these parameters?

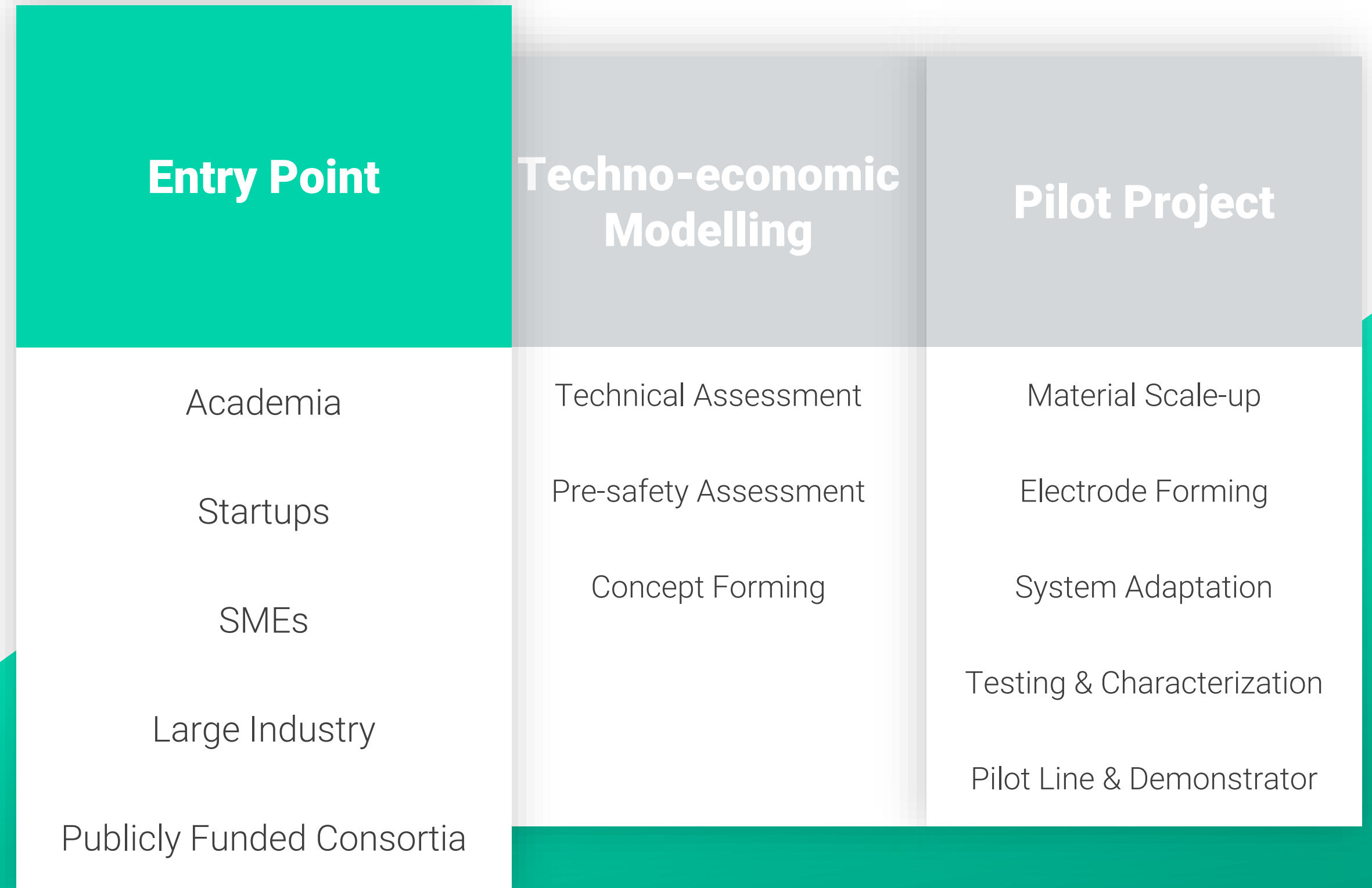
- To generate knowledge
- To identify potential issues early and to ensure safety
- To optimize performance and efficiency
- To ensure the longevity of the system

