

Novel Catalysts toward Carbon Neutral Recycling

Ming-Kang Tsai, Hao Ming Chen, Wei-Hung Chiang, Yi-Hsin Liu

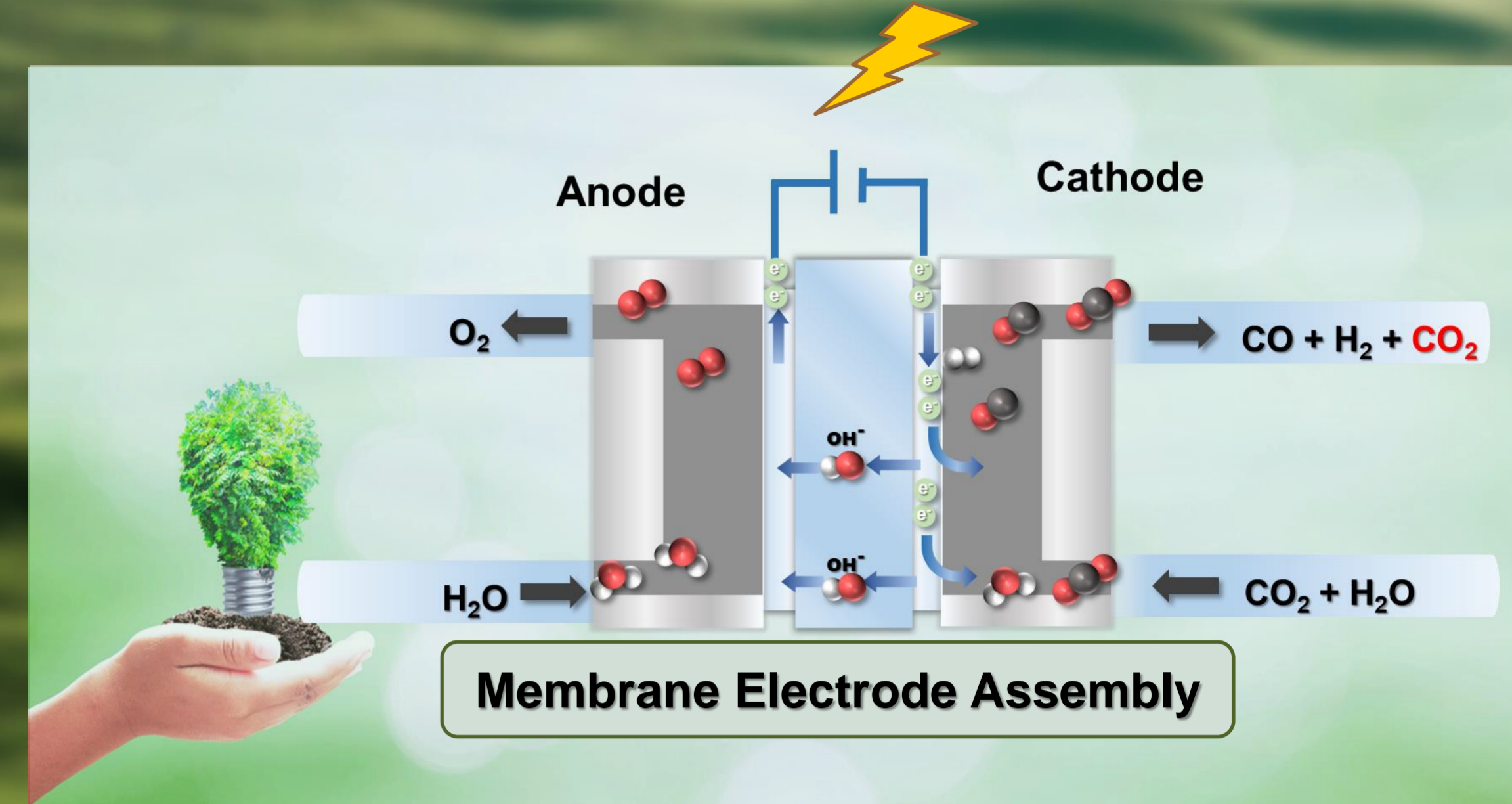
National Science and Technology Council, Taipei, Taiwan

Abstract

In this project, we propose to develop an electricity-driven CO₂ electrolysis system to reach the goal of carbon neutral recycling (CNR). With fabricated CO₂RR and OER catalysts, we are able to effectively convert CO₂ into chemicals, via breaking down the obstacles of energy-cost in traditional electrolysis process and turn it economically practical.

