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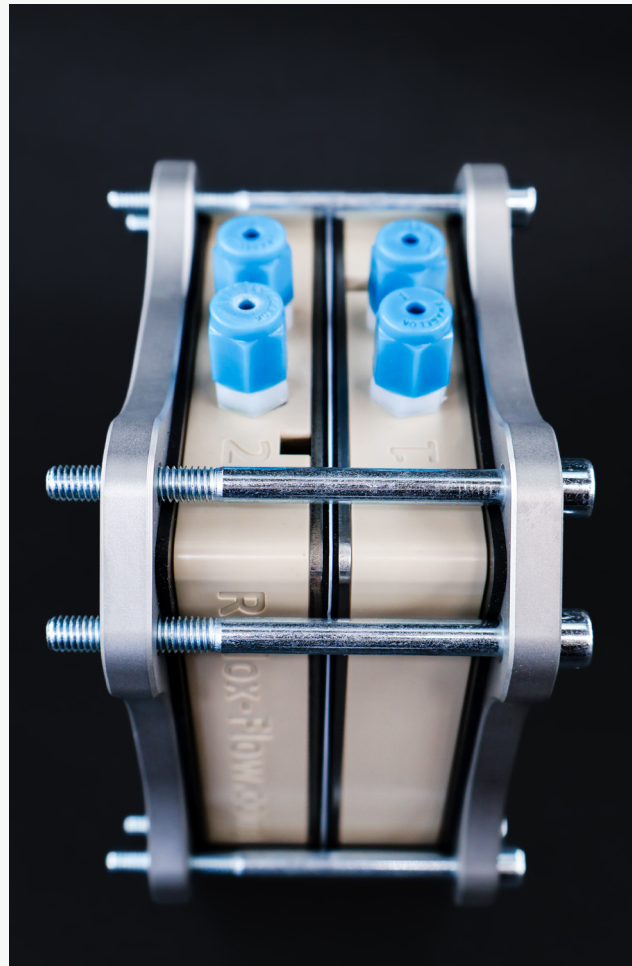
THE X-CELL

FLEXIBLE & MODULAR ELECTROLYSIS
LAB CELL



The Most **Versatile & Modular** Electrolysis Cell for *R&D*

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The X-Cell

The X-Cell is a modular, high-performance flow cell designed for virtually any electrolysis application. From hydrogen production to CO₂ reduction and redox flow batteries, it adapts to your setup — not the other way around.

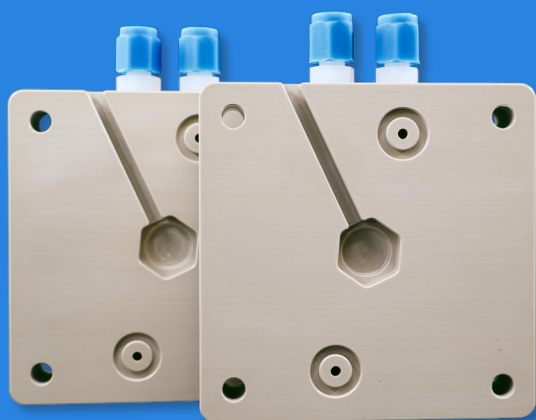
What makes it a great choice for R&D?

- Adapts to any electrode thickness - no restriction on material or format.
- Works with any membrane or separator - from PEM and AEM to alkaline and non-aqueous systems.
- Customizable with interchangeable current collectors - choose flat plates or flow-field designs in a wide range of materials.
- Supports full pH spectrum and high-temperature operation - stable up to 95°C.
- Enables precise temperature monitoring - external temperature control* ensures fast and stable operation.
- Fast assembly and disassembly - modular design reduces setup time.
- High chemical resistance - minimizes leaching and prevents catalyst poisoning.
- Available in standard active areas (2.5 × 2.5 cm and 5 × 5 cm) - with options for customization.
- Optimized for high electrochemical performance - designed to deliver reliable, reproducible results across applications.

Explore the most versatile electrochemical flow cell on the market.

* External temperature control needed

Components & Configuration



Flow Bodies

Material: PEEK or PTFE

Ensures minimal contamination.

