S-SERIES membranes for PEMWE

Improvements in gas crossover and membrane structure

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Abstract

S-SERIES, a FORBLUE™ membrane, is a perfluorinated ion exchange membrane used for polymer electrolyte membrane water electrolysis and various other electrolysis and electrolysis applications. Recently, AGC has developed a new generation of S-SERIES membranes with smaller thicknesses, improved reinforcement, and higher ion exchange capacity (IEC). The membrane showed lower electrochemical resistance, more stable dimensional change, and lower gas crossover compared to standard and competitive membranes.

Comparison with Conventional Membrane

<table>
<thead>
<tr>
<th>Ratio of functional group (%)</th>
<th>Standard A</th>
<th>Standard B</th>
<th>AGC</th>
<th>Standard A (Same from)</th>
<th>AGC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water uptake (%)</td>
<td>60</td>
<td>55</td>
<td>45</td>
<td>40</td>
<td>35</td>
</tr>
</tbody>
</table>

Conclusion

- Higher IEC makes larger ion channels, referred to as water uptake, lowering cell voltage.
- Additionally, new reinforcement improved dimensional stability even with higher water uptake.
- Gas crossover can be minimized even with a thinner membrane.
- Newly developed membranes optimize IEC, thickness, and reinforcement.

History of AGC’s FORBLUE Business

AGC Chemicals Company Position in the Hydrogen Economy

With 40 years of experience in ion exchange membranes (SEM, AGC has supported various industries and embraces the opportunity to support the growing hydrogen economy.

FORBLUE™ SEELION
- First ion exchange membrane for electrolysis and utilization
- Developed the first ion exchange membrane for PEM water electrolysis

FORBLUE™ FLEMION
- Expanded the first ion exchange membrane for PEM water electrolysis
- Developed the first ion exchange membrane for PEM water electrolysis

FORBLUE™ SUNSEP
- Perfused sulfonated ion exchange membranes
- Developed the first ion exchange membrane for PEM water electrolysis

FORBLUE™ S-SERIES
- New generation of S-SERIES membranes with smaller thicknesses, improved reinforcement, and higher IEC
- Developed the new generation of S-SERIES membranes with smaller thicknesses, improved reinforcement, and higher IEC