

POWERFUL POLYMERS FROM JMC

Ionomers are a special class of polymer that combine neutral and ionized units in their structure. This unique combination gives ionomers exceptional properties as ion-exchange and charge separation materials. Engineering the polymer backbone can deliver enhanced mechanical strength, thermal stability and barrier properties. Discover how JMC's ionomers can power your products to new heights.



Hydrocarbon Ionomers: Ion Exchange and Charge Separation

Hydrocarbon ionomers are a revolutionary class of materials that feature ionic groups on hydrocarbon backbones. This combination offers distinct advantages over traditional ionomers and unlocks exciting possibilities across various fields.

One important class of hydrocarbon ionomers are sulfonated ionomers. The manufacture of these materials draws on JMC's key strengths in sulfonating materials and handling the associated byproducts and wastes.

Key Features of Hydrocarbon Ionomers:

- ✓ **Excellent Durability:** The hydrocarbon backbone provides superior strength and stability, making these ionomers suitable for harsh environments.
- ✓ **Enhanced Processability:** Hydrocarbon ionomers can be easily shaped into films, membranes and other desired forms, increasing their versatility.
- ✓ **Tunable Conductivity:** By adjusting the type and amount of ionic groups, the ionomer's ability to conduct electricity can be tuned for specific applications.
- ✓ **Environmental Friendliness:** Some hydrocarbon ionomers are biodegradable or recyclable, offering a more sustainable alternative to traditional materials. In particular, hydrocarbon ionomers can be engineered to be fluorine-free.

Potential Applications of Hydrocarbon Ionomers:

- ✓ **Electrolysis Cells:** These use electricity to generate hydrogen from water, using conducting electrodes and an ionomer-based membrane.
- ✓ **Fuel Cells:** These combine hydrogen and oxygen to produce energy. The durability of ionomer membranes and their tunable conductivity make hydrocarbon ionomers promising candidates for high-temperature fuel cell membranes.
- ✓ **RFB Cells:** Hydrocarbon ionomers are a promising candidate material for membranes used in Redox Flow Batteries (RFBs), particularly Vanadium Redox Flow Batteries (VRFBs)
- ✓ **Separation Membranes:** Hydrocarbon ionomers' exceptional durability and tunable properties can be applied to water purification and other separation processes.
- ✓ **Other Applications:** Researchers are exploring the potential of hydrocarbon ionomers in medical imaging, tissue engineering and other nanotechnology applications.

Sulfonated Polysulfone: The Next Generation Ionomer



Sulfonated polysulfones (sPSU) are a cost-effective and high-performance option for your ionomer needs. These polymers can be realized using JMC's long-standing and deep expertise in sulfonating materials.

Here's why sPSU is the Ionomer of the Future:

- ✓ **Cost-Competitive:** Compared to traditional ionomers like Nafion®, sPSU offers a significant cost advantage, making it ideal for various applications.
- ✓ **Excellent Film-Forming Ability:** sPSU readily forms thin, uniform films, crucial for optimal performance in ionomer applications.
- ✓ **Outstanding Thermal and Mechanical Stability:** sPSU boasts exceptional resistance to heat and mechanical stress, ensuring long-lasting performance in demanding environments.
- ✓ **Tunable Proton Conductivity:** By adjusting the degree of sulfonation, sPSU's proton conductivity can be tailored for specific applications.
- ✓ **Promising Candidate for PEM Applications:** sPSU is emerging as a frontrunner for Proton Exchange Membrane (PEM) fuel cells, offering a viable alternative to traditional materials.

Unlock the Potential of Sulfonated Polysulfone:

- ✓ **Fuel Cells:** Develop cost-effective and durable PEM fuel cells with sPSU membranes.
- ✓ **Electrolysis:** sPSU has the potential to play a significant role in the future of clean hydrogen production through electrolysis.
- ✓ **Sensor Applications:** Explore the potential of sPSU for developing next-generation ion-selective sensors.

Ready to learn more?

Contact us today and discover how hydrocarbon ionomers and sulfonated polysulfones can revolutionize your ionomer projects. Let's embark on the journey towards a future powered by innovation!