

合金电极
Alloy Electrode

高电流密度适配
High Current Density



最大宽幅
Max.Width 2.5 m

规模化验证/MW-Scale Validated:
< 1.65 V @ 4,000 A/m²^b

Item	Standard ^a	Result
析氢过电位 HER Overpotential	< 220 mV @ 3,000 A/m ² < 300 mV @ 5,000 A/m ²	< 140 mV @ 3,000 A/m ² < 200 mV @ 5,000 A/m ²
超声减重率 Ultrasonic weightloss	< 5%	< 3%
抗逆电流测试 Reverse current tolerance (3,000 A/m ²)	测试前后变化 ▲Overpotential < 50 mV	≤ 10 mV

a. 《中国石油化工集团有限公司企业标准-碱性水电解制氢系统采购技术规范》
b. 常用特定结构，数据来源于某客户

启停稳定性 (2,500 cycles)
START-STOP STABILITY

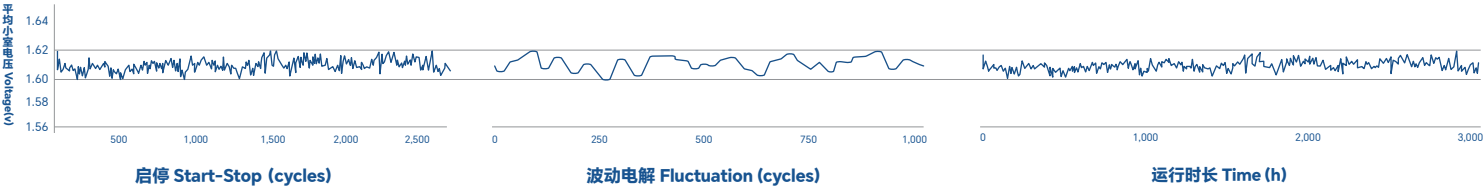
1 Cycle = 5 min ON/ 3 min OFF
4,000 A/m² ➡ Cell Voltage: 1.60 ~1.62 V

波动稳定性 (1,000 cycles)
FLUCTUATION STABILITY

4,000 A/m² ➡ Cell voltage: 1.61~1.62 V
Ref: GB/T45092-2024

恒流稳定性 (3,000 h)
CONSTANT CURRENT STABILITY

恒流测试无明显衰减
4,000 A/m² for > 3,000 h ➡ Cell voltage: 1.60 ~1.62 V



测试条件/TEST CONDITION

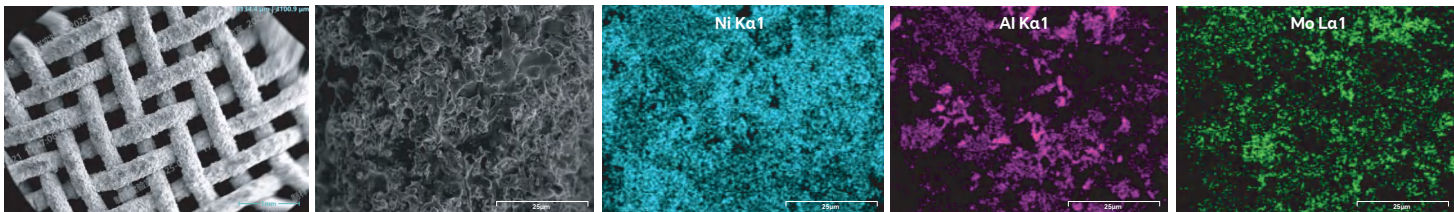
10-cell stack, Φ95 mm, 30% KOH, 85 ± 5°C

BV认证长期稳定性优异/BV CERTIFIED: EXCELLENT LONG-TERM STABILITY

3,000 A/m²恒电流及启停测试，运行衰减率 ~ 2 μV/h
Shows a degradation rate of ~ 2 μV/h (3,000 A/m² constant current & start-stop)



