塑膠雙極板使用於燃料電池之可行性研究

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摘 要

現今質子交換膜燃料電池(PEMFC)雙極板，主要係以石墨板 為材料，利用銑床加工而成，導致雙極板的成本占有燃料電池生 產成本中很大的比重，且雙極板重量亦占燃料電池重量的百分之 八十以上。雖然多年來燃料電池界極力研發新的雙極板技術，但 是尚未有良好的解決方案出現。 本研究提出一個創新的PEMFC 雙極板的構想，此一雙極板 係以塑膠材料為基板，結合一個電流收集器，該電流收集器可於 氣體擴散層的協助之下，進行雙極板上陰、陽兩極的電子傳導工 作。研究中主要在於探討此一塑膠雙極板應用於空氣呼吸式 PEMFC 之可行性。研究結果顯示，無論由數值模擬方法進行探 討，或實際組裝成單電池進行實驗量測，皆發現此一創新雙極板 與目前所使用的石墨雙極板性能甚為接近，但是塑膠雙極板具有 加工容易、成本低、不易碎裂等多項優點，頗具有發展潛力，希 望將來能使用於燃料電池以降低其生產成本。

關鍵詞 : 質子交換膜;燃料電池;雙極板

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