



# 領域網絡分析概覽— 化學工程 2022

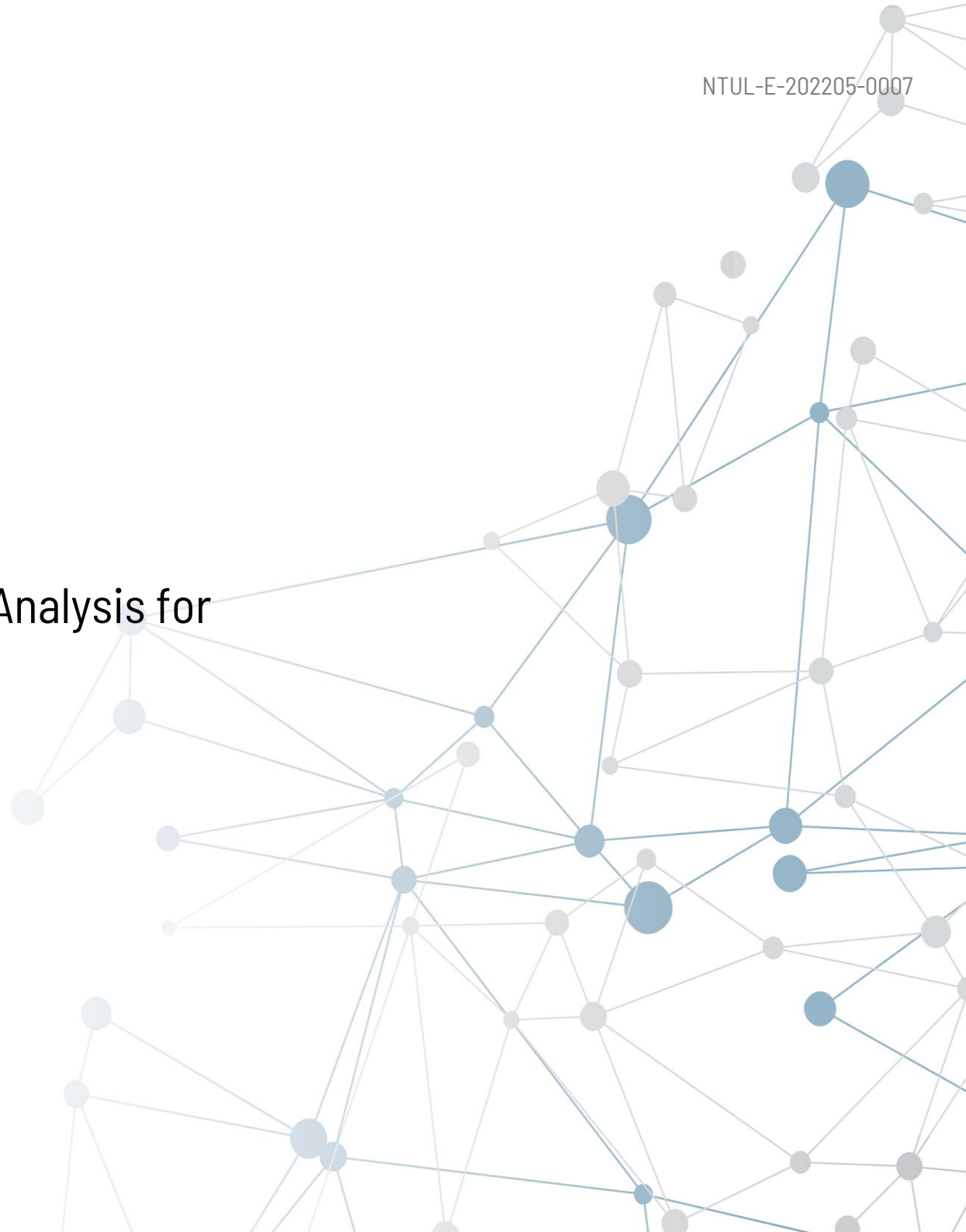
At a Glance – Domain Network Analysis for  
Chemical Engineering 2022

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臺大圖書館研究支援組

☎ 02-3366-2336

✉ [ntulibcn@ntu.edu.tw](mailto:ntulibcn@ntu.edu.tw)



# 01

## 分析說明

- ▶ 領域類別以及評析學校係以 2022 年 QS 世界大學領域排名（QS World University Rankings by Subject）資訊為依據，並使用 QS 世界大學排名系統合作的 Scopus 和 SciVal 資料庫為數據來源。
- ▶ 運用書目計量及社會網絡分析等方法，側重分析各學科領域中全球及亞洲焦點學校之研究主題方向，提供本校教師及院系學術研究發展之參考。



The QS World University Rankings by Subject 2022 共分 5 大領域 51 個學科主題。

[Methodology](#)：學科領域排名計算方法及權重說明。











[QS Subject Categorization](#): QS WUR 2022 學科領域清單，以及與 Scopus ASJC codes 對照方法。

# 01

## 分析對象族群

- ▶ 以世界頂尖及亞洲精選各 10 所學校為焦點族群進行評析，非採個別單一學校方式。
- ▶ 「世界頂尖大學群」依 QS WUR 2022 於化學工程領域全球排名前 10 名學校。
- ▶ 「亞洲精選大學群」係挑選中國、香港、日本、南韓、新加坡等 5 個國家及地區於化學工程領域排名前 2 名學校。

### ● 世界頂尖大學群\*

1		Massachusetts Institute of Technology
2		Stanford University
3		National University of Singapore
4		University of California, Berkeley
5		University of Cambridge
6		ETH Zurich-Swiss Federal Institute of Technology
7		Nanyang Technological University
8		University of Oxford
9		California Institute of Technology
10		Imperial College London

### ● 亞洲精選大學群\*

13		Tsinghua University
26		Peking University
40		Hong Kong University of Science and Technology
54		University of Hong Kong
15		University of Tokyo
32		Kyoto University
3		National University of Singapore
7		Nanyang Technological University
22		Seoul National University
23		Korea Advanced Institute of Science & Technology

\* 學校名稱前方數字為 QS World University Rankings by Subject 2022 — Chemical Engineering 排名序位。

# 02

## 研究主題分析

- ▶ 提供 2022 年 QS 世界大學排名化學工程領域全球排名前 10 名、亞洲 10 個精選大學以及臺灣大學，共3個族群之發展概況資訊。
- ▶ 研究主題 (Topics) 資料來源為 SciVal 資料庫，其以 Scopus 蒐錄文獻間的直接引用關係進行聚類，全球共分成近 1,500 個 Topic Clusters (上層主題) 及 95,000 多個 Topics。

### DATASET

Source	SciVal
Publication Year	2018-2021
Retrieved Date	2022.05.17-19

### METHODOLOGY

1. SciVal之研究主題 (Topics) 屬文章層級 (article-level) 的聚類，每篇文章給予 1 個 Topic。不同於依文章的所屬期刊進行分類，給定1 到多個不等的複分學科方法。
2. 詳細說明：[How are Topics and Topic Clusters created](#)

# 02

## 世界頂尖大學群



Total  
Scholarly Outputs  
**20,449**

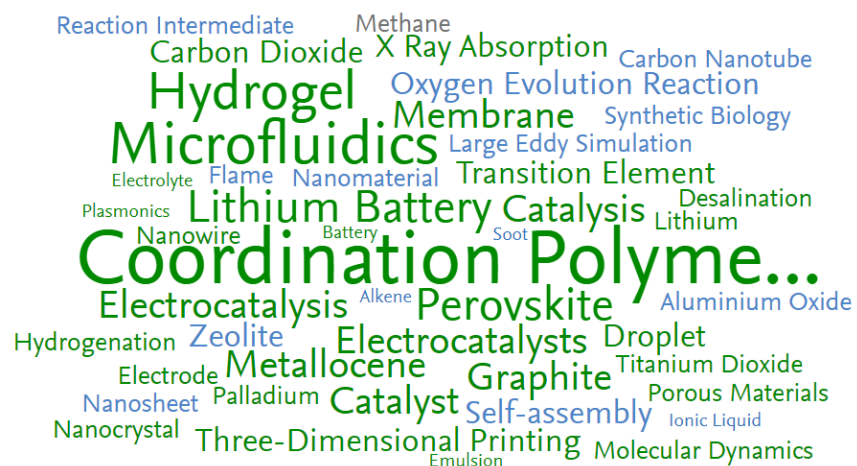


Citations  
per Publication  
**18.5**



Total  
Topics  
**1,469**

● Top 50 keyphrases\* by relevance, based on 20,449 publications



\* Keyphrases產生方式說明：

[https://service.elsevier.com/app/answers/detail/a\\_id/27763/supporthub/scival/](https://service.elsevier.com/app/answers/detail/a_id/27763/supporthub/scival/)

● Top 10 Topics by Scholarly Outputs

Topic ID	Scholarly Outputs	Topic 1st-3rd Relevance Keyphrases
T.3479	199	Carbon Dioxide; Electrocatalysts; Chemical Reduction
T.4025	172	Oxygen Production; Electrocatalysts; Catalyst
T.5315	131	Organic Polymers; Triazines; Porous
T.350	106	Zinc Air Batteries; Electrocatalysts; Catalyst
T.5899	84	Catalyst; Cobalt Phosphide; Water Splitting
T.2252	80	Cyanogen; Graphitic Carbon Nitride; Photocatalysts
T.153	75	Thin Film Composite Membranes; Gas Transport; Gas
T.1412	73	Bismuth Vanadium Tetraoxide; Photoelectrochemical Cell; Cathodes
T.7236	70	Osmosis; Thin Film Composite Membranes; Membrane
T.1584	70	Droplets; Microfluidics; Lab-on-a-chip Devices

# 02

## 亞洲精選大學群



Total  
Scholarly Outputs  
**27,390**

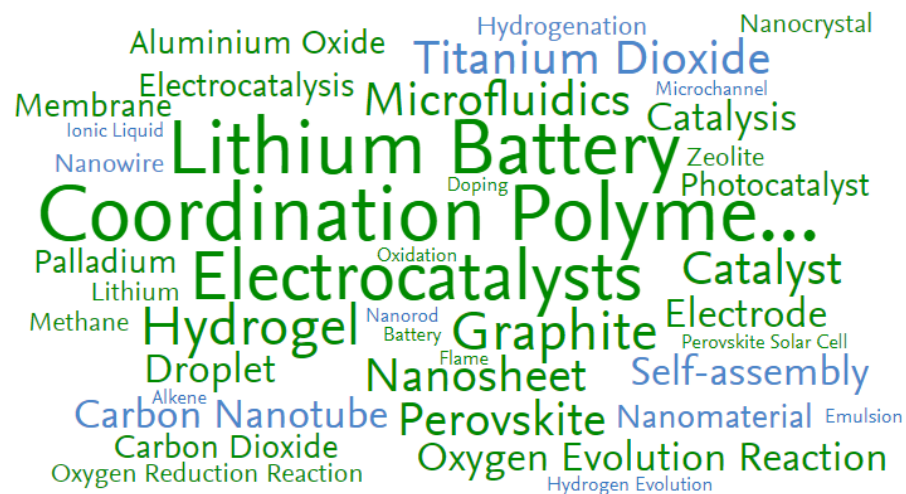


Citations  
per Publication  
**16.3**



Total  
Topics  
**1,641**

● Top 50 keyphrases by relevance, based on 27,390 publications



● Top 10 Topics by Scholarly Outputs

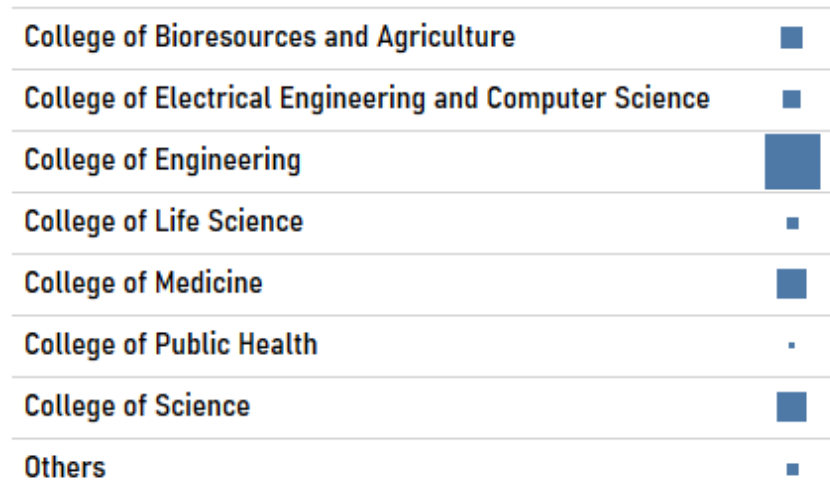
Topic ID	Scholarly Outputs	Topic 1st-3rd Relevance Keyphrases
T.4025	262	Oxygen Production; Electrocatalysts; Catalyst
T.350	212	Zinc Air Batteries; Electrocatalysts; Catalyst
T.2252	191	Cyanogen; Graphitic Carbon Nitride; Photocatalysts
T.3479	185	Carbon Dioxide; Electrocatalysts; Chemical Reduction
T.5899	161	Catalyst; Cobalt Phosphide; Water Splitting
T.5315	158	Organic Polymers; Triazines; Porous
T.6669	137	Activation; Sulfate Radical; Advanced Oxidation
T.9673	118	Alkene; Cross-coupling Reactions; Photocatalysis
T.319	107	Catalysis; 8-Aminoquinoline; Rhodium
T.1445	97	Fluorescence; Metal Clusters; Icosahedron



# 02

## 本校學院參與情形

- ▶ 本校 2018-2021 年於 QS 世界大學排名化學工程領域計有論文 1,911 篇，運用可茲取得之本校教師 Scopus Author ID 進行所屬系所比對，共 1,631 篇可查得 ID 資料。
- ▶ 相同單位之 2 位以上作者之文章，於該單位統計時計數 1 篇。醫學院與臺大醫院合併統計，校級研究中心列入「others」。
- ▶ 各學院於 QS 世界大學排名化學工程領域論文數比例如右上圖。右下圖為各學院合著情形，點選[線上檢視](#)，可選擇學院分別檢視。

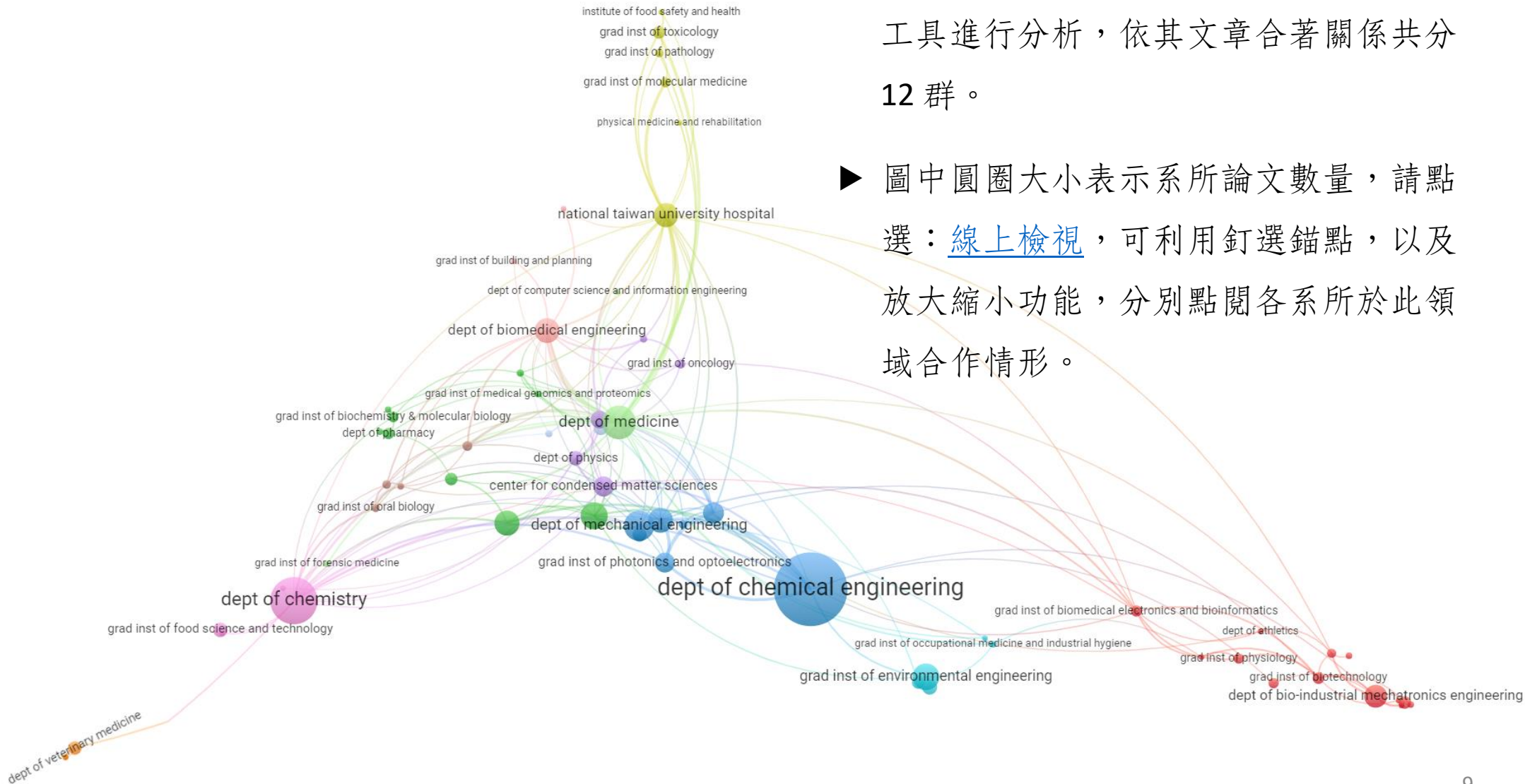


# 02

## 本校系所參與情形

▶ 本校於 2018-2021 年於 QS 世界大學排名化學工程領域論文計有66個系所合著發表。運用社會網絡分析及VOSViewer工具進行分析，依其文章合著關係共分12群。

▶ 圖中圓圈大小表示系所論文數量，請點選：[線上檢視](#)，可利用釘選錨點，以及放大縮小功能，分別點閱各系所於此領域合作情形。



# 02

## 研究主題差異分析

▶ 下圖為全球頂尖大學群論文佔比排序前 15 位之研究主題。[線上檢視](#)可自行選擇排序群組，藉此瞭解彼此間領域發展之相近或差異情形。

論文數佔比 World Top 10 Universities



← 排序功能圖示

Topic ID	Topic 1st-3rd Relevance Keyphrases	論文數佔比 World Top 10 Universities	論文數佔比 Asia Selected 10 Universities	論文數佔比 National Taiwan University
T.3479	Carbon Dioxide; Electrocatalysts; Chemical Reduction	2.05%	1.37%	1.46%
T.4025	Oxygen Production; Electrocatalysts; Catalyst	1.78%	1.94%	2.12%
T.5315	Organic Polymers; Triazines; Porous	1.35%	1.17%	0.66%
T.350	Zinc Air Batteries; Electrocatalysts; Catalyst	1.09%	1.57%	1.20%
T.5899	Catalyst; Cobalt Phosphide; Water Splitting	0.87%	1.19%	1.33%
T.2252	Cyanogen; Graphitic Carbon Nitride; Photocatalysts	0.83%	1.41%	1.06%
T.153	Thin Film Composite Membranes; Gas Transport; Gas	0.77%	0.44%	0.53%
T.1412	Bismuth Vanadium Tetraoxide; Photoelectrochemical Cell; Cathodes	0.75%	0.68%	0.27%
T.7236	Osmosis; Thin Film Composite Membranes; Membrane	0.72%	0.47%	0.66%
T.1584	Droplets; Microfluidics; Lab-on-a-chip Devices	0.72%	0.69%	0.40%
T.2556	Microreactor; Continuous Flow; Batch Process	0.68%	0.63%	0.00%
T.6	Electrode; Cobaltous Sulfide; Electrode Materials	0.67%	0.65%	0.40%
T.51	Lithium-ion Batteries; Electrode; Electrochemical Properties	0.64%	0.51%	0.00%
T.9673	Alkene; Cross-coupling Reactions; Photocatalysis	0.60%	0.87%	0.27%
T.8060	Bioprinting; Three-Dimensional Printing; Tissue Engineering	0.59%	0.49%	0.53%

# 02

## 本校重點研究主題

- 依國立臺灣大學於化學工程領域各研究主題之論文百分比進行排序，其中論文佔比 1% 以上之研究主題項目如下圖。完整研究主題資訊請詳參：[線上檢視](#)。

Topic ID	Topic 1st-3rd Relevance Keyphrases	論文數佔比: World Top 10 Universities	論文數佔比: Asia Selected 10 Universities	論文數佔比: National Taiwan University
T.4025	Oxygen Production; Electrocatalysts; Catalyst	1.78%	1.94%	2.12%
T.9839	Azeotropes; Distillation; Azeotropic Mixture	0.02%	0.02%	1.99%
T.6223	Granulation; Aerobic Granular Sludge; Biofilm Matrix	0.03%	0.04%	1.59%
T.14487	Deionization; Water Desalination; Electrode	0.23%	0.33%	1.59%
T.3479	Carbon Dioxide; Electrocatalysts; Chemical Reduction	2.05%	1.37%	1.46%
T.3044	Ligands; Cages; Self-Assembly	0.56%	0.33%	1.46%
T.16	Bioenergy; Regenerative Fuel Cells; Bioelectricity	0.28%	0.31%	1.46%
T.1195	Fluorescence; Nanodots; Carbon Nanoparticles	0.31%	0.42%	1.46%
T.5899	Catalyst; Cobalt Phosphide; Water Splitting	0.87%	1.19%	1.33%
T.1144	Biomass; Levulinic Acids; Ethyl Levulinate	0.46%	0.51%	1.33%
T.4393	Electrophoresis; Poisson-Boltzmann Equation; Electric Field	0.01%	0.01%	1.20%
T.42496	Activity Coefficients; Solvation; Liquid	0.01%	0.00%	1.20%
T.350	Zinc Air Batteries; Electrocatalysts; Catalyst	1.09%	1.57%	1.20%
T.5267	Distillation; Direct Contact; Membrane	0.40%	0.31%	1.06%
T.3903	Droplet; Hyaluronate Lyase; Impingement	0.34%	0.43%	1.06%
T.2252	Cyanogen; Graphitic Carbon Nitride; Photocatalysts	0.83%	1.41%	1.06%
T.155	Anaerobic Digestion; Biofuel; Methane Production	0.32%	0.47%	1.06%
T.13412	Methanol; Carbonylation; Temperature Programmed Desorption	0.03%	0.05%	1.06%

# 03

## 國際合作



Worldwide  
Scholarly Outputs  
**724,319**

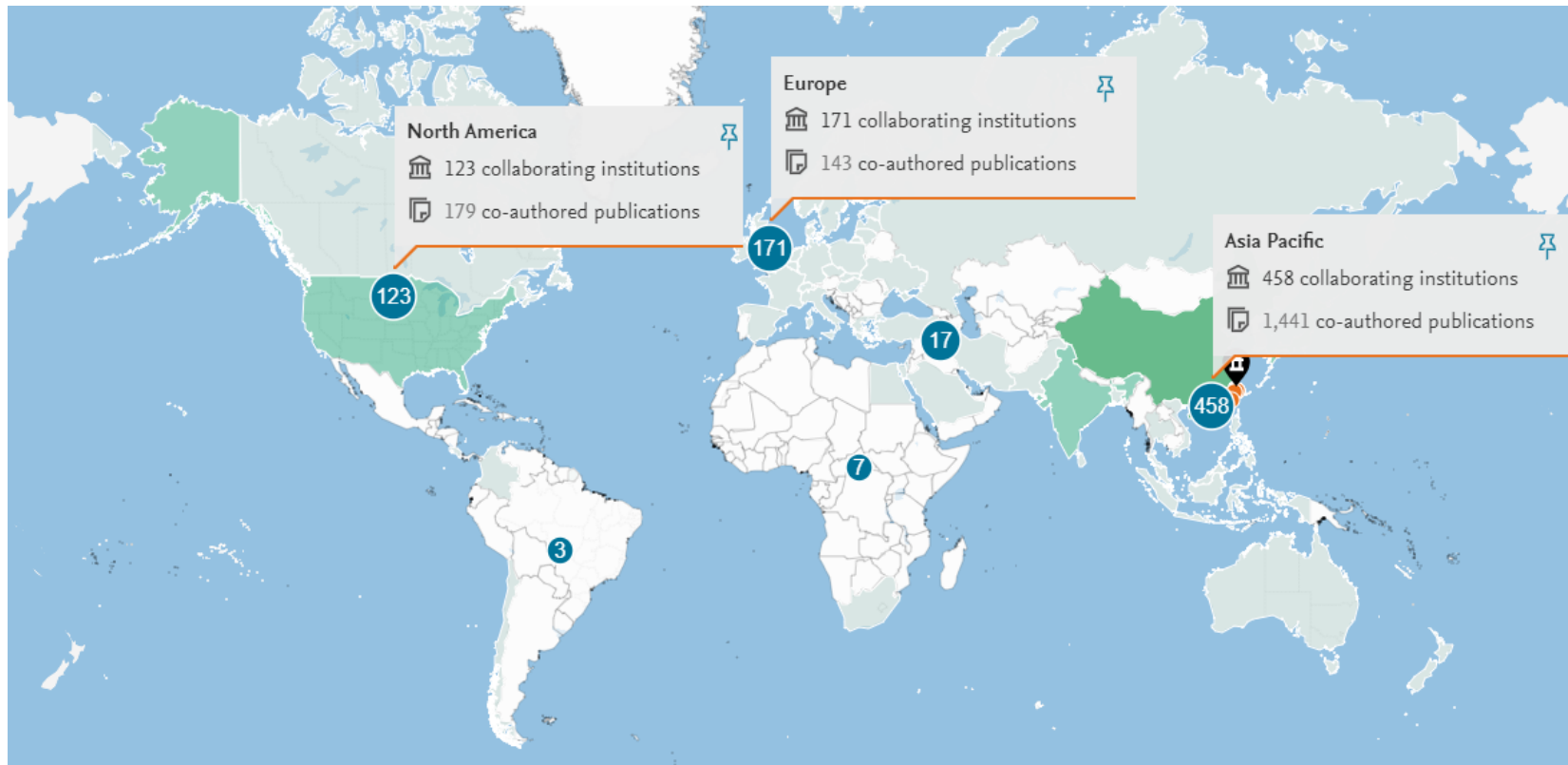


Worldwide  
Citations per Publication  
**9.6**



International  
Collaboration  
**23.0%**

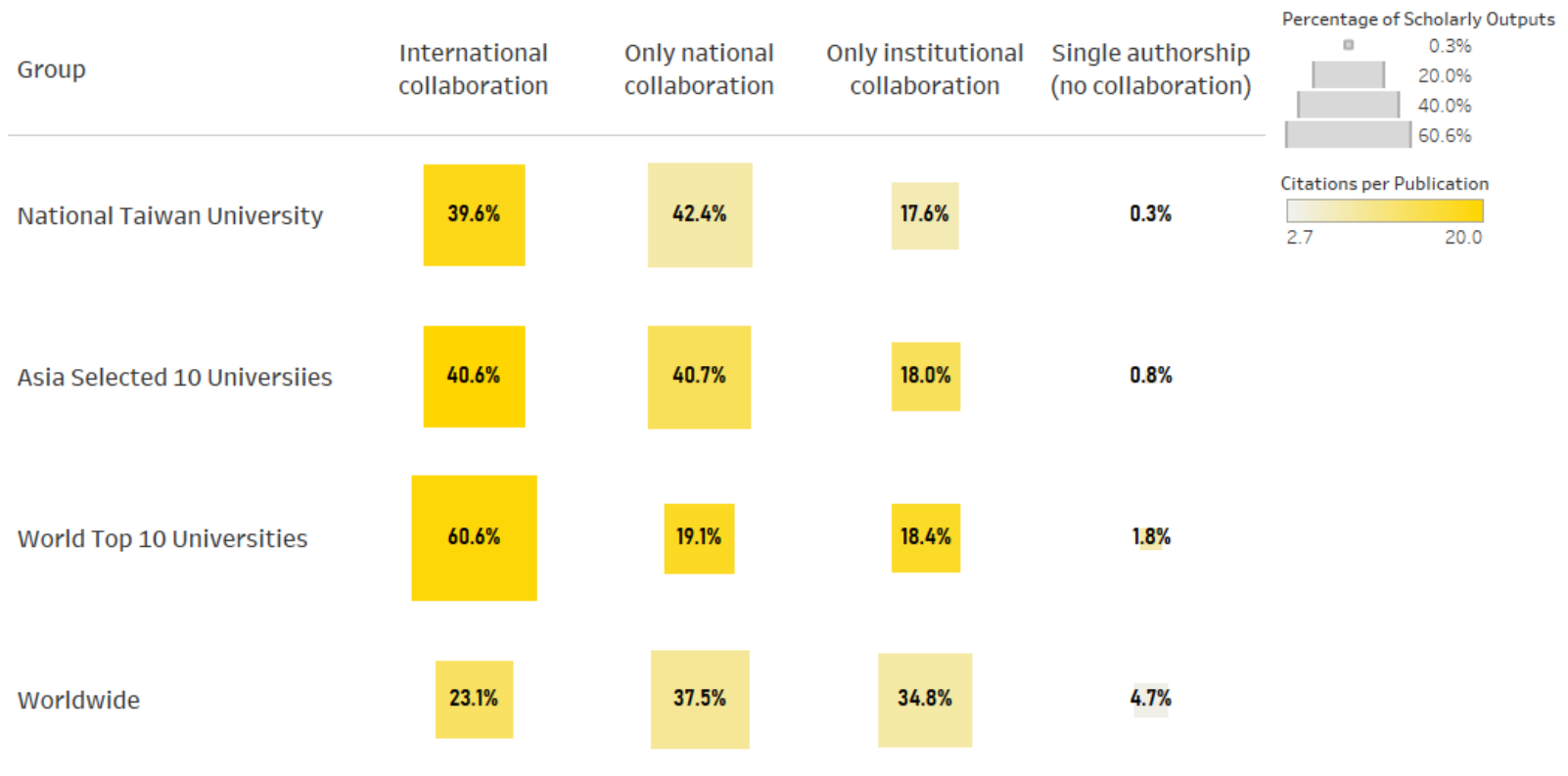
### Institutions Collaborating with National Taiwan University



# 03

## 合作情形

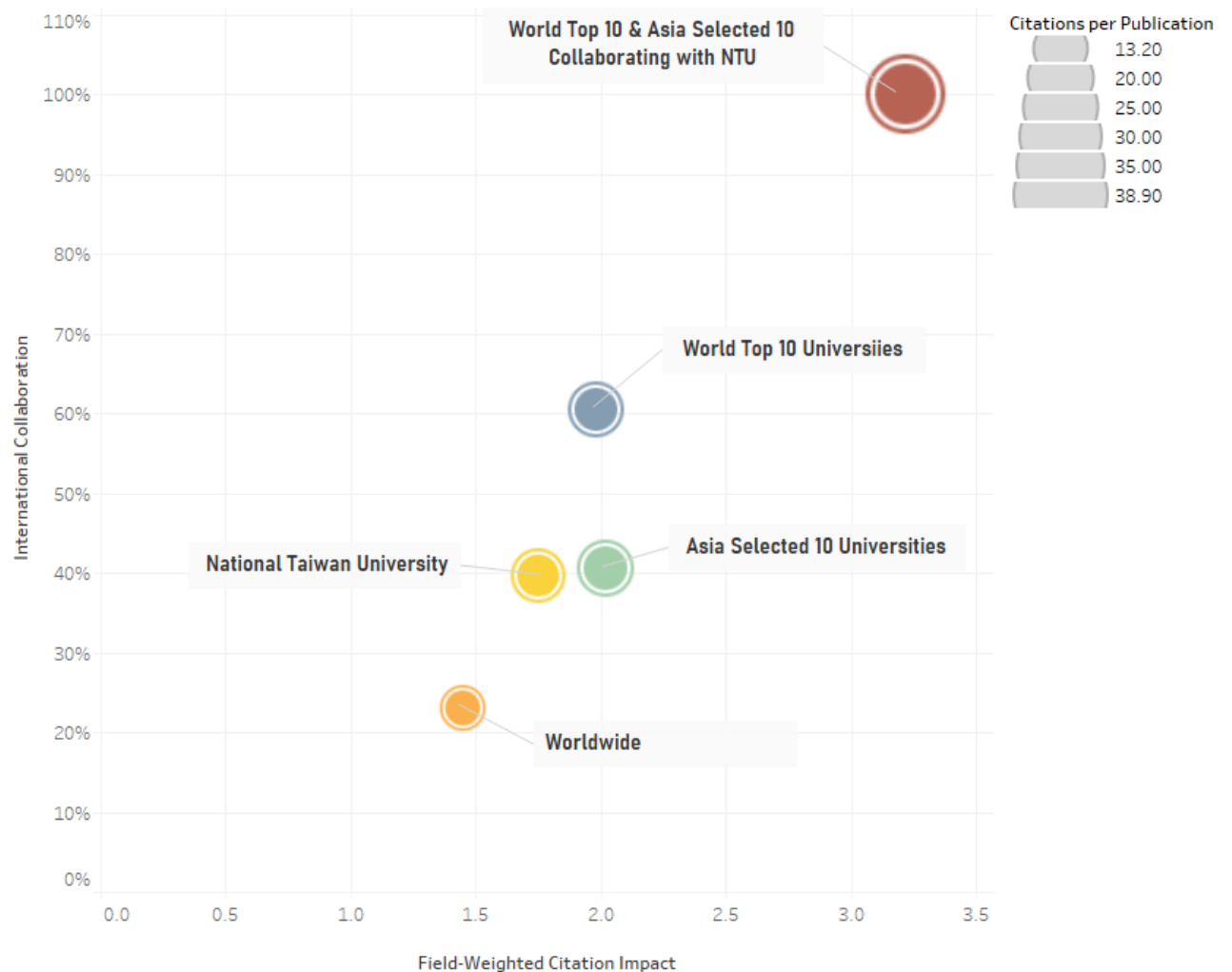
- ▶ 合作模式區分為個人著作、機構合作、國內合作與國外合作四種類型。
- ▶ 於 2022 年 QS 世界大學排名化學工程領域，四個群組皆以國際合作模式所取得的平均文章被引次數為最高。



# 03

## 國際合作表現

- ▶ 於 2022 年 QS 世界大學排名化學工程領域，本校與全球頂尖大學群以及亞洲精選大學群等 18 個學校合作論文發表共 55 篇。
- ▶ 本校與全球及亞洲頂尖學校之國際合作學術產出，由右圖可知其影響力高於其他群組的平均表現。

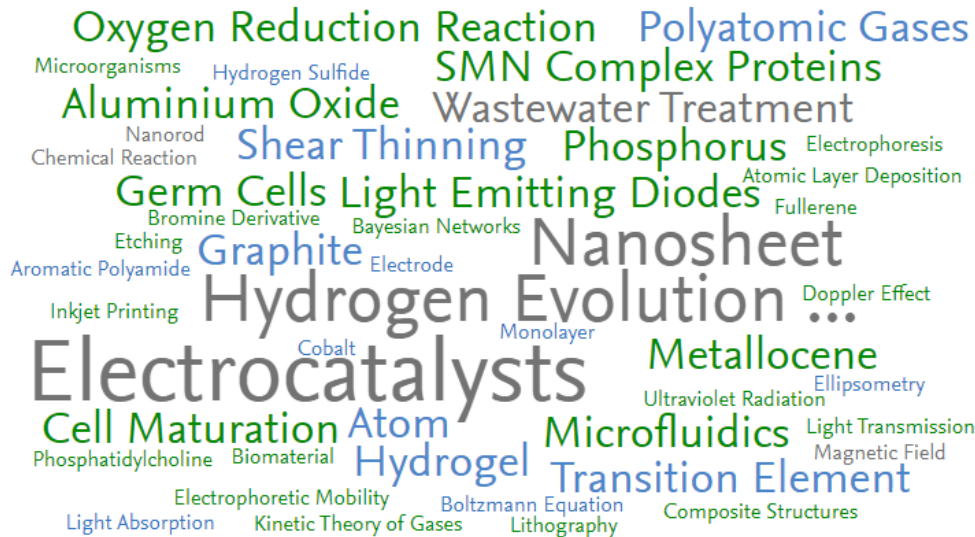


# 03

