A direct methanol fuel cell power system for the battery charging in electric vehicle

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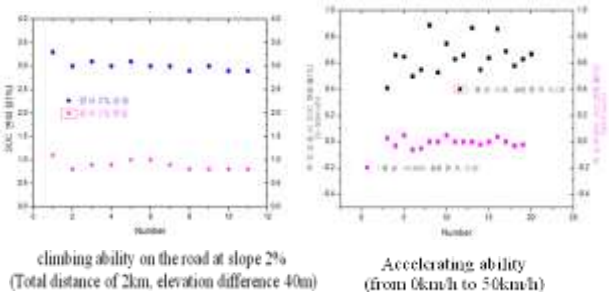
Abstract

Recently, performance of the battery was very much improved. There are many merit such as quiet, easy maintenance and environmental. But disadvantages are long battery charging time due to low-energy density, distance limit of driving, expensive battery prices, heavy weight and environmental issues due to using of commercial electric power. Electric vehicles are used battery instead of an internal combustion engine for power sources.

Direct methanol fuel cell (DMFC) differs has many merits compared with the conventional type fuel cell as follows; no need of fuel reformer, easy to transport, low price, use liquid duel such as methanol, safer reaction temperature lower then 80℃. Therefore DMFC is very advantageous power source such as portable, mobile, residential, small or remote discrete demand.

This work was tested driving performance of a fuel cell and $LiFePO_4$ battery hybrid electric vehicle. For this work, we were tested characteristics of charging and discharging in the EV battery(Fig. 1), manufactured 2kW class DMFC stack and tested I-V characteristics(Fig. 2), mounted on commercial neighborhood electric vehicle (NEV) with a DMFC power system(Fig. 3).

Essentially a power source for electric vehicles is battery. It is charged by the fuel cell, not commercial power. We have developed a fuel cell battery hybrid neighborhood electric vehicle that can drive only fuel cell power or with fuel cell and battery powers. We will identify the advantages and disadvantages of the hybrid electric vehicles and were tested the driving characteristics.



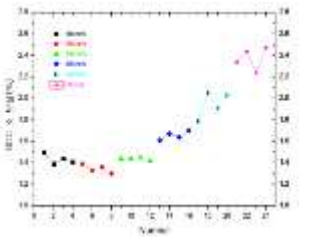


Fig. 1. Characteristics of charge and discharge in the EV battery.

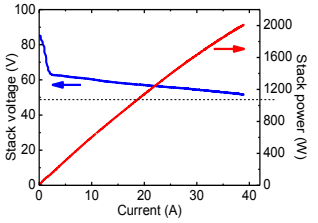


Fig. 2. DMFC stack and I-V characteristics

Fig. 3. System bench test.

Acknowledgement

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