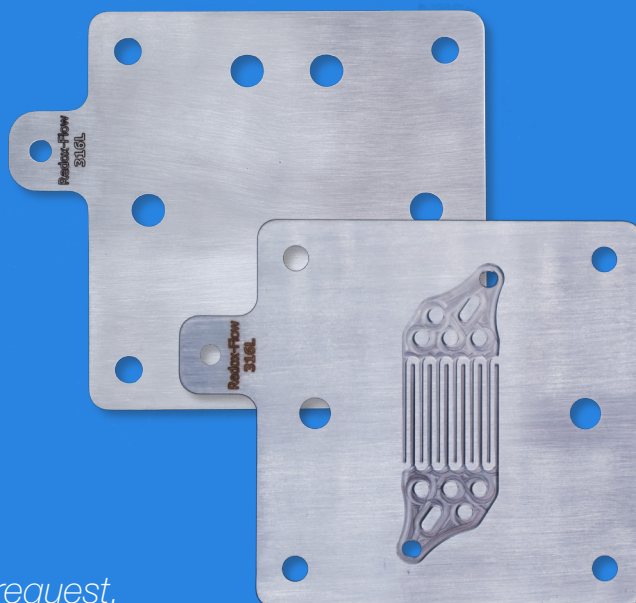
Anode and cathode current collectors

2.5 x 2.5 cm, 5 x 5 cm, or no flow field area

Interdigitated or serpentine pattern

Nickel, stainless steel (316L), titanium,
copper, platinum-coated titanium, or
gold-coated titanium

Custom materials and dimensions on request.





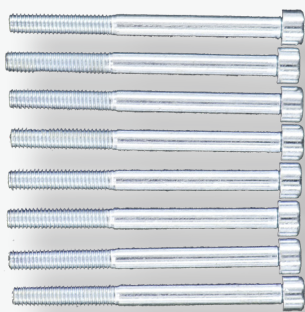
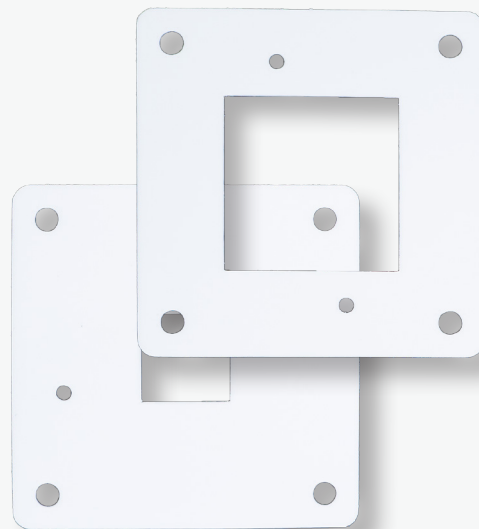
THE X-CELL

