

# 鹼性膜燃料電池與電堆關鍵材料開發計畫

執行單位

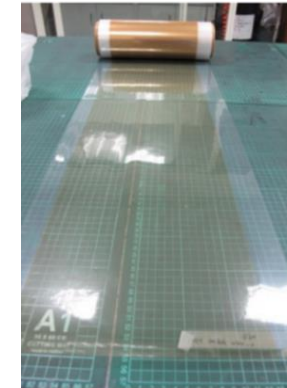
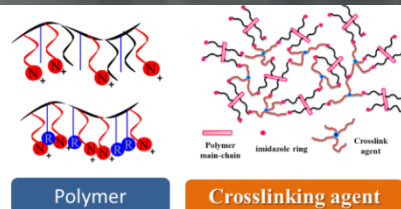
工研院材化所

計畫主持人

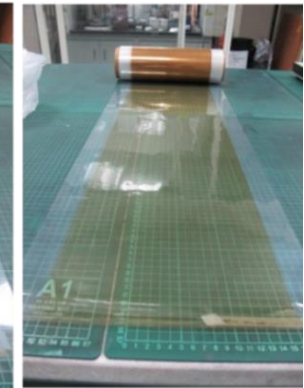
蔡麗端

- 本計畫建構低成本高效能鹼性燃料電池膜電極組，取得關鍵材料及技術的主導權，且所開發之系統技術可應用於國內能源產業，如不斷電系統(分散式發電系統/智慧綠建築等)與備用電源(行動電話基地台等)等。

本計畫從單體合成、高分子/交聯劑聚合直至陰離子交換膜製成，針對關鍵技術進行多國專利申請(高分子/交聯劑/離子交換膜)，目前已申請9件專利，獲證3件。



• 厚度 10µm  
• 25cm, 7.9M



• 厚度 20µm ± 1  
• 25cm, 7.4M

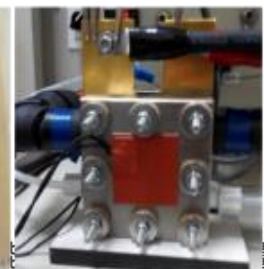
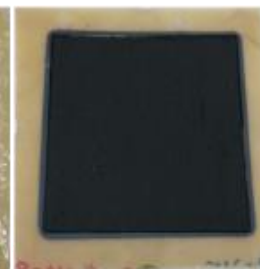
ITRI ionomer

ITRI membrane

CCM

MEA

Single cell



- 本計畫為開發高性能之鹼性離子交換膜、非鉑觸媒與膜電極組等關鍵材料，並透過電堆設計及系統整合技術，提升操作壽命。開發之陰離子交換可用於燃料電池、電解產氫、電滲析等相關應用領域，配合高效能之非貴重金屬觸媒，可提升燃料電池效能並降低成本，以建立國內自主材料設計與製造技術，避免關鍵材料受控於國外廠商。目前建立陰離子交換膜Roll-to-Roll連續式塗佈技術，其膜材離子導電度可達0.043S/cm，大量穩定化生產膜材後，有機會與國內廠商接軌合作，促進業界成長。

# Development of system and related materials for alkaline fuel cells

**Execution Unit**

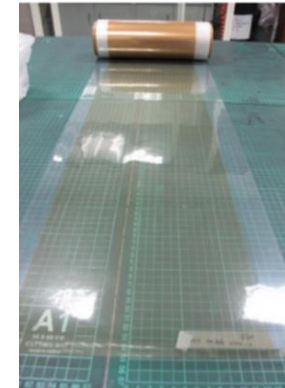
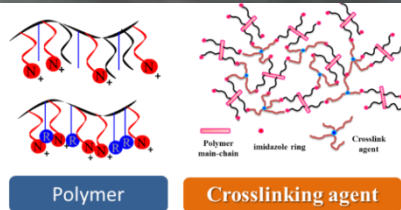
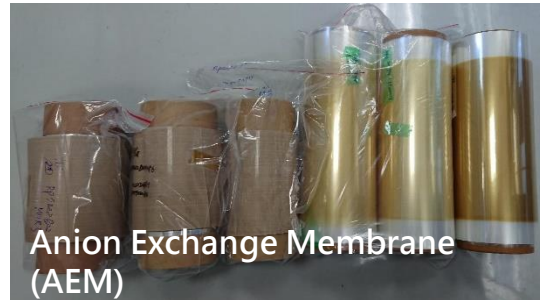
Industrial Technology Research Institute / Materials and Chemical Laboratories

**Project Director**

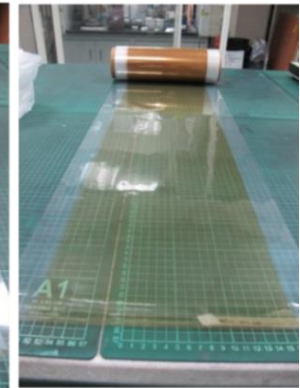
**Li-Duan Tsai**

This project was aimed to develop low cost and high performance membrane electrode assemblies (MEA) for alkaline fuel cells including the development of both key materials and techniques. The developed MEA and techniques can be applied to energy market such as UPS (distributed power/green building) and backup power (base station for cell phones).

Multinational patent applying (total 9 pending, 3 granted), including monomer synthesis, polymer/crosslinker polymerization, and process to produce ion exchange membrane



- 厚度 10 $\mu$ m
- 25cm, 7.9M



- 厚度 20 $\mu$ m  $\pm$  1
- 25cm, 7.4M

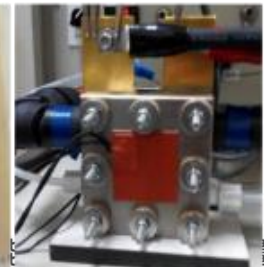
**ITRI ionomer**

**ITRI membrane**

**CCM**

**MEA**

**Single cell**



- This project was aimed to develop key materials for long life and low cost alkaline fuel cells, including anion exchange membrane, non-Platinum catalyst and membrane electrode assemblies. The anion exchange membrane can be applied to fuel cell, water electrolysis, and electrodialysis. Among all the techniques developed, the roll-to-roll coating process of anion exchange membrane was well established and can be used to mass produce membranes of stable and high qualities (conductivity  $\geq 0.043\text{S/cm}$ ). All the above materials and techniques are transferable and we look forward to cooperation with Taiwan companies.