

Ammonia Oxidation Activity of Pt Alloy Thin Film Electrode in Alkaline Solution

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Hydrogen production using renewable energy is regarded as a key technology to achieve sustainable society. But hydrogen has a low volumetric energy density and it's difficult to storage and transport. Therefore, ammonia normally produced by the Haber-Bosch process with hydrogen and nitrogen attracts much attention as hydrogen carrier. Although ammonia is toxic, it has a low risk because we can detect it immediately due to its characteristic smell when it leaks. So, a direct ammonia fuel cell (DAFC) that directly generates electricity from ammonia is expected to be a new power generation system. Pt is used as an anode catalyst for ammonia oxidation reaction in DAFC, but an alternative one is required because it is expensive and deactivated by adsorbed N species. In this study, we focused on Pt alloy anodes. We chose Al, Cu and Ni as alloying elements. We have discovered the improvement of ammonia oxidation activity by alloying Pt with other elements. Especially, Pt-11.6at.%Al showed the highest ammonia oxidation current, 7.33 mA cm^{-2} , and it will be attractive candidate for DAFC.

Keywords : Fuel cell, Ammonia, Pt alloy, DAFC, anode