**IN-SITU EVALUATION OF SULFOPHENYLATED POLYSULFONE MEMBRANES IN A HYDROGEN/OXYGEN PEFC**

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**INTRODUCTION**

Aromatic polymers such as polysulfones are known for their high thermal, chemical and mechanical stability. These polymers are frequently modified to obtain proton-conducting membrane materials intended for use in fuel cells, especially at temperatures above 100°C [1].

We have previously reported on the preparation of sulfophenylated polysulfones via lithiation and reaction with 2-sulfobenzoic anhydride [2]. In the present work, the performance of membranes based on this polymer was evaluated in a fuel cell, cf. Figure 1.

**EXPERIMENTAL**

The polymer used to cast the membranes had a degree of substitution of 0.7, as determined by titration, and the equilibrium swelling at room temperature corresponded to 0.18 g of water per g of dry membrane.

A 50 mm Ø circular piece of membrane was mounted in our in-house cell [3], sandwiched between a pair of circular 20 mm Ø ETEK’s Nafion impregnated ELAT commercial electrodes. 30 mm Ø circular graphite current collectors with spiral formed gas channels were used (co-flow). The clamping pressure was 5 bars.

The cell temperature was 60°C. The in-let gases were humidified to 100 % and led into the cell with high stoichiometry at 1 atm.

The experiment was run at constant cell voltage (0.5 V) for over 300 h, with shorter interrupts for a few hours when recording polarisation curves. Current interrupt technique was used to measure the cell resistance.

**RESULTS AND DISCUSSION**

Some recorded polarisation curves at different times are presented, together with a reference curve for a cell with a Nafion 117 membrane run under similar conditions, cf. Figure 2.

An increase of overall cell resistance of around 30 % was observed during the experience. It is however uncertain, at this point, if this increase is due to degradation of the membrane itself, or if it is connected to interface phenomena between the Nafion in the electrode and the membrane.

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**REFERENCES**