Cover gaskets

Material: VITON, EPDM, PTFE

Active area: 2.5 x 2.5 cm, 5 x 5 cm

Thickness: 0.05 mm, 0.1 mm, 0.25 mm,
0.5 mm, 1 mm



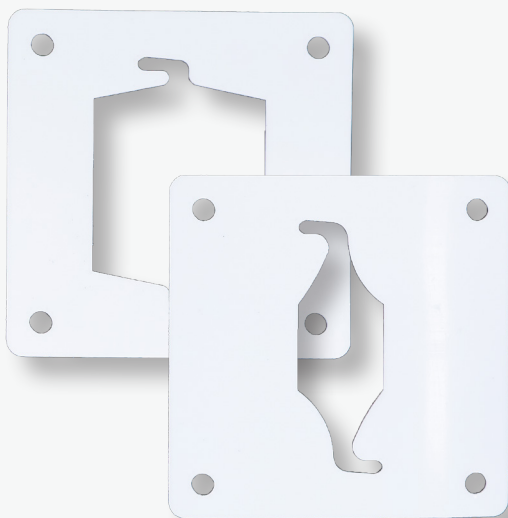
M6 Bolts

Standard: 7 cm & 8 cm

Lengths up to 18 cm available

Alignment bars

For ensuring exact cell alignment
with every reassembly



Flow field gaskets

Material: VITON, EPDM, PTFE

Active area: 2.5 x 2.5 cm, 5 x 5 cm

Thickness: 0.25 mm, 0.5 mm, 1 mm,
1.5 mm, 2 mm



About the cell

Modular Electrolysis Cell for Versatile Flow Applications

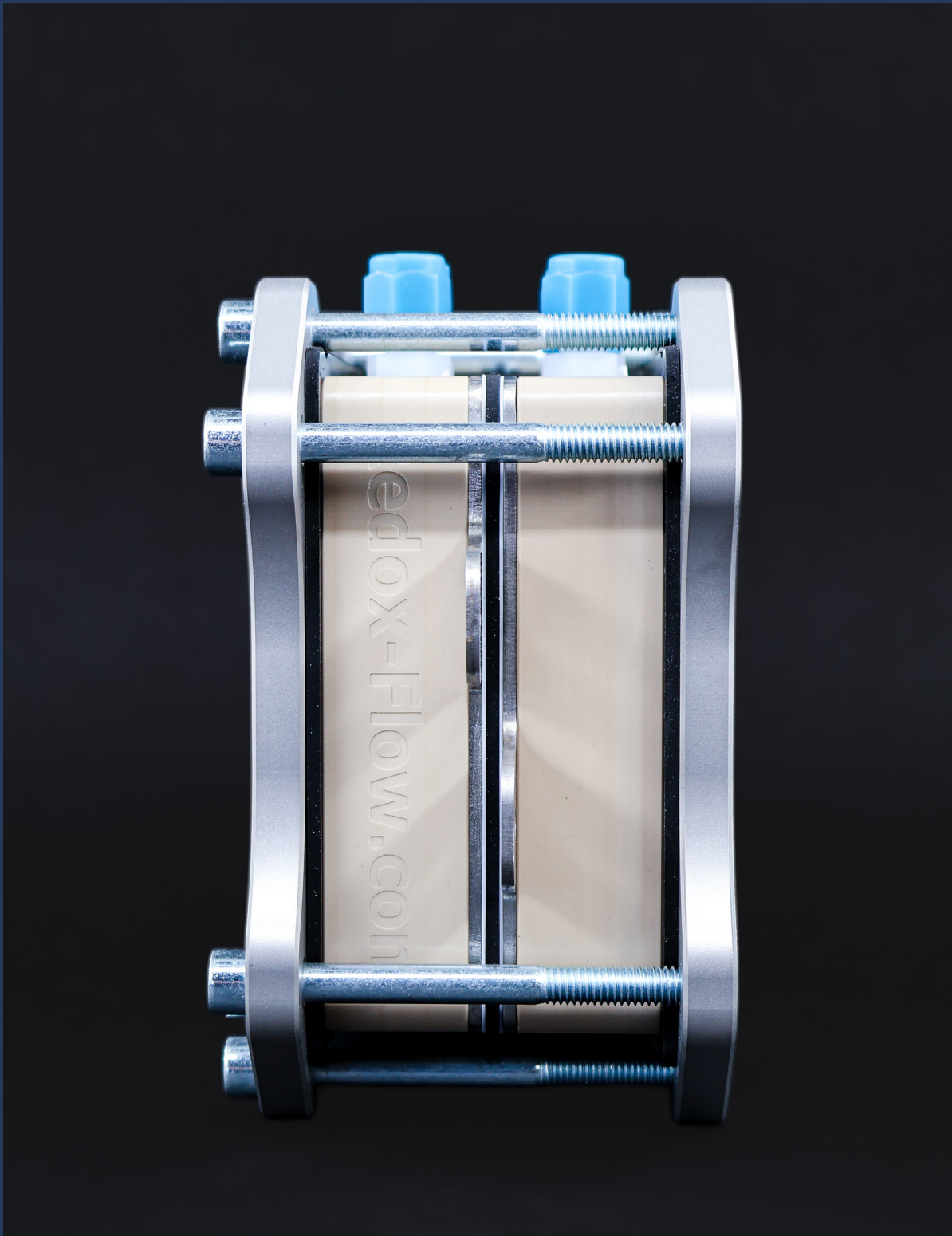
The X-Cell is a fully modular, high-performance electrolysis cell designed for a wide range of flow-based electrochemical applications. It is ideally suited for research and development, where flexibility, chemical compatibility, and ease of reconfiguration are critical. The platform allows researchers to adapt the setup to specific experiments without switching to a new cell. It is also fully compatible with our other electrochemical flow cells, such as the S-Cell and A-Cell.