涂层元素均匀分布 Coating elements uniformly distributed



EHYDRO® ANO-I CA

镍铝电极
Ni-Al Anode

高稳定性
High Stability

阴阳极通用设计
Universal Electrode



最大宽幅
Max.Width 2.5 m

Item	Standard ^a	Result
析氢过电位 HER Overpotential	< 220 mV @ 3,000 A/m ² < 300 mV @ 5,000 A/m ²	< 220 mV @ 3,000 A/m ² < 300 mV @ 5,000 A/m ²
析氧过电位 HOR Overpotential	< 300 mV @ 3,000 A/m ² < 400 mV @ 5,000 A/m ²	< 300 mV @ 3,000 A/m ² < 400 mV @ 5,000 A/m ²
超声减重率 Ultrasonic weightloss	< 5%	< 3%
抗逆电流测试 Reverse current tolerance (3,000 A/m ²)	测试前后变化 ▲ Overpotential < 50 mV	≤ 10 mV

a. 《中国石油化工集团有限公司企业标准-碱性水电解制氢系统采购技术规范》

启停稳定性 (2,500 cycles)
START-STOP STABILITY

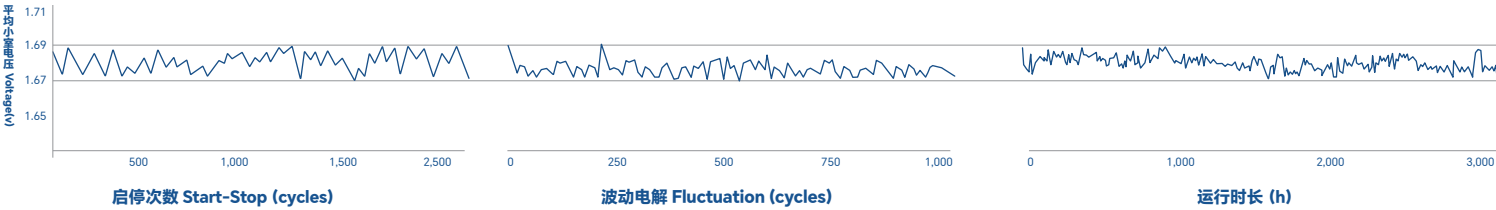
I Cycle = 5 min ON/ 3 min OFF
3,000 A/m² ➡ Cell Voltage Stable at ~1.68 V

波动稳定性 (1,000 cycles)
FLUCTUATION STABILITY

3,000 A/m² ➡ Cell Voltage Stable at 1.68 -1.69 V
Ref: GB/T45092-2024

恒流稳定性 (3,000 h)
CONSTANT CURRENT STABILITY

恒流测试无明显衰减
3,000 A/m² for > 3,000 h ➡ Cell voltage: 1.678 -1.69 V



测试条件/TEST CONDITION

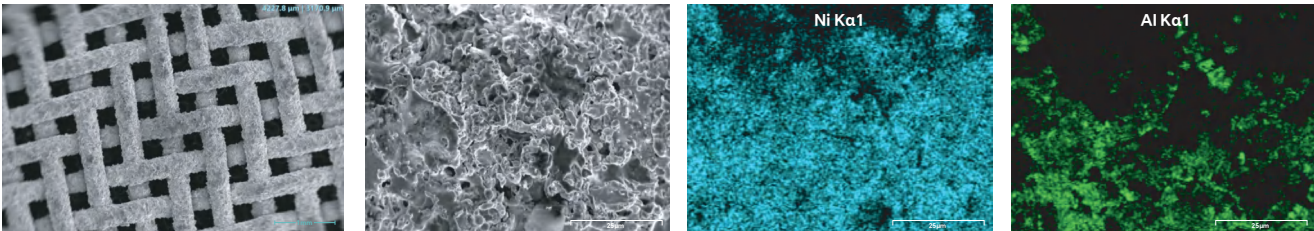
10-cell stack, Φ95 mm, 30% KOH, 85 ± 5°C

BV认证长期稳定性优异/BV CERTIFIED: EXCELLENT LONG-TERM STABILITY

3,000 A/m²恒电流及启停测试，运行衰减率 ~1.5 μV/h
Shows a degradation rate of ~1.5 μV/h (3,000 A/m² constant current & start-stop)



涂层元素均匀分布 Coating elements uniformly distributed



陶瓷电极
Ceramic Electrode

免活化设计
Activation-Free

稳定高效
Stable & Efficient



最大宽幅
Max.Width 2.5 m
Ni ≥ 99.5% (XRF Thermo Fisher XL3t 950)