Our proposed high-efficiency catalysts intrinsically reduce the overpotentials of CO₂RR in which state-of-the-art single-atom Fe³⁺-N-C catalysts take lead. For the industrial applications, scale-up and stability issues turn out to be the first paramount subjects in realization of efficient CO₂ conversion. Hence, nitride dopants were introduced to improve catalyst stability via advancing redox-capability and ameliorating metal oxide morphology reconstruction issue.

Additionally, with theoretical prediction to development and structure of novel catalysts, our team can further achieve massive catalyst productions, and ultimately enable the realization of carbon-negative goals.



Objectives and Progress

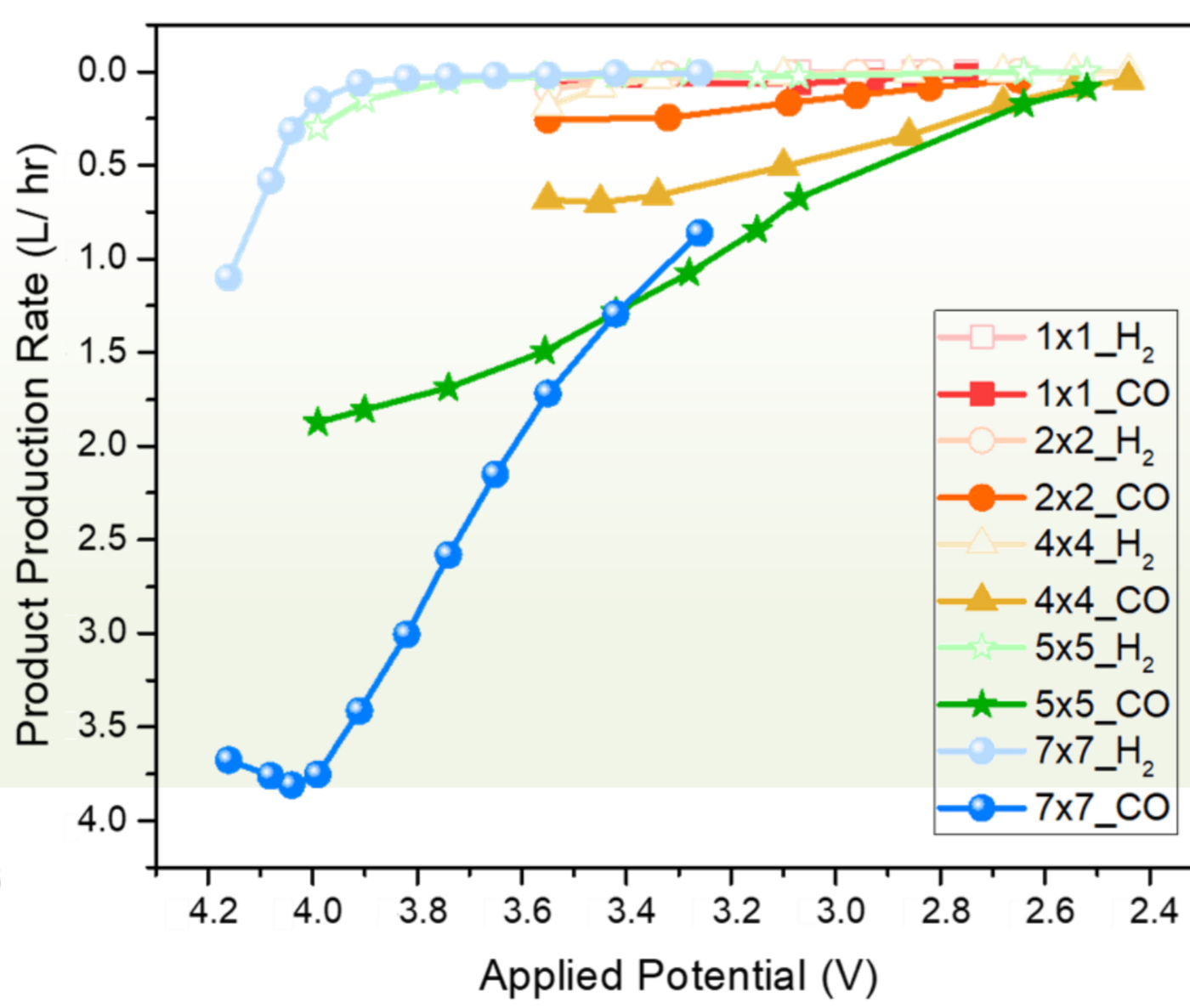
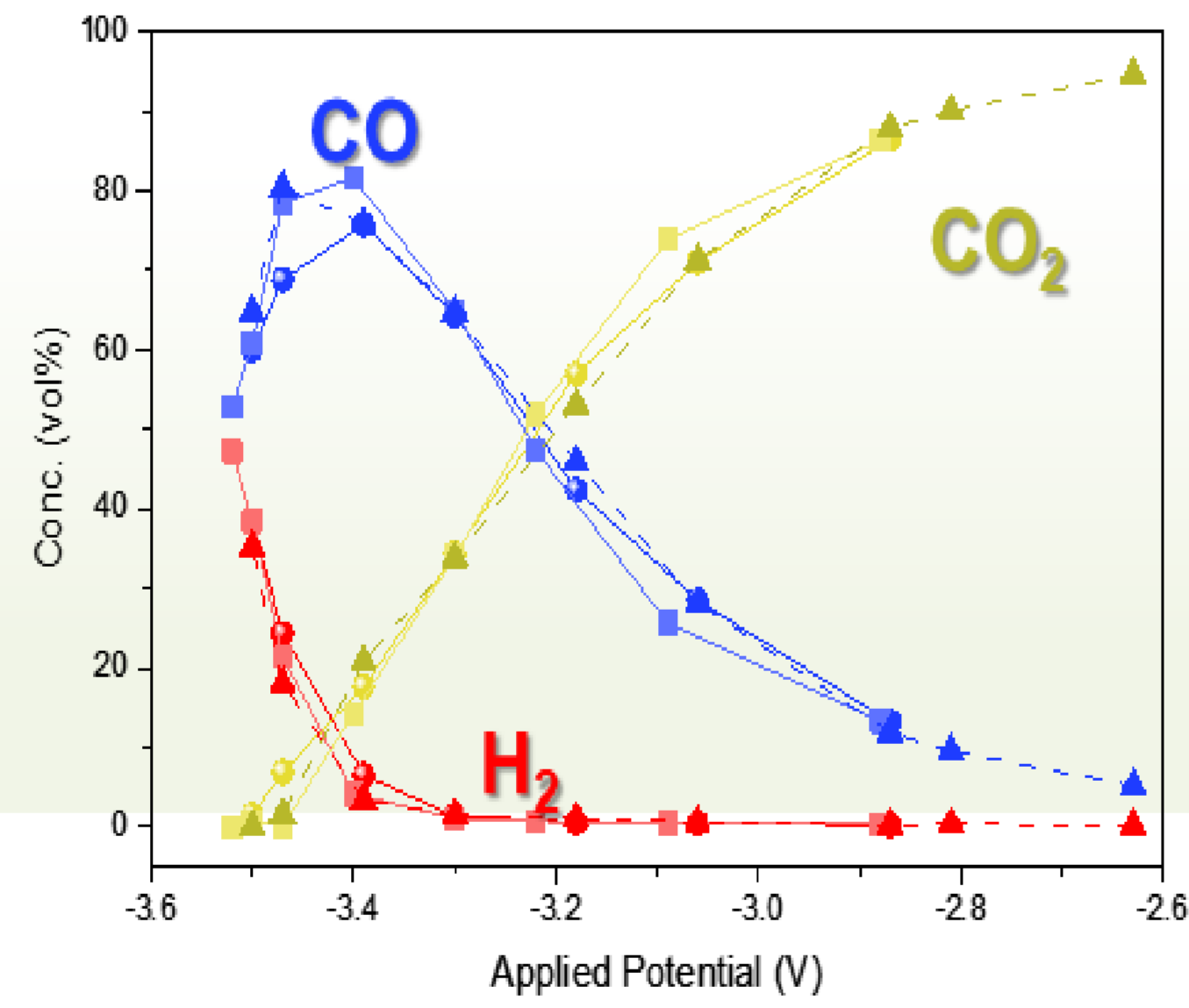
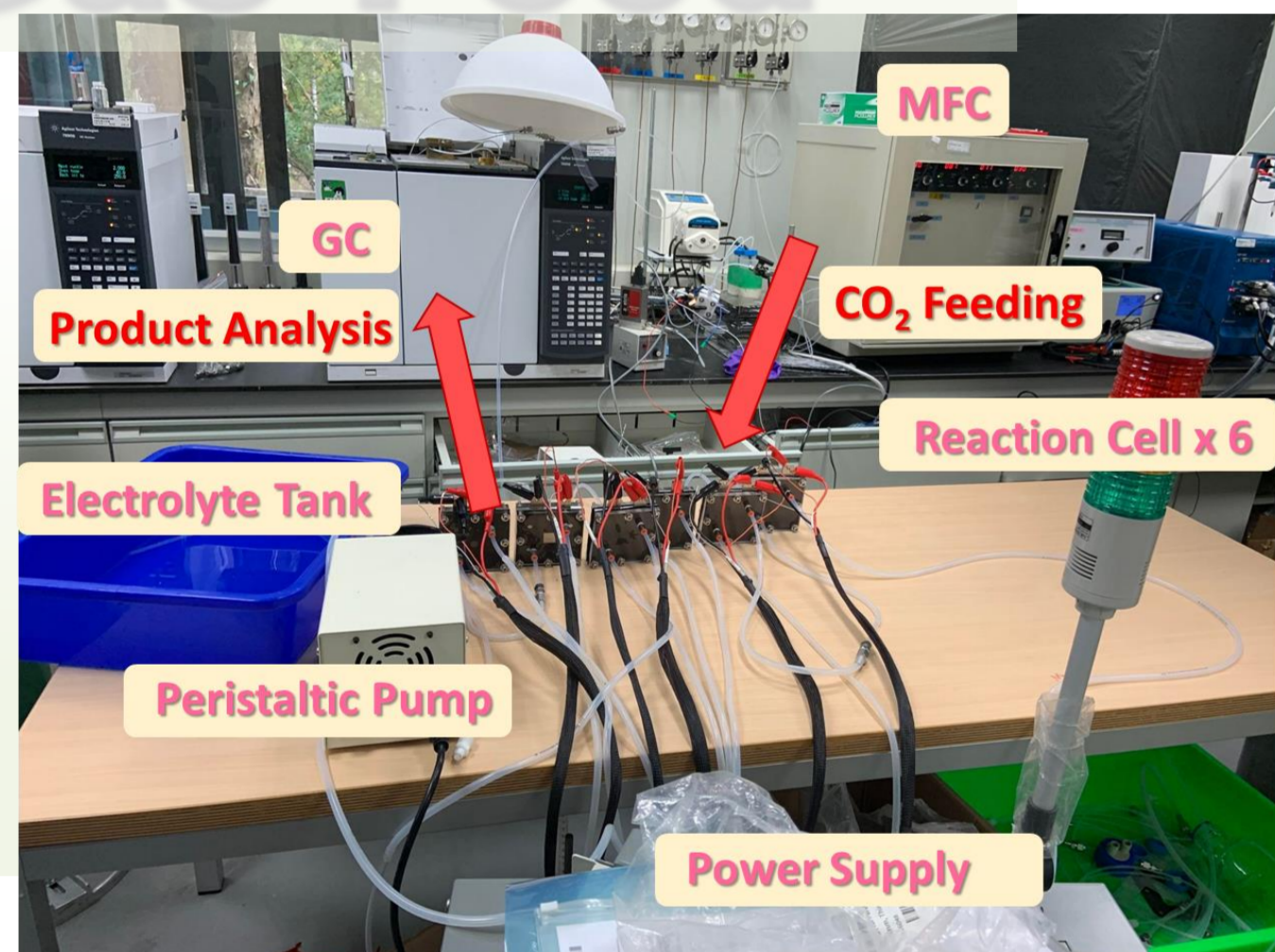
Catalyst Screening (NTNU)

