IONOMR INNOVATIONS

AEMION+® ELECTROLYSIS OFFERINGS

Anion Exchange Membranes & Polymers

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PRODUCT INFORMATION

Ionomr designs and manufactures breakthrough advanced ion-exchange materials to enable rapid growth of the hydrogen economy. Ionomr's Aemion+ anion exchange membranes are significantly more durable than our competitor's leading to thinner membranes, longer service life and reduced overall system costs.

Our membranes have low ionic resistance, high electrical resistance, and strong chemical stability in solutions of both high and low pH, including concentrated alkaline solutions up to 3 M at 80 °C.

Ionomr's advanced anion exchange membranes and polymers are a breakthrough in material science with a unique hydrocarbon structure and the strongest alkaline stability available. Aemion⁺® provides specialized solutions for OEMs with unique application challenges.

Aemion⁺® represents a fundamental shift in anion exchange technology. Through Aemion⁺®, we provide a platform to enable simultaneous performance and lifetime improvements in clean technologies while further reducing their environmental impact.

For use in electrolysis applications including AEM water electrolysis & CO_2 Electrolysis, hydrocarbon based Aemion⁺® membranes and polymers can be utilized in the required conditions and paired with its high performance, unlocks many end use applications that were previously constrained by the membrane's instability.

Aemion⁺® enables electrochemical systems without the need for precious metals (commonly platinum and iridium), providing a pathway for the production of energy-efficient and low-cost green hydrogen as well as profitible carbon capture and utilization technologies.

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AEMION+ ® REINFORCED MEMBRANES

Thickness and Reinforcement Properties

Membrane Type	Typical Thickness (µm)	IEC[1] (meq/g)	Reinforcement
AF2-HWP8-75-X	75	2.3 - 2.6	Woven Polyolefin

Physical Properties[2]	MD	TD	Test Method
Tensile Strength, MPa	> 40	> 40	ASTM 638
Young's Modulus, MPa	270- 360	270- 360	ASTM 638
Elongation to break, %	30 - 40	30 - 40	ASTM 638
Hydrolytic Properties[3]			
Water Uptake			
water soaked, 22 °C	< 45%		ASTM D570
water soaked, 80 °C	< 50%		ASTM D570
Linear Expansion			
water soaked, 22 °C	< 5%		ASTM D570
water soaked, 80 °C	< 5%		ASTM D570
Z-Expansion			
water soaked, 22 °C	< 10%		ASTM D570
water soaked, 80 °C	< 15%		ASTM D570
Electrochemical Properties			
Area Resistance, mΩ • cm^2	< 150		Internal[4]
Hydrogen Crossover Current, Vol%	< 0.5		Ambient Pressure
Chemical Stability			
Max. Recommended Condition	3 M KOH, 80 °C		Internal[6]
Other Properties			
Maximum Processing Temperature	105 °C		
Polymer Tg	> 300 °C		
Counter-ions	I^-/Cl^-		

Notes

1 IEC in the hydroxide (OH^-) counter-ion form.
2 Measured at 22 °C in atmospheric condition
3 Measured from dried to equilibrated in DI water at 22 °C
4 Measured in water electrolysis conditions at 60 °C, 1 M KOH, OCV
5 Measured in AEM fuel cell conditions with GDE configuration at 60 °C, 100% RH
6 Measured ex-situ by change in mechanical strength, conductivity & IEC after soaking electrolyte

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AEMION+® IONOMERS: DRY RESIN

Ionomer Type	IEC[1] (meq/g)	Conductivity Cl^-/I^- (mS/cm)	Water Uptake[2] OH^- (%)	Water Uptake[2] Cl^-/I^- (%)
AP2-HNN8-00	2.3 - 2.6	8 - 11	95 - 100	20 - 60
AP2-HNN5-00	1.4 - 1.7	2 - 4	35 - 50	20 - 45

Notes

1 IEC in the hydroxide (OH^-) counter-ion form.
2 Approximate swelling properties when cast into membrane form at 25 - 50 µm

These are prototype materials only intended to be used for early development activities and not intended for production items. Product information is to be used as a guide only, subject to change at any time.

Document ID	Title
FM-6028-B	Properties of Aemion+™ Water Electrolysis Membranes

Revision	Prepared By	Approved By	Effective Date
B	Omid Toussi	Ben Britton	Jan 27, 2021

This document is reviewed to ensure its continuing relevance to the systems and process that it describes.

REVISION HISTORY:

Revision	Date	Description of Changes	Approved By
A	March 30, 2021	Initial Draft	Ben Britton
B	Jan 27, 2022	Updated offerings	

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