Item	Standard ^a	Result
析氢过电位 HER Overpotential	< 220 mV @ 3,000 A/m ² < 300 mV @ 5,000 A/m ²	< 150 mV @ 3,000 A/m ² < 260 mV @ 5,000 A/m ²
超声减重率 Ultrasonic weightloss	< 5%	< 3%
抗逆电流测试 Reverse current tolerance (3,000 A/m ²)	测试前后变化 ▲ Overpotential < 50 mV	≤ 10 mV

a. 《中国石油化工集团有限公司企业标准-碱性水电解制氢系统采购技术规范》

启停稳定性 (2,500 cycles)
START-STOP STABILITY

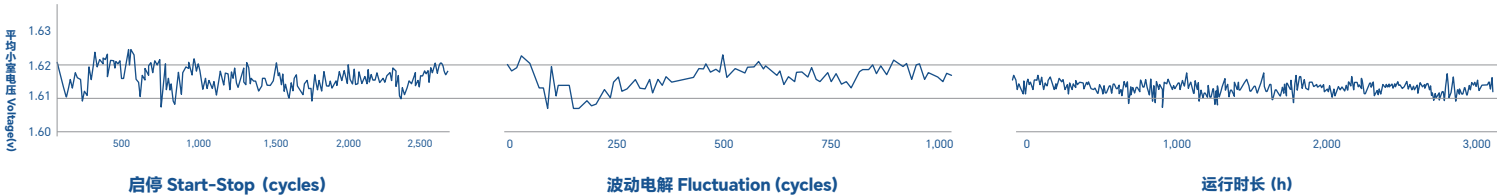
1 Cycle = 5 min ON/ 3 min OFF
3,000 A/m² ➡ Cell Voltage Stable at ~1.62 V

波动稳定性 (1,000 cycles)
FLUCTUATION STABILITY

3,000 A/m² ➡ Cell Voltage Stable at 1.61 - 1.62 V
Ref: GB/T45092-2024

恒流稳定性 (3,000 h)
CONSTANT CURRENT STABILITY

恒流测试无明显衰减
3,000 A/m² for > 3,000 h ➡ Cell voltage Stable at 1.61 - 1.62 V



测试条件/TEST CONDITION

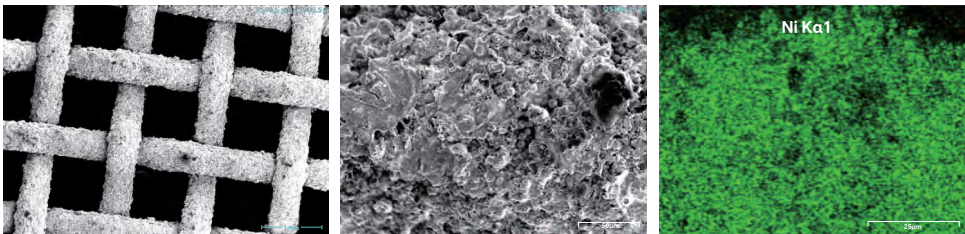
10-cell stack, Φ95 mm, 30% KOH, 85 ± 5°C

BV认证长期稳定性优异/BV CERTIFIED: EXCELLENT LONG-TERM STABILITY

3,000 A/m²恒电流及启停测试, 运行衰减率 ~ 1.5 μV/h
Shows a degradation rate of ~ 1.5 μV/h (3,000 A/m² constant current & start-stop)



涂层元素均匀分布 Coating elements uniformly distributed



EHYDRO® PCM500+

多孔复合膜

Porous Composite Membrane

耐碱

Alkali-Resistant

隔气

Gas-Barrier

低阻

Low-Resistance

适配宽负载和动态启停 Optimized for Dynamic & Variable-Load Conditions



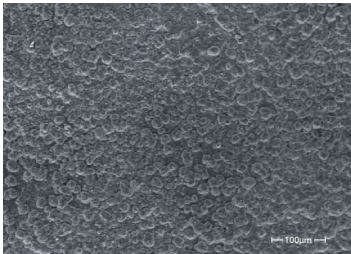
最大宽幅
Max.Width **2.1 m**

厚度 (μm) ^a Thickness	500 ± 50	抗拉强度 (MPa) ^d Tensile Strength	≥ 25
孔隙率 (%) Porosity	55 ± 10	最高使用温度 (°C) Max. Operating Temperature	110
泡点 (bar) ^b Bubble Point	4 ± 1	使用寿命 (年) Service Life (yr)	≥ 7
平均孔径 (nm) Average Pore Size	< 150	面电阻 ^c (Ω·cm ²)(30°C, 30% KOH) Area Resistance	≤ 0.3