New Catalyst (NTU)

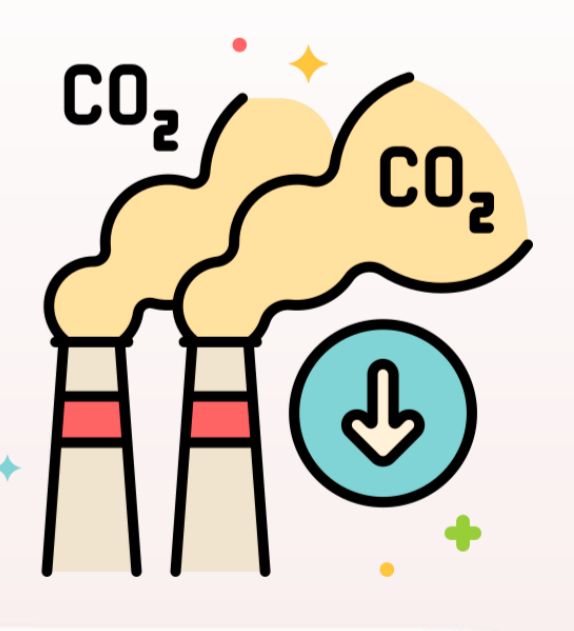
Scale-up (NTUST)

Device Integration (NTNU)

