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Characteristics of hydrogen crossover through pinhole in polymer electrolyte membrane fuel cells

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ABSTRACT

In polymer electrolyte membrane fuel cells, because of the characteristic of membranes, an inevitable phenomenon called crossover occurs. It is imperative to investigate this phenomenon since it is one of the primary reasons why the system durability deteriorates. In this study, the electrochemical performance and hydrogen crossover rate are therefore measured to detect the presence of any perforated MEAs that can be brought out by unsafe manufacturing and severe operating conditions. In this experiment, a pinhole is artificially formed by a micro-needle and the performance change and hydrogen crossover rate are measured under various current densities. Moreover, to analyze the effect of the position of pinhole formation, cell performance and gas crossover rate are measured for differently located pinhole cases. As a result, it is confirmed that such a small size of pinhole can be identified through measuring the Download English Version:

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