

Trend of the Development of Fuel Cell Vehicles and the Poisoning by Fuel Containing Impurities in Fuel Cells

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In this paper, we investigated the R&D trend for fuel cell vehicles in the world, and analyzed power systems used on the vehicles. The results of the investigation are summarized as follows:

- 1) PEM fuel cells are the most suitable for vehicles by reason of high power density and easy operation;
- 2) As for fuel storage and supply, an approach based on reformed methanol or hydrogen absorbing alloys is advantageous to designing a more compact system;
- 3) The hybrid FC system in combination with batteries or ultracapacitors, which is expected to achieve high efficiency, is a promising power system for urban vehicles with frequent accelerating and braking. This paper also covers our investigation into a decline in fuel cell productivity resulting from hydrogen fuel containing impurities. In this study, we had several investigations as follows:
 - 1) Prediction of the gas components generated from the methanol reformer for fuel cell vehicles;
 - 2) Decline in fuel cell productivity resulting from poisoning by impurities. The results of the investigation are summarized as follows: i) Components of the gas generated from methanol reformers adopting steam reforming (STR), partial oxidation (POX) and auto thermal reforming (ATR) approaches were predicted, and specific components and their concentrations were identified; and ii) various experiments and analyses were conducted to determine the dependence of CO poisoning on the type of catalyst electrodes between platinum and platinum-ruthenium alloy.