研 究 論 文

Pt Oxide Blackのアンモニア酸化活性とアルカリ形アンモニア燃料電池の放電特性

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Ammonia Oxidation Activity of Pt Oxide Black and Discharge Property of Alkaline Ammonia Fuel Cell

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In this study, the ammonia oxidation activity of Pt Black and Pt Oxide Black was investigated by using rotating disk electrode in order to clarify the influence of electrochemical reduction and the content of anion-exchange resin in the electrocatalyst layer. The H_2/O_2 and NH_3/O_2 fuel cells were then manufactured by using three types of anode catalysts, namely, Pt Black, Pt Oxide Black and Pt Oxide Black electrochemically reduced, and these discharge performances were examined. The ammonia oxidation activity of the Pt Oxide Black was increased by electrochemical reduction. The activity was also improved by changing the mass ratio of Pt/anion-exchange resin in the electrocatalyst layer. The increase of three-phase boundary was interpreted as the key factor in the improvement of ammonia oxidation activity. Both the H_2/O_2 and NH_3/O_2 fuel cells using the Pt Oxide Black electrochemically reduced as the anode catalyst showed the superior discharge performance compared with the fuel cells using the Pt Black or the Pt Oxide Black without reduction. The reaction mechanism of the ammonia oxidation on the former catalyst may be different from those on the two latter catalysts, with the result that the poisoning by the intermediate products of ammonia oxidation on the Pt Oxide Black electrochemically reduced was inhibited.

Keywords : Pt Oxide Black, Ammonia Oxidation, Anode Catalyst, Alkaline Ammonia Fuel Cell, Electrochemical Reduction.