Key Features and Flexibility

- *Fully modular design* - easily swap or customize components for different experiments.
- *Interchangeable current collectors* - available as flat plates or flow-field designs in nickel, stainless steel, titanium, copper, platinum-coated titanium, gold-coated titanium, or custom materials.
- *Integrated temperature monitoring* - embedded sensor ports provide accurate, real-time readings.
- *Broad chemical compatibility* - corrosion-resistant polymers minimize contamination and ensure stable performance.
- *Full pH and temperature range* - operates reliably across the entire pH spectrum and up to 95 °C.
- *Reference electrode compatibility* - optional Luggin capillary ports enable true three-electrode measurements.
- *Superior material selection* - only corrosion-resistant, low-impurity materials are in contact with the electrolyte, preserving catalyst and electrode integrity.
- *Customizable and upgradeable* - additional gaskets and modules allow conversion for new applications without replacing the entire cell.

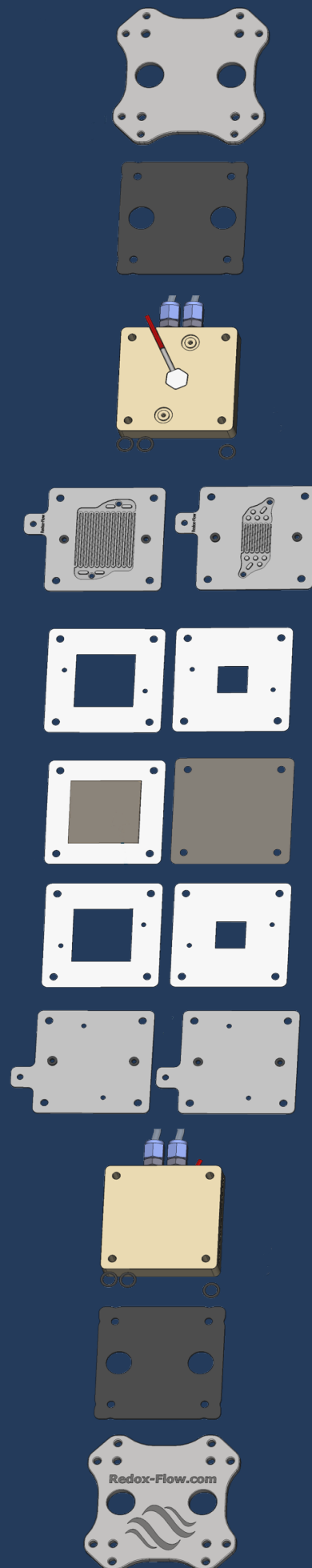


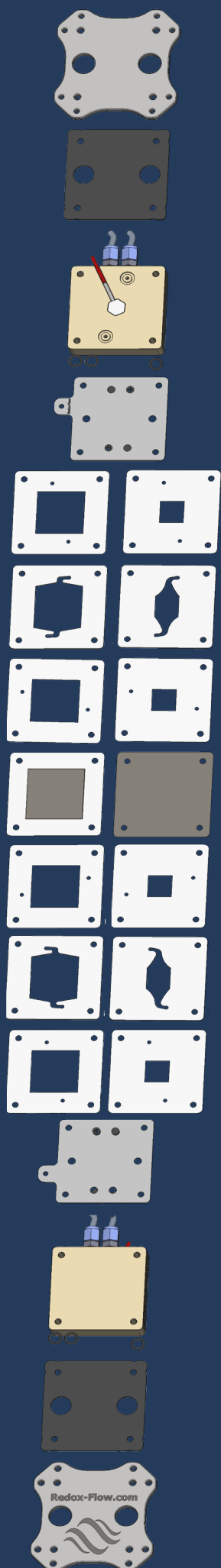
THE X-CELL



Gasket configuration using current collectors **with flow field**

Simple gasket configuration limits risks of leakage. Ideal for thin electrodes and prefabricated MEAs.





Gasket configuration using **flat** current collectors

Both flow-field and cover gaskets are required. Cover gaskets are used to fine-tune the total thickness, matching the electrode thickness. Ideal for thick porous electrodes and multilayer electrodes, GDL, and MPL.