Electrochemical Flow System



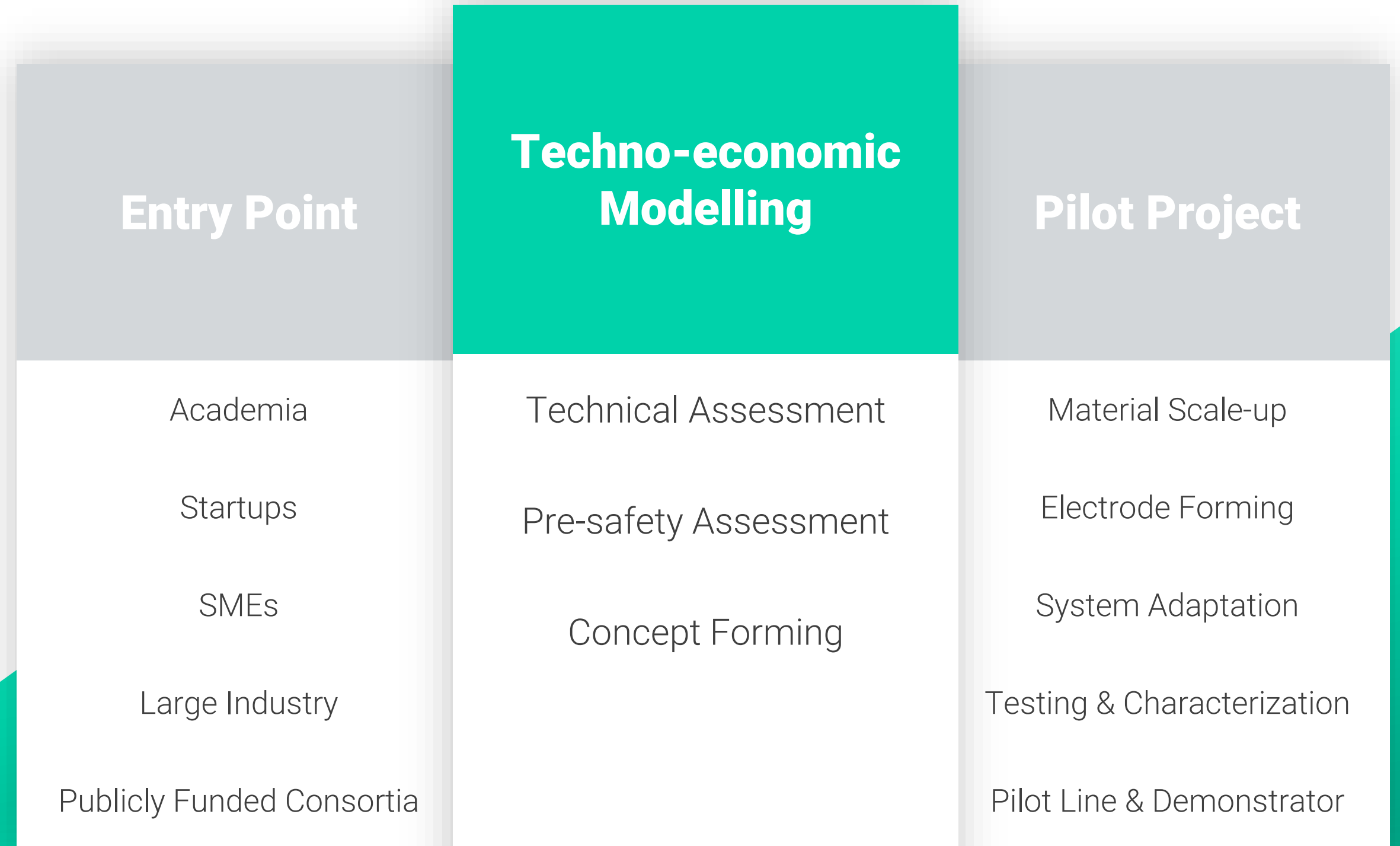
WIRA-SET framework

WISE Researchers and other interested entities are welcome!



WIRA-SET framework

The research project is defined at this stage, and its feasibility is assessed.



WIRA-SET framework

The research project is carried out at the testbed with the support of WIRA-SET team (researches, engineers, CAD designers, etc.)

Entry Point	Techno-economic Modelling	Pilot Project
Academia	Technical Assessment	Material Scale-up
Startups	Pre-safety Assessment	Electrode Forming
SMEs	Concept Forming	System Adaptation
Large Industry		Testing & Characterisation
Publicly Funded Consortia		Pilot Line & Demonstrator

2024

WIRA-SET timeline

Jan -
March

WISE Dialogue 2024
Gothenburg
14th-15th March

April -
June

1st WIRA-SET Workshop for
WISE researchers
(online)

Research projects can now
be submitted

2024

**July –
Sept**

1st WIRA-SET Workshop for
Swedish Industry (online)

Inauguration of WIRA-SET
laboratory at redox.me
**Centre for Electrochemical
Flow Systems**

**Oct –
Dec**

2nd WIRA-SET Workshop for
WISE researchers

2nd WIRA-SET Workshop for
Swedish Industry



WIRA SET

Thank you
find us



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