Gas-Feed

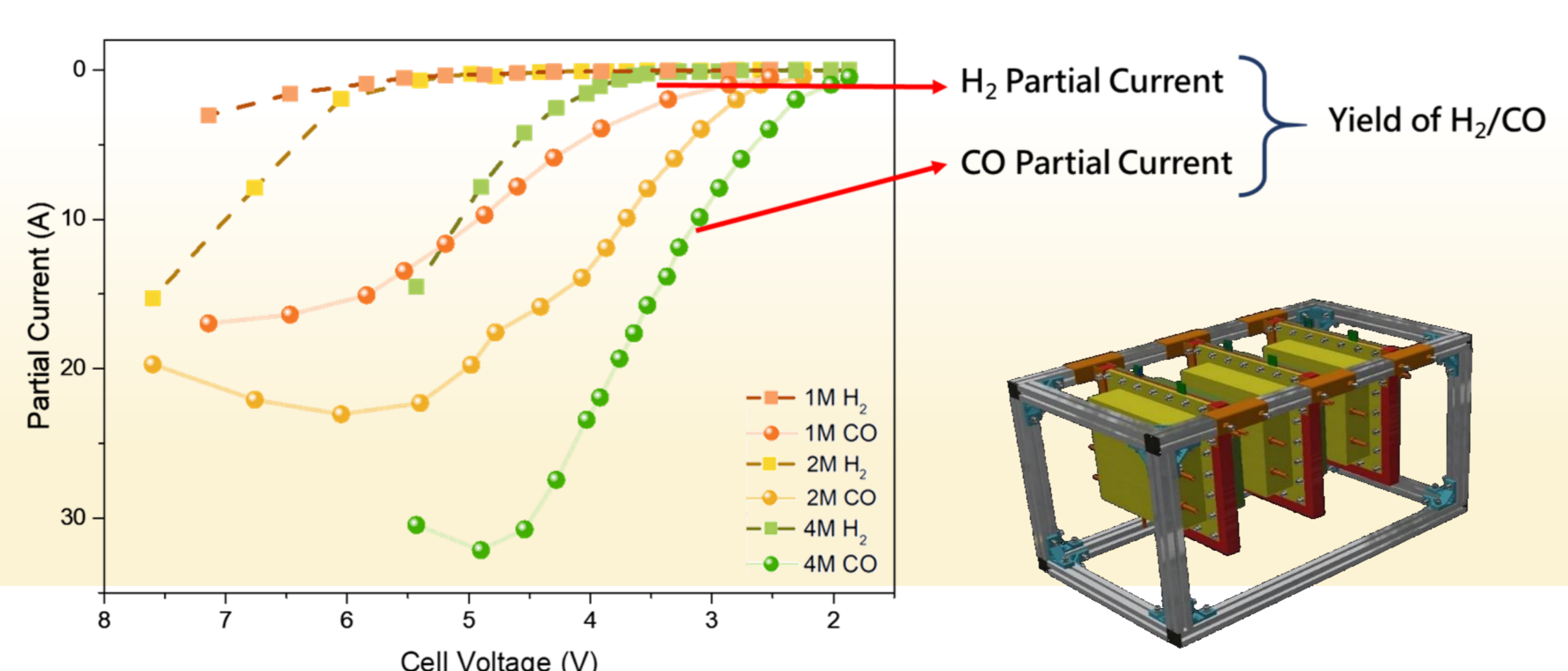
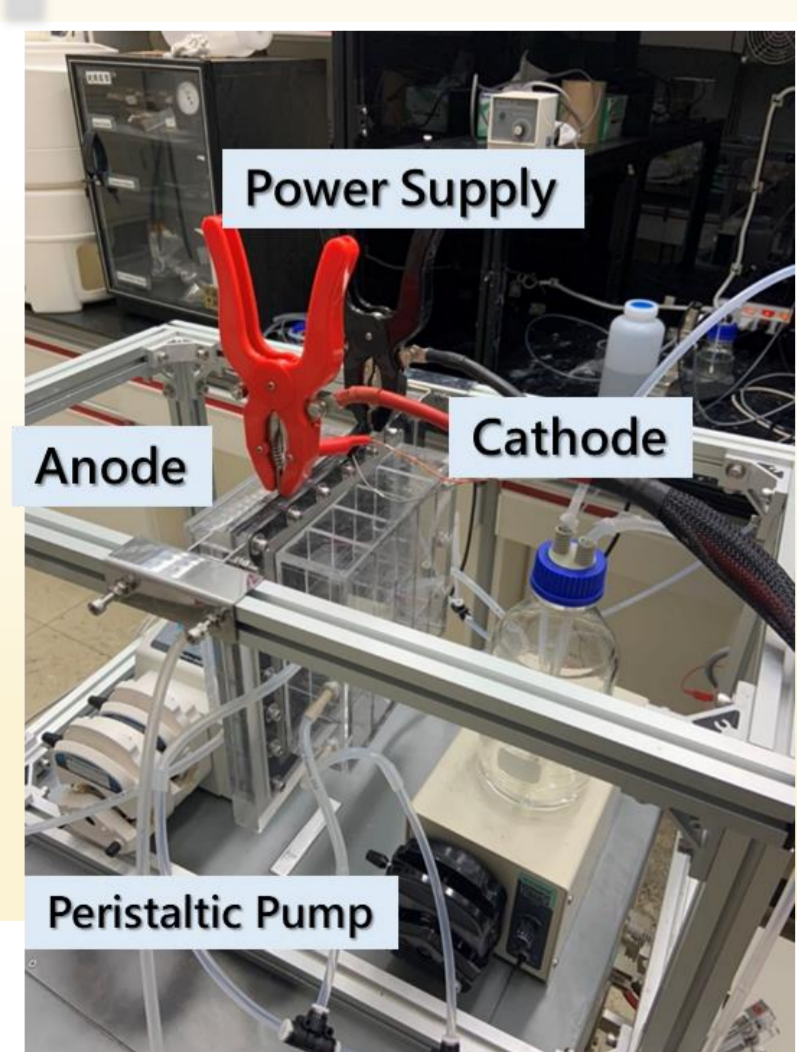


CO₂ Converter Prototype



規格	
電源供給 Power Supply	110V / 2200W
氣體流量可應用範圍 Gas Flowrate	10 ~ 200 s.c.c.m
尺寸 Dimensions	700x500x1550mm
重量 Weights	15 kg
操作壓力 Operating Pressure	10 ~ 20 psi
操作溫度 Operating Temp	15 ~ 90°C
操作電壓 Operating Voltage	2 ~ 4 V
未來可應用產物 Conversion Products	CO, CH ₄ , C ₂ H ₆ , HCOOH, CH ₃ OH, C ₂ H ₅ OH

Liquid-Feed



Acknowledgement

