質子交換膜燃料電池中水氣生成觀測暨組裝界面壓力對性能之影響

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摘 要

一般燃料電池設計均著重於大面積與大電流的特點，當數個 單電池組合成燃料電池組(Stack)以後，組裝與水熱管理的問題相 較於單電池起來便更形複雜與重要。由於水的生成在燃料電池的 效率上影響非常大。主要是因為水生成時，若堵塞住氣體的傳輸 通道時，會大幅的降低質傳的極限，造成燃料電池性能下降，因 此水的生成與傳輸將是本研究的主要目標。本研究中以實驗探討 透明單蛇行流道質子交換膜單燃料電池，利用微攝影的技術進行 燃料電池內流道內部的拍攝水氣生成，並實際觀察不同入口下的 燃料電池其水氣分佈的狀態與性能，並應用感壓軟片探討接觸壓 力對氣體擴散層與流道板間的接觸壓力。進一步將組裝界面壓力 可視化，並佐以相關物理量之量測，來探討燃料電池的水熱生成 機制與組裝界面壓力之間的關連。

關鍵詞 : 燃料電池組，水熱管理，質子交換膜，感壓軟片

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