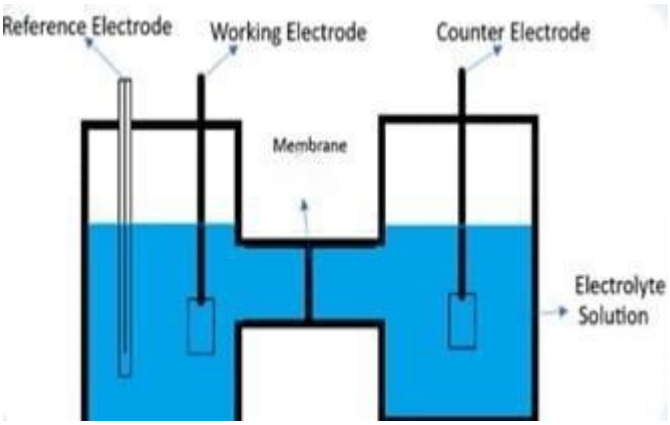
EC Manual H–Cell

BASi

Reach Your Potential

H-cell is a dual-compartment cell that is mainly designed for electrochemically characterizing a membrane or any kind of separator in a liquid medium. The typical characterizations include measurement of selectivity, cross-over, resistance, and conductivity. H-cells are used alongside electrochemistry in various situations where it's important to keep the working electrode separate from the counter electrode.



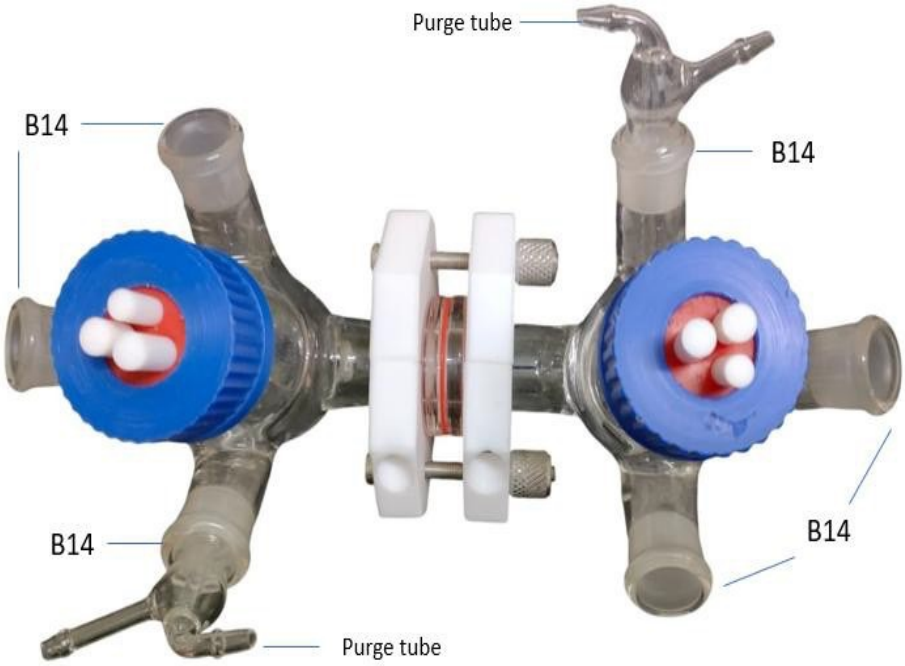
ELECTROCHEMICAL H–CELL

The H-Cell is a two-compartment electrochemical cell used for membrane testing, H, permeation, or any other experiment where two separate electrode chambers are required.

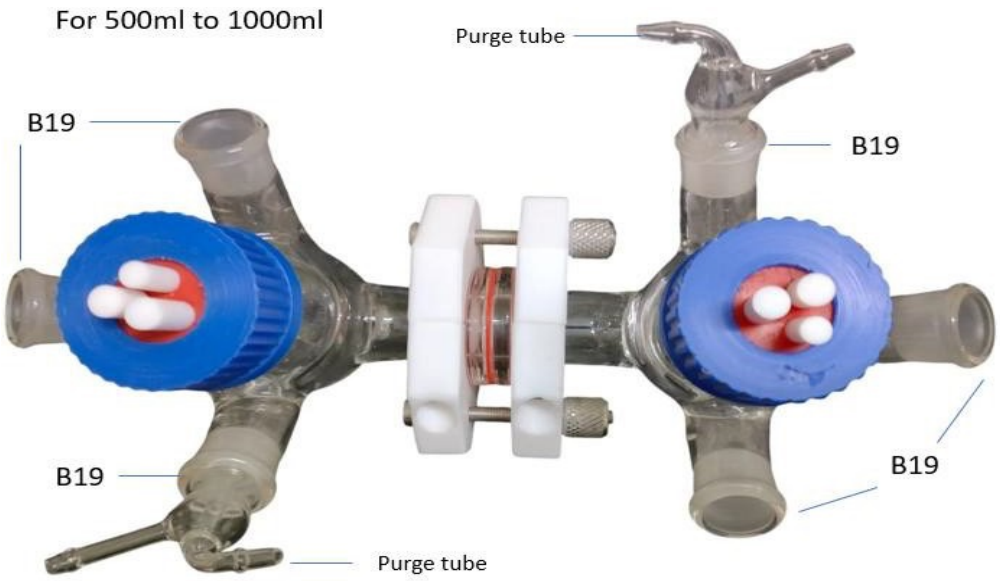
Both compartments can be separated by an ion-exchange membrane. Thus, any byproduct generated at the counter electrode does not affect the working electrode's behavior and vice versa.

The design allows a gas-tight setup. Each chamber is equipped with three glass joints for gas-purging or adding electrodes or sensors. The H-cell is available in different sizes, ranging from 25 mL up to 1 L for each compartment cell.

FOR 25ML TO 250ML



FOR 500ML TO 1000ML



TECHNICAL SPECIFICATIONS

Includes	EC H-Cell 25ml	EC H-Cell 50ml	EC H-Cell 100ml	EC H-Cell 250ml	EC H-Cell 500ml	EC H-Cell 1000ml	Images
Glass Reservoir With 3 side port	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	
Spacer (silicon) ID 0.63 inch, OD 1.4 inch, 0.04-inch-thick (ID 16mm, OD 35mm, 1mm thick)	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	
Screw (SS 304)	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	
Grip Nut (SS 316)	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	
Purger (Glass)	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	
Teflon Support for holder (PTFE)	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	

TECHNICAL SPECIFICATIONS

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Top Dummy (silicon)	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	
Top Dummy 3 hole (silicon)	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	02 Nos	
Plugs Dummy (Teflon)	06 Nos	06 Nos	06 Nos	06 Nos	06 Nos	06 Nos	
Silicon tube 0.5m (ID 0.12 inch (ID 3mm)	04 Nos	04 Nos	04 Nos	04 Nos	04 Nos	04 Nos	
Lugging Capillary for Reference Electrode	-	-	-	-	01 No B19	01 No B19	
Silicon septa with 4mm hole (03 Nos and without hole (03 Nos)	06 Nos B14 septa	06 Nos B14 septa	06 Nos B14 septa	06 Nos B14 septa	06 Nos B14 septa	06 Nos B14 septa	

APPLICATIONS

1. ELECTROCATALYSIS AND ELECTROCHEMICAL KINETICS:

> Used for studying catalyst performance in oxygen reduction (ORR), hydrogen evolution (HER), and CO_2 reduction (CO_2RR).
> Helps in analyzing reaction mechanisms by isolating oxidation and reduction reactions.

2. BATTERY AND FUEL CELL RESEARCH

> Redox flow batteries (RFBs): H-Cells are used to test new electrolyte materials and electrodes.
> Fuel cells: Evaluation of electrocatalysts and their efficiency in reactions like hydrogen oxidation and oxygen reduction.

3. ELECTROCHEMICAL WATER SPLITTING (HYDROGEN & OXYGEN EVOLUTION REACTIONS - HER & OER)

> Investigates materials for hydrogen production by electrolysis.
> Allows separate collection of gases generated at the anode and cathode.

4. CO_2 REDUCTION REACTION (CO_2RR) & GREEN ENERGY RESEARCH

> Used in carbon capture and conversion, studying catalysts that convert CO_2 into valuable chemicals like CO, methanol, and ethylene.
> The divided cell design prevents unwanted crossover of reaction products.

5. ELECTROCHEMICAL SENSING AND BIOSENSORS

> Development of sensors for detecting pollutants, heavy metals, and biomolecules.
> Helps in precise measurement of electrochemical signals without interference.

6. CORROSION STUDIES

> Analysis of corrosion rates and protective coatings in different environments.
> Used to understand electrochemical reactions that cause metal degradation.

7. MICROBIAL ELECTROCHEMICAL SYSTEMS (MICROBIAL FUEL CELLS & ELECTROLYSIS CELLS - MFCS & MECS)

> Used in wastewater treatment and bioelectricity generation.
> Allows the study of electron transfer mechanisms in bacteria.

8. ORGANIC ELECTROSYNTHESIS

> Used to synthesize organic compounds via electrochemical reactions.
> Helps in designing sustainable green chemistry processes.

SETUP FOR H-CELL EXPERIMENT

> H-Cell is used to perform electrochemical measurements through various techniques such as cyclic voltammetry, chronoamperometry, impedance spectroscopy etc.
> An H-Cell, it is a fundamental requirement to have three essential components: a counter electrode, a working electrode, and a reference electrode, all immersed in an electrolyte solution.

PREPARATION OF ELECTROLYTE SOLUTION

> Choose the desired electrolyte salt, like sodium chloride (table salt) or potassium sulphate.
> Measure a specific amount of the chosen salt (usually in grams) and add it to distilled water.
> Stir the mixture until the salt fully dissolves in the water.
> Your electrolyte solution is ready for use in the electrochemical cell.

In a CV experiment, as electrons transfer, ions in the solution move to maintain electrical balance. To reduce solution resistance, a salt (supporting electrolyte) is added to the solvent, forming the "electrolyte solution." Here's what makes a good solvent and supporting electrolyte:

SOLVENT:

> Fully dissolves the analyte and supporting electrolyte.
> Stable against oxidation and reduction within the experiment's range.
> Doesn't cause harmful reactions with analyte or electrolyte.
> Can be purified if needed.

SUPPORTING ELECTROLYTE:

> Highly soluble in the chosen solvent.
> Chemically and electrochemically inert under experimental conditions.
> Can be purified as necessary

- Different electrode materials can lead to varying electrochemical responses due to differences in electron transfer kinetics, adsorption tendencies, or reactivity with substrates. Changing the electrode material can help diagnose and address these issues.

- Layer on the silver wire. Regardless of the reference choice, having an internal standard like ferrocene in all measurements is advisable.

ELECTRODES FUNCTION:

Electrodes	Role	Example material	Function in H-Cell
Working Electrode (WE)	Main reaction site	Pt, Au, C, Metal Oxides	Electron transfer (oxidation/reduction)
Counter Electrode (CE)	Completes circuit	Pt, Graphite, Au	Provides or accepts electrons
Reference Electrode (RE)	Stable voltage reference	Ag/AgCl, SCE, SHE	Maintains fixed potential

CORPORATE HEADQUARTERS

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