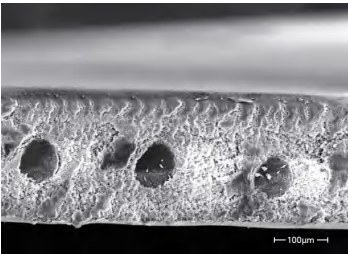
a. ASTM D6988-21; b. ASTM F316-03; c. ASTM D7148-07; d. ASTM D882-02

微观图

MORPHOLOGY



均匀致密涂层，高效气体阻隔能力
The dense coating layer ensures high gas barrier properties



断面海绵孔，抗压能力强
The sponge-like pore structure in cross section ensures high pressure resistance

耐碱

ALKALI RESISTANCE

30% KOH, 100°C环境条件下保存100天，性能保持稳定
Performance remains unchanged after 100 days in 30% KOH at 100 °C.



BV认证/BV CERTIFICATION^{e,f}

2,000 h 电解槽认证测试，性能指标保持稳定
After 2,000 hours, all key parameters exceed the standard.

Item	Key Value	Standard
泡点压力 (MPa) Bubble Point	0.32	> 0.1
面电阻 (Ω·cm ²) (30°C)Area Resistance	0.27	≤ 0.3
碱失重 (%) Alkali Weight Loss	0.08	< 1.5



气体渗透性^g

GAS PERMEATION

5 Bar



e. T/CECA-G0365-2025;

f. 《中国石油化工集团有限公司企业标准—碱性水电解制氢系统采购技术规范》

g. GB/T 32361-2015

EHYDRO® PCM200

多孔复合隔膜
Porous Composite Membrane

耐碱
Alkali-Resistant

隔气
Gas-Barrier

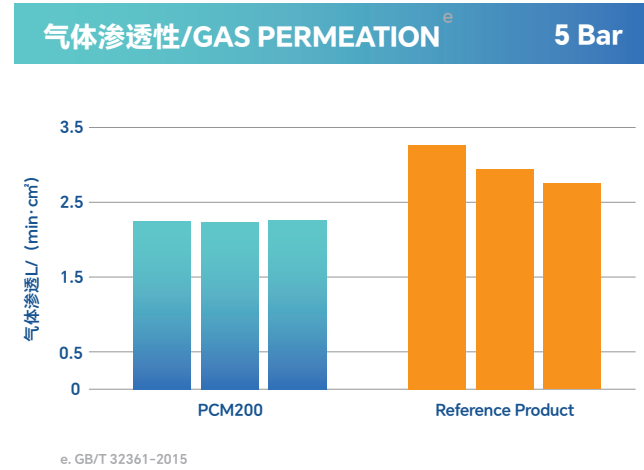
低阻
Low-Resistance

适配宽负载和动态启停 Optimized for Dynamic & Variable-Load Conditions



厚度 (μm) ^a Thickness	200 ± 20	面电阻 ^c (Ω·cm ²)(30°C, 30% KOH) Area Resistance	≤ 0.2
孔隙率 (%) Porosity	50 ± 10	抗拉强度 (MPa) ^d Tensile Strength	≥ 20
泡点 (bar) ^b Bubble Point	5 ± 1	最高使用温度 (°C) Max. Operating Temperature	110
平均孔径 (nm) Average Pore Size	< 150	使用寿命 (年) Service Life (yr)	≥ 7

a. ASTM D6988-21; b. ASTM F316-03; c. ASTM D7148-07; d. ASTM D882-02



耐碱/ALKALI RESISTANCE

30% KOH, 100°C环境条件下保存100天, 性能保持稳定
Performance remains unchanged after 100 days in 30% KOH at 100 °C.

微观图
MORPHOLOGY

均匀致密涂层, 有效保证较高的气体阻隔能力
The dense coating layer ensures high gas barrier properties

断面海绵孔, 抗压能力强
The sponge-like pore structure in cross section ensures high pressure resistance