

Self-humidifying Reinforced Membrane Based on Pt/CeO₂ and Nafion with Improved Life Time

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Abstract

Ceria supported Platinum was prepared and added to Nafion to make Pt/CeO₂-Nafion composite membrane. The Pt particles can catalyze the oxidation of crossover hydrogen with oxygen to generate water to humidify the membrane. CeO₂ was added as free-radical scavengers to minimize the degradation of membrane. Fuel cell performance was tested under 100% relative humidity and 35% relative humidity. Accelerated durability tests were performed at low humidity under OCV conditions. Pt/C-Nafion was also made for comparison. Gas crossover was monitored during the durability test, and the MEAs were examined by SEM and EDS before and after the durability test. The results showed that adding CeO₂ as free-radical scavengers to the electrode greatly improves the chemical stability of the membrane. Pt/CeO₂-Nafion membrane showed improved performance under low humidity compared to Nafion membrane.

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