Asahi Kasei Aciplex-S Membranes for PEFCs
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## Introduction

Aciplex perfluorinated ion exchange membranes are used worldwide for caustic soda production and other applications. On the basis of this technology Asahi Kasei has studied the fundamental properties of membranes for PEFC on NEDO Project since 1992. At present Asahi is trying to identify the membrane to attain highly durable fuel cell stacks. Here we report our progress to date, in ascertaining the effect of higher EW thinner membranes and the influence of methanol impurity during the circumstance cycle assuming actual climate conditions.

## Results and Discussion

Higher EW polymer can be expected to have higher mechanical properties due to its higer crystallinity. We have clarified various properties of higher EW membranes(S1001X, S1102, S1201Q) regarding fuel cell performance.conducted Their Exchange Capacity which is the reverse number of EW are 1.0, 0.91, 0.84 respectively. Their ion conductivity measured by AC inpedance are 0.21, 0.18, 0.15 S/cm under 80℃/95%RH atmosphere and also 0.10, 0.08, 0.05S/cm under 80℃ /80%RH atmosphere. It indicates high cell performance can be expected in even lower humidification condition by optimizing EW and membrane thickness.

Fig.1 shows creep properties with various EW membranes under 80 ℃ /95%RH. The effect of EW is clearly significant on creepage as well as SS-curve which is not shown here.

Single cell long run test is conducted with S1102 and S1201Q membranes under ambient pressure. As shown in Fig.2, their cell performances are quite stable up to 5000hrs. OCV are stable between 0.92 and 0.93V for the boths. Internal cell resistance of S1201Q showed about 0.07 to 0.08Ωcm2 and that of S1101 was about 0.12Ω cm2.

Assuming MeOH residue of fuel reforming from Anode side, circumstance cycle test with MeOH impurity of were conducted between –40 ℃ and 80 ℃ /95%RH atmosphere. As a result, higher content of MeOH caused bigger creepage in 80℃/95% atmosphere. But, other properties did not change before and after above cycles. The details of results shall be presented at the Meeting.

## Acknowledgment

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## References

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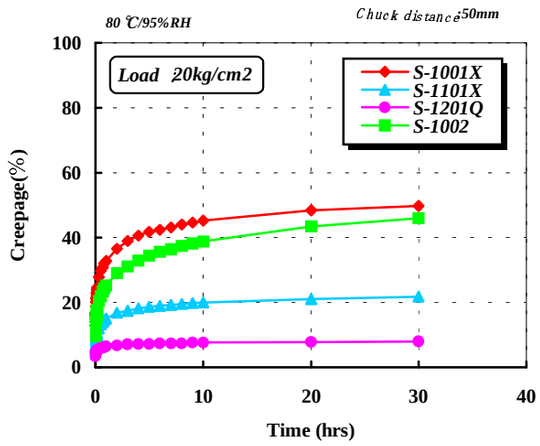


*Fig.1 Creep Properties for Various membarens*

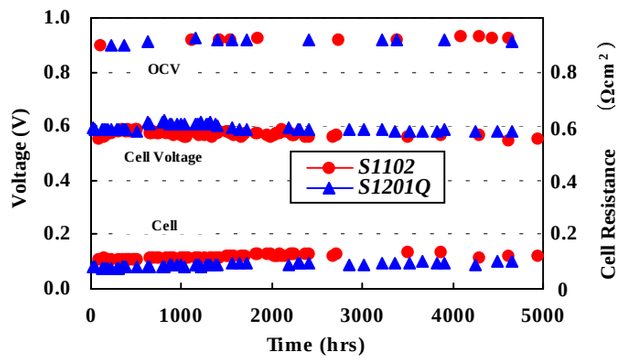


*Fig.2 Long Run Test with*

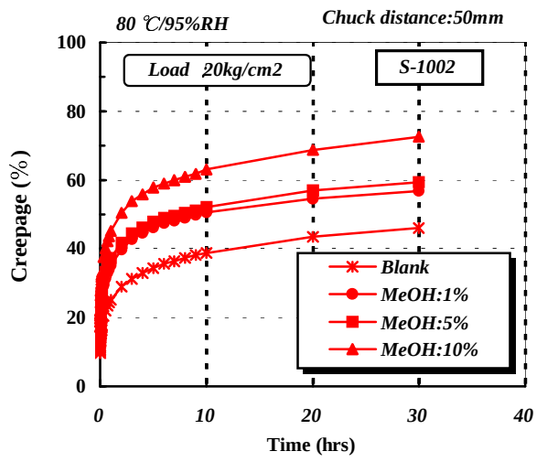


*Fig.3 Effect of MeOH on Creep Propertiy*