

Aemion™

Anion Exchange Membrane For Electrolysis & Fuel Cells

Aemion™ is a breakthrough material providing true alkaline stability to enable development of next-generation environmental technologies. The material has a hydrocarbon backbone, which makes it far less impactful on the environment than common fluorinated materials. By using advanced stabilization techniques, Aemion™ is able to compete with the most robust of alternatives.

Ionmr's hydrocarbon membranes are significantly tougher than competitive products leading to a longer service life and reduced lifetime cost. Unlike their proton exchange counterparts, alkaline based anion exchange membrane systems can operate without the use of precious metals such as platinum and iridium.

Aemion™ integration results in improvements to lifetime cost and reduced hydrogen crossover, alongside improved energy efficiency and volumetric energy density.

Typical Applications

- AEM fuel cells
- AEM electrolyzers
- CO₂ electrolysis

Features & Benefits:

- Strong alkaline stability as both membrane/separator & ionomer in the catalyst layer
- High concentration of functional groups for maximum anion conductivity
- Low hydrogen transport
- Processable in low-boiling solvents as an electrode catalyst-coating or binder with strong oxidative and alkaline/acid stability.
- Hydrocarbon backbone for reduced environmental impact and effortless catalyst recovery at end of life
- High strength and toughness – operate at pressure
- Zero/differential back-pressure operation capability

MATERIAL PROPERTIES

Ion Transport Options	HCO ₃ ⁻ , CO ₃ ²⁻ , OH ⁻
Tensile Strength¹	60 MPa
Young's Modulus¹	900 - 1200 MPa
Elongation at Break¹	85-110%
pH continuous	pH 0-14 (-1 to 15)
Alkaline & Acid Stability	2M KOH, 60 °C (indefinite) >1M H ₂ SO ₄
Maximum Temperature	80 °C (strong alkaline)
H₂ Crossover	<0.001 mL/min·cm ²

¹ Coincident properties presented for the dry iodide form as produced

PRODUCT REFERENCE DATA

Product Code	Thickness µm	IEC meq/g	Resistance (OH ⁻) Ω·cm ²	Conductivity ² (OH ⁻) mS/cm	Permselectivity ³ %	Water Uptake %
AF1-HNN8-50-X	50	2.1-2.5	0.13	>80	91-94%	33-37%
AF1-HNN8-25-X	25	2.1-2.5	0.063	>80	90-93%	33-37%
AF1-HNN5-50-X	50	1.4-1.7	0.42-0.67	15-25	94-96%	20-25%
AF1-HNN5-25-X	25	1.4-1.7	0.21-0.33	15-25	93-95%	20-25%
AP1-HNN8-00-X	-	2.1-2.5	-	>80	-	33-37%

² Measured under in-situ conditions in CO₂-free environment

³ Measured in 0.1 / 0.5M NaCl

All data is preliminary and should be used as a guide only, not a specification. Subject to change without notice.

Company

Ionomr is pioneering and commercializing the world's most advanced ion-exchange materials. These provide an enabling platform for clean tech solutions after more than five decades of stagnation in available materials. Using our deep knowledge of scalable electrochemical systems, we enable more efficient systems that will lead to the decarbonization of the planet for future generations.

To-date, electrochemical applications in the clean tech realm use materials that contain toxic fluorinated chemicals (PFCs). PFCs leach into water sources and bioaccumulate for hundreds of years, having a dire impact on human health and the entire ecosystem. We are driven to replace these materials with our environmentally friendly hydrocarbon alternatives that reduce pollution at the source, and are proven to be more durable and efficient than incumbent materials.

Ionomr's membranes and polymers are highly processable, which allow for simple integration into electrochemical systems. We enable optimal performance in applications for chemical & water remediation, energy storage and hydrogen. We are passionate about empowering the development of resilient and sustainable systems that will underlie the future of the renewable energy and circular chemical economies.

Aemion™ Membranes

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. Some of the many benefits include:

Stable — Aemion™ is chemically and oxidatively stable across a wide range of operating conditions. It is the only commercial product that provides practical strong alkaline functionality in addition to acidic stability for use in the harshest of applications.



High Strength — Compared to previous AEMs, Aemion™ provides the strongest unsupported membranes on the market for ease of handling, longer life, and thinner, lower resistance products. Reinforced products are also in development for additional improvements in strength as well as ease of handling.

Processable — Aemion™ can be used in dry membrane form and is soluble in low-boiling solvents as an ionomer, allowing simple, consistent integration into existing products as a high strength industrial coating. It can also be used as a stable, conductive catalyst ionomer binder, enabling development of coated and 3D electrodes and potential for catalyst recovery.