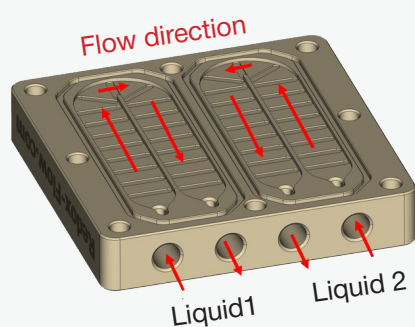
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Temperature control

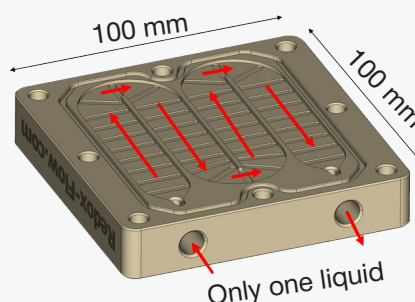
Temperature Control Unit

This system can be used in combination with a dedicated temperature control setup based on a flow heat exchanger principle. To the best of our knowledge, similar products cannot be found by any other companies in the field.

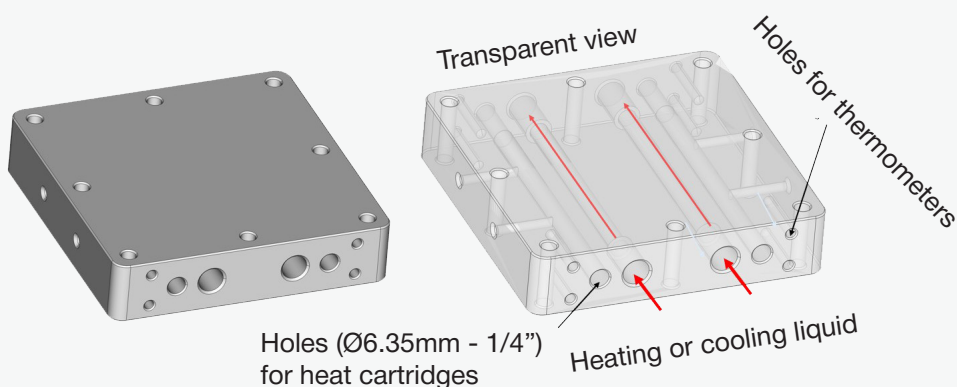
PEEK flow body variant



PEEK flow body variant 2



Metal heating/cooling block

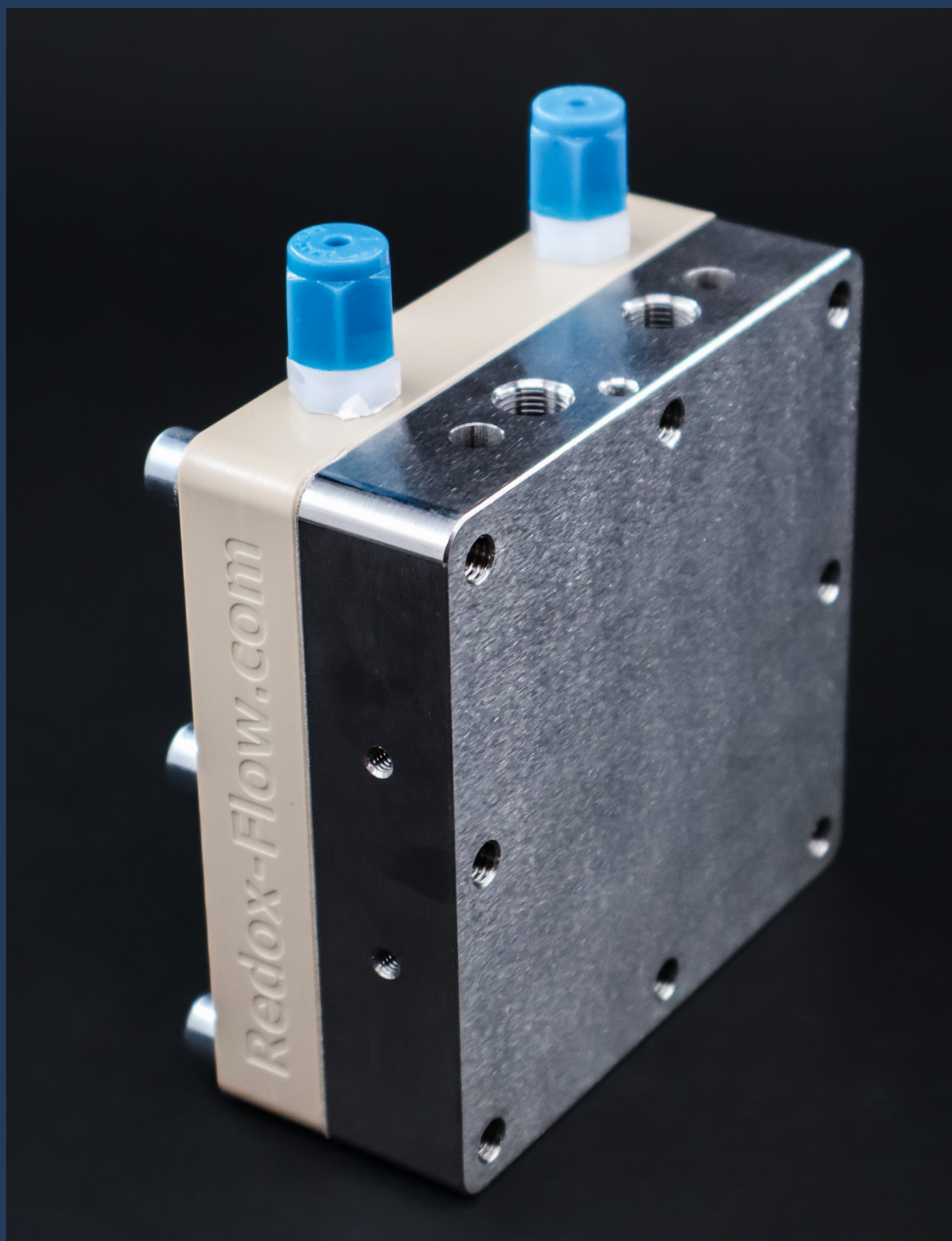


Our solution comes as three different configurations that are based on the same components and can be interchanged. All options are based on a PEEK flow body and metal block shown above. The PEEK body contains one (variant 1) or two separate (variant 2) flow chambers for heating/cooling one or two independent liquids, respectively. The liquids in the experimental setup are circulated through the PEEK flow body and placed up against a metal heating/cooling plate, whereby heat is transferred to or from the liquids in the PEEK flow body. The metal plate is separated from the liquids by a thin PTFE sheet, whereby corrosive/oxidative solutions also can be heated without corroding the metal plate.

Besides the possibility for placing the metal block on a heating plate, it also comes with holes for heat cartridges, cooling liquids, and thermometers.



THE X-CELL



Accessories



Inline Pressure Unit

Differential Pressure Measurement Unit.

- Compact, inline design for direct differential pressure measurement
- Monitor hydraulic resistance of electrodes with high accuracy
- Integrated temperature sensing for added diagnostics
- Built from chemically highly resistant materials



Open Circuit Voltage Cell

Reference Cell For OCV & Potential Monitoring.

- For accurate anode/cathode potential measurement
- Multifunctional design for OCV and overpotential studies
- Easy integration into existing setups with internal reference electrolyte chamber
- Durable graphite flow bodies ensure chemical resistance and stability



UV/VIS Flow Cell

UV/VIS Fiber Optical Flow-Cell.

- Adjustable optical path length (0.05–8 mm) for maximum flexibility
- Supports high flow rates (>100 ml/min) with minimal pressure loss from unique design with hydraulic bypass
- Connects with standard fiber based spectrometers using SMA 905 connectors



Flow-through electrode holder

Inline Reference Potential Measurement Unit.

- Fits a wide range of electrode diameters (3–17 mm)
- Durable, chemically resistant construction
- Measures e.g. pH, ORP, or reference potential.

Variants



The X-Cell

Fully modular design with
Interchangeable current collectors
Designed for high chemical resistance
Minimal leaching or catalyst poisoning
Suitable for operation at elevated temperatures (up to 90 °C)
Compatible with both ion exchange membranes and porous separators

The X-Cell with 3 or 4 compartments

Variable compartment thickness, determined by gaskets
Can be supplied with current collectors (flow field or 'flat surface')
Material choices are large, can fit almost any chemistry
Application areas: Electrodialysis,
Electrochemical CO₂ reduction



The X-Cell with ports for reference electrodes

Reference electrode measurements inside cell via Luggin Capillary
Reference electrodes are placed outside cell
The cell can be operated at high temperatures
Four ports for connection of up to three reference electrodes

Application Areas

The X-Cell supports a broad range of electrochemical processes, including:

- Alkaline water electrolysis
- PEM and AEM water electrolysis
- CO₂ electrolysis and electrochemical reduction
- Electrochemical metal recovery and refining
- Desalination and ion removal
- Organic electrosynthesis and non-aqueous systems
- Electrodialysis
- Redox flow battery testing

Technical Specifications

Active Area: 2.5cm x 2.5cm and 5cm x 5cm

Current collectors with and without flow field – any electrode thicknesses

Main flow body is machined in highly corrosion resistant PEEK

Can be operated up to 95°C

Full pH range – depending on current collector and gasket materials

Standard materials for current collectors: nickel, stainless steel, titanium, copper,
platinum-coated titanium, gold-coated titanium

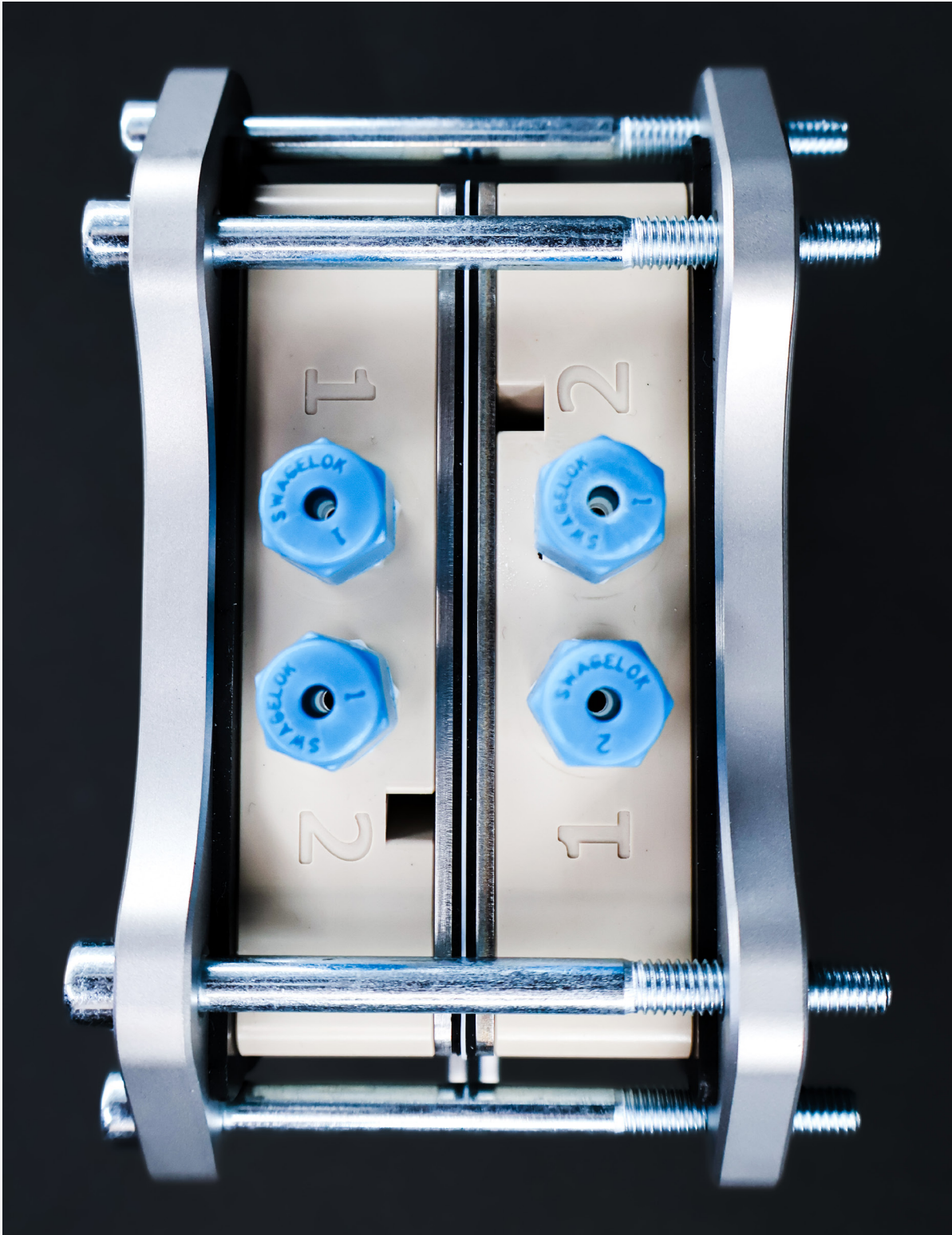
Swagelok fittings for tight connecting to 1/8" tubing

Gasket materials: PTFE, EPDM or VITON

We accommodate custom requests for active area sizes, materials for current collectors, and tubing dimensions. For this, submit a request on www.redox-flow.com.



THE X-CELL

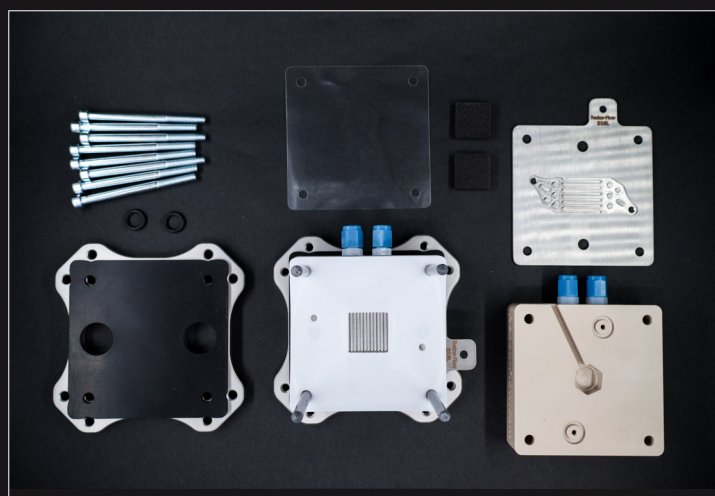
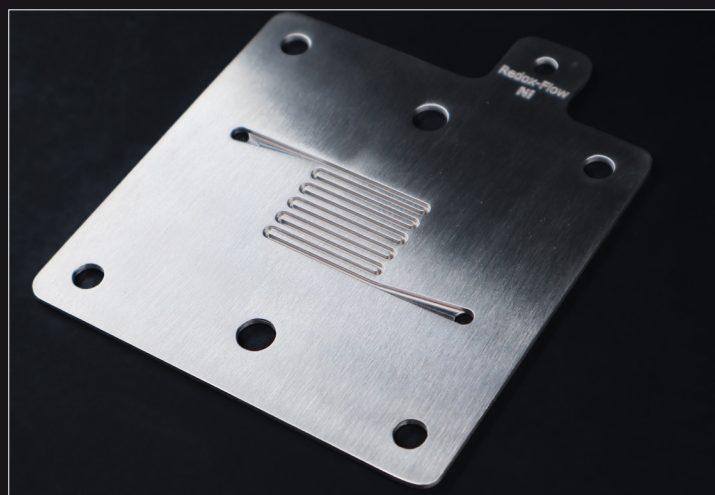


REDOX FLOW

Our Solutions

Born from PhD project that identified *the need for modular design* in flow cell R&D, we've grown in five years into a startup with *over 1,000 customers worldwide.*

WWW.REDOX-FLOW.COM



Custom

Electrochemical research is constantly evolving — and so are we. Whether you want to test a new material, explore a novel geometry, or build something entirely from scratch, we're here to help. Serpentine flow fields, BMED cell designs, custom gasket shapes — these are just a few of the projects we've taken on over the years. From small design tweaks to full custom builds, we've got you covered.

THE X-CELL

One-Stop

We sell Complete Flow Battery Setups — including the flow cell, pump, hydraulic connection pack, battery control unit, and all the fittings and gaskets needed for a classic R&D setup. Everything arrives ready to run, so you can skip the sourcing headaches and get straight to experimentation. If you're looking for an out-of-the-box solution, this is the easy choice.

Modular & Scalable

Our flow cells are built to be flexible and upgradeable. Parts are compatible across our entire cell range, so switching to a completely different chemistry is as simple as swapping a few components — no need for a new cell. Assembly and disassembly are equally straightforward, giving you the freedom to experiment as your research demands. Add extra parts to upgrade a single cell into a stack, or order replacement flow bodies and gaskets for electrode and membrane testing. One cell really can do a lot.

REDOX FLOW

Redox Flow[®] Family

X-Stack

X-Cell

X-Cell with ports for
reference electrodes

THE X-CELL

S-Stack

A-Cell



M-Cell

S-Cell



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Any questions?
We're happy to hear from you.



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