

Analysis of a decline of Fuel Cell Productivity with Fuel Containing Impurities

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In recent years, the so-called “environmental energy issue” resulting from problems such as fossil fuel depletion, global warming, air pollution and acid rain etc. has been widely discussed. Due to this, there has been mounting pressure on the automobile industry to develop automobiles that are equipped with clean environmentally friendly power sources, which can replace the conventional combustion engine. Fuel cell vehicles are presently attaining much attention as a potential replacement for combustion engine vehicles. This paper reports about the results of our analysis concerning the problem of a decline in the electricity generation performance of the fuel cell, resulting from the use of hydrogen fuel containing CO in fuel cell vehicles. The specific details of our investigation were as follows.

- 1) Analytic methods that utilize poisoning estimation coefficients and poisoning prediction formulas were proposed.
- 2) The development mechanism of CO poisoning in the fuel cell was analyzed.
- 3) The dependency of CO poisoning on mixed CO concentration, operating pressure and operation temperature were investigated.

Further, in this investigation a variety of types of experimental and analytical tests were carried out on the Proton-exchange Membrane Fuel Cell (PEMFC), which has proven itself the most practically successful fuel cell for automobile use.

