FORBLUE i-SERIES
Ionomer Dispersions
What are i-SERIES Ionomer Dispersions?

- Perfluorosulfonic acid ionomer dispersed in ethanol/water
- An ion exchange polymer in acid form
- Made from PSVE/TFE copolymer
- Contains high polymer solid
- Forms highly durable catalyst layers with less cracks
- Usable in anode or cathode electrode catalyst layers
- Ideal for high voltage fuel cell applications
- Standard and low equivalent weight grades available
Applications for Fuel Cell Technology

Vehicles
- Cars
- Buses
- Forklifts

Stationary
- Telecom backup power

Electric Chargers
- Mobile chargers

Others
- Telecom backup power

Fuel cell

H₂ → Membrane → O₂ → H₂O
H⁺ e⁻ e⁻ e⁻ e⁻
Global Trend: CO₂ Reduction Based on CAFE Standards

- Stricter CO₂ emission restrictions
- Conventional internal combustion engines can not achieve the latest regulation values
- Automotive companies pay penalties if they can not clear regulation values
How Fuel Cells are Used in Vehicles

- The fuel cell system provides the right environment for the hydrogen to form with the oxygen to create electricity and water.
- This generates the electricity that flows to the electric motor.
Shift to Heavy Duty Vehicles

- Market is shifting to heavy duty vehicles because FCV has more benefits for bigger vehicles/longer distance
- FCEV sales forecasted to grow by 2030

**Source:** Horizon Educational
Ionomers Function in Fuel Cell Products

Polymer dispersions (ionomers) → Membrane/Electrode → Membrane electrode assembly

Stack → System → End Products
Ionomers in Membrane Electrode Assemblies

- Polymer dispersions (ionomers)
- Gas diffusion layer
- Platinum catalyst
- Hydrogen
- Carbon carrier

Membrane: 
- e\textsuperscript{−}
- H\textsuperscript{+}

Hydrogen: 
- e\textsuperscript{−}

Oxygen: 
- e\textsuperscript{−}

Water: 
- e\textsuperscript{−}
Proton Exchange Membrane Fuel Cell

1. Hydrogen atoms enter at the anode
2. Atoms are stripped of their electrons in the anode
3. The positively charged protons pass through the membrane to the cathode and the negatively charged electrons are forced through a circuit, generating electricity
4. After passing through circuit, electrons combine with protons and oxygen from air to generate fuel cell by-products: water and heat.

Source: FCHEA.org/fuelcells
Advantages of i-SERIES Ionomer Dispersions

- Delivers increased proton conductivity, which enables to achieve higher energy output with a smaller fuel cell stack
- Good chemical and mechanical stability, which enables robust catalyst layer after long-term operation
- Has long-side-chain sulfonic acid groups and performs comparably or better than other ionomers with short-side-chain sulfonic acid groups, even with less ion exchange capacity