

## 附件四、技術說明表



### 氣液相產物分流二氧化碳電解裝置及系統

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簡歷：(可列出相關連結，例如系所、研究室網頁)

- <https://chenhm.wixsite.com/ntuch-hmchen>
- 2002 年臺灣大學化學學士
- 2004 年臺灣大學化學碩士
- 2008 年臺灣大學化學博士
- 2012-2013 年加州大學柏克萊分校化學系博士後研究員
- 2013, 2018, 2021 年分別任職臺灣大學化學系助理教授, 副教授, 教授

#### 市場及需求:

市場: 高密度碳排放之重工業工廠、加工廠

需求: 二氧化碳輸入、電力輸入

#### 技術摘要(含成果):

本技術藉由導入氣/液相分流反應器之設計，將二氧化碳經電催化還原後所得之碳氫化合物、酸、醇類等產物，以氣/液相分流方式生成，可大幅提升產物分離之效率。

#### 優勢:

1. 藉由氣/液相進料方式可改善傳統設備反應物濃度低下的問題，並可提升反應效率。
2. 藉由氣/液相產物分流之法可提升分離效率，除能大幅降低分離之能耗及成本，亦能將具相似物、化性之產物有效分離。

#### 競爭產品:

熱催化二氧化碳還原系統(仍待解決高反應耗能的問題)

#### 專利現況:

本團隊長期深耕二氧化碳還原技術，且運用多種分析技術(如:同步輻射臨場分析等)針對二氧化碳還原之理論暨催化劑開發部分有深度的認知與理解，其研究成果也同時在國際頂級期刊 *Science*、*Nature Energy* 上取得認可。

#### 聯絡方式(請不用填):

臺大產學合作總中心

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## Electrochemical Equipment and System thereof for Reduction of Carbon Dioxide

PI : Prof. Hao Ming Chen

Department of Chemistry, National Taiwan University

### Experience:

- <https://chenhm.wixsite.com/ntuch-hmchen>
- B.S., 2002, Department of Chemistry, NTU
- M.S., 2004, Department of Chemistry, NTU
- Ph.D., 2008, Department of Chemistry, NTU
- Postdoctoral Fellow, 2012-2013, Department of Chemistry, UC Berkeley.
- Assistant Professor, Associate Professor, Professor, 2013, 2018, 2021, Department of Chemistry, National Taiwan University

### Market Needs:

Market: Highly CO<sub>2</sub> emitted industry (e.g. Petrochemical plants, Manufacturing plants)

Needs: CO<sub>2</sub> feeding, Electrical power supply

### Our Technology:

We develop a gas/ liquid split-flow electrochemical system to process and reutilize CO<sub>2</sub> into reduced products, such as hydrocarbons, carboxylic acids and alcohols.

With the merits of such split-flow system, the goal of efficient product separation process can be achieved.

### Strength:

1. Previous problems of limited reactivity from low CO<sub>2</sub> concentration in aqueous system can be ameliorated with gas/ liquid split-flow CO<sub>2</sub> feeding.
2. With such gas/ liquid split-flow system, energy consumption and cost for product separation can be substantially reduced, also, the products that sharing similar properties can be segregated effectively.

### Competing Products:

Thermal CO<sub>2</sub> reduction system (Higher energy consumption and cost)

### Intellectual Properties:

Our group has been dedicated to CO<sub>2</sub> reduction related techniques and intensively studied on CO<sub>2</sub> reduction mechanism and catalysts development via diverse analyzing approaches (e.g. in-situ synchrotron radiation). Our research results are also continually published and recognized by top-rated journals. (e.g. *Nature Energy*, *Science*)

### Contact (do not need to fill out):

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