PEMION™ HYDROCARBON MEMBRANE AND POLYMER SET TO DISRUPT HEAVY-DUTY FUEL CELL APPLICATIONS

Vancouver, Canada | September 21, 2022 | CNW| – Ionomr Innovations Inc. today released its breakthrough Pemion™ hydrocarbon-based proton exchange membrane and polymer, marking a revolutionary advance in materials for green hydrogen fuel cell applications for heavy-duty industry.

Pemion™ is used in large fuel cell applications including heavy-duty transport, automotive, and stationary power, offering superior chemical and mechanical stability, conductivity, durability, and efficiency, all of which serve to dramatically reduce the unit cost of the fuel cell.

Pemion™ is environmentally friendlier than conventional fluorinated membrane and polymer technology, decreasing reliance on these increasingly regulated materials, and enables simplified and lower-cost recycling for the recovery of expensive catalysts at end of life.

Bill Haberlin, Chief Executive Officer of Ionomr, says, "Governments and regulators across Europe, in the U.S., indeed around the world, are rightly calling for the elimination of toxic, perfluorinated materials. Pemion™ is an ideal replacement for conventional materials, for its environmental benefits and for its superior performance. With our Pemion™ materials now produced at scale, our partners can take their fuel cell and other clean energy technologies to market faster, cleaner, and with better performance. Pemion™ provides a tangible differentiation in the heavy-duty market."

Dr. Matthias Breitwieser, Chief Technology Officer at ionysis GmbH, said: "We have been collaborating with Ionomr for several years, and after working with their Pemion® materials have now achieved a step-change in the performance of fully hydrocarbon membrane-electrode-assemblies (MEAs), rivaling PFSA solutions. Based on this success, we've established our new company, ionysis, to develop high-performance hydrocarbon MEAs as a viable alternative to conventional solutions."

Pemion™ represents a fundamental shift in proton exchange technology

Conventional polymers and membranes are produced using perfluorinated sulfonic acid (PFSA) chemistry. Perfluorinated compounds are known environmental toxins that can leach into water sources, accumulate biologically in living organisms, and are difficult to recycle.

Eliminating these widely used substances from all sources is an urgent focus globally. Pemion™ products are produced using environmentally benign hydrocarbon materials and avoid the environmental problems associated with conventional counterparts, while still achieving maximum durability and performance.

Also, significantly, Pemion™ materials' gains in performance and reductions in gas crossover result in a significant reduction in lifetime hydrogen fuel cell cost. Higher temperatures are possible for higher power stacks with improved cooling and higher efficiency, and the lifetime of the fuel cell is enhanced due to reduced degradation. Pemion boasts one of the highest room temperature conductivities available while maintaining its mechanical stability for improved overall efficiency and longer system life.

About Ionomr Innovations Ionomr Innovations is revolutionizing electrochemistry with newly developed ion-exchange membranes and polymers for clean energy. Ionomr's Pemion™ and Aemion™ technologies

provide cost, performance and sustainability advantages for fuel cells, hydrogen production and carbon capture, use and conversion. Ionomr was founded in 2018 and employs 43 professionals in Vancouver, Canada and Rochester, New York. www.ionomr.com

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BACKGROUNDER
PERFORMANCE ADVANTAGES OF PEMION™

Ionomr Innovations' hydrocarbon-based Pemion™ membrane and polymer offers several advantages over incumbent perfluorinated materials to increase the efficiency, versatility, and lifetime of fuel cell engines in heavy-duty transport and automotive.

- Advantages include: i) lower gas crossover for increases to range and lifetime of both membrane and catalyst; ii) higher proton conductivity for additional gains to efficiency and power density; iii) significantly greater temperature stability to enable multiple system design benefits; and iv) substantially easier end-of-life precious metal recovery, reducing costs and eliminating the significant environmental concerns specific to acidic perfluorinated compounds.

- Reduced solubility of gases in the polymer leads to reduced crossover of both hydrogen and nitrogen, providing an immediate reduction in parasitic losses and considerably reduces the formation of highly reactive radicals to minimize chemical degradation for the longest possible lifetime.

- Unlike PFSA materials, hydrocarbon Pemion™ polymers are chemically stable up to 200°C, enabling a development platform for other fuel cell components to address industry operating targets of 120°C.

- Pemion™ membranes are produced on reinforcement at thicknesses competitive to leading PFSA membranes in the industry, with record conductivity enabling the highest performance systems. As a result, Pemion™ offers leading conductance and durability without compromise.

About Aemion+™
The commercial release of Pemion™ follows Ionomr's earlier release of its Aemion+™ membrane technology for industrial-scale green hydrogen production by water electrolysis. Aemion+™ alkaline membranes are ultra-stable Anion Exchange Membranes (AEMs) designed to eliminate the traditional expensive components for water electrolysis -- like Iridium, Platinum, and Titanium, replacing these with less expensive materials while maximizing performance. Ionomr is now undertaking joint development activities for AEM electrolysis with industry majors Shell & Nouryon, and has signed six more MOUs with equipment manufacturers to accelerate the rollout of commercial equipment.
Durability test results on Ionomr's Aemion+™ alkaline membranes made public earlier this year achieved milestones that exceed internationally established aspirational standards set for 2024.