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直接甲醇燃料電池之膜電極組效能測試研究

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摘要

本文介紹直接甲醇燃料電池(Direct Methanol Fuel Cell; DMFC)之功率效能測試，針對自製之質子交換膜及觸媒層組合，簡稱為膜電極組(Membrane Electrode Assembly; MEA)加以測試分析。MEA 為燃料電池之核心部分，經由電子負載器執行模擬負載後，量測其產生之最大功率密度，藉以評估其發電功效。本文針對三種不同來源之 MEA：自製之 MEA 與市售教學用 MEA 及杜邦公司技術合作 MEA，在交互比較測試各種基本功率特性後，藉由比較實驗後所得之數據資料，進而改良 MEA 之各種製程條件與配方。功率測試方面則改變進料系統甲醇水溶液濃度、溫度和氧化劑之空氣溫度等等，以期瞭解並提升 MEA 所能產生之最大功率密度。

關鍵字: 直接甲醇燃料電池; 膜電極組; 燃料電池功率測試

Design and Research of DMFC Power Test for MEA

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Abstract

This paper describes the DMFC performance test results for the single cell. The control system of electronic load was operated to allow determination of the MEA's performance characteristics among three kinds of MEA sources, commercial demonstration MEA, DuPont's MEA and our home-made MEA. The power density of three kinds of MEA is carefully evaluated in order to optimize and improve MEA process developments. The power test system contains a software for data acquisition in which operating parameters such as circuit fuel feeding temperature, heating air pressure, voltage and current can be controlled.

Key words: Direct methanol fuel cell (DMFC);
Membrane electrode assembly (MEA);
Fuel cell load test system