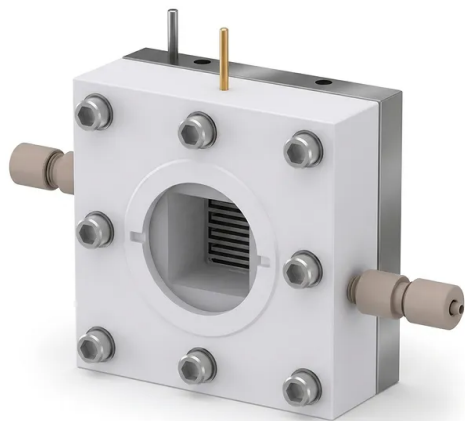


Gas Diffusion Photoelectrochemical Cell With Serpentine Flow Field For Undivided Gas Phase Electrolysis

Item Number: PL-DJ39



Introduction

This gas diffusion photoelectrochemical cell features an advanced serpentine flow field for optimal electrode reactant contact. Engineered for undivided photoelectrolysis and photo driven gas phase catalysis, it provides a stable platform for high yield carbon dioxide reduction applications and solar fuel research.

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Application	Description	Key Benefit
Photoelectrochemical CO ₂ Reduction	Converting gaseous carbon dioxide feedstocks into carbon monoxide, methane, or ethylene using a gas diffusion photoelectrode under simulated solar light.	Bypasses the mass transport limitations of dissolved carbon dioxide in aqueous electrolytes, enabling high-rate reduction at commercial-scale current densities.
Photo-Assisted Nitrogen Fixation	Direct reduction of nitrogen gas to ammonia using a gas diffusion photocatalyst interface at ambient operating temperatures.	Enhances triple-phase boundary contact, allowing stable adsorption and activation of inert nitrogen molecules on the photoactive catalyst site.
Solar Fuel Device Prototyping	Benchmarking the solar-to-chemical conversion efficiency of novel semiconductor materials deposited on gas-permeable substrates.	Provides a standardized, highly reproducible optical and fluidic geometry for precise comparison of catalyst activity and stability.
Gas-Phase Photochemical VOC Abatement	Utilizing UV-activated photocatalysts to decompose volatile organic compounds within an industrial exhaust or process gas stream.	Serpentine channel design maximizes the residence time and interaction between the gaseous pollutants and the photoactive catalyst surface.
Photoelectrocatalytic Water Vapor Splitting	Operating the cell under humidified gas streams to generate green hydrogen and oxygen without relying on full liquid immersion.	Reduces bubbles sticking to the electrode surface, preventing optical shadowing and local mass transport blockages.
Catalyst Screening for Gas Diffusion Electrodes	Rapid testing of various catalyst inks, binder loadings, and gas diffusion layer configurations under controlled illumination and gas flow.	Fast mechanical disassembly facilitates rapid sample swap-out, accelerating high-throughput material discovery pipelines.

Parameter	Specifications of PL-DJ39
Model	PL-DJ39
Cell Configuration	Undivided Gas Diffusion Photoelectrochemical Cell
Chamber Material	High-Purity PTFE (Polytetrafluoroethylene)
Optical Window Material	Synthetic Quartz (High UV-Vis Transmittance)
Optical Window Diameter	30 mm (Effective aperture: 20 mm)
Active Electrode Dimensions	20 mm × 20 mm (4.0 cm ² active area)
Gas Flow Field Design	Single serpentine channel pattern
Channel Dimensions	Width: 1.0 mm, Depth: 1.0 mm, Rib width: 1.0 mm
Inlet/Outlet Port Connectors	1/8-inch NPT stainless steel or PTFE compression fittings
Current Collector Material	Titanium foil / mesh (Gold-plated copper optional)
Chamber Liquid Volume	15 mL (Adjustable with optional PTFE inserts)

Parameter	Specifications of PL-DJ39
Gasket Seals	Viton (FKM) standard (Perfluoroelastomer / FFKM optional)
Maximum Operating Temperature	120°C
Maximum Gas Operating Pressure	0.2 MPa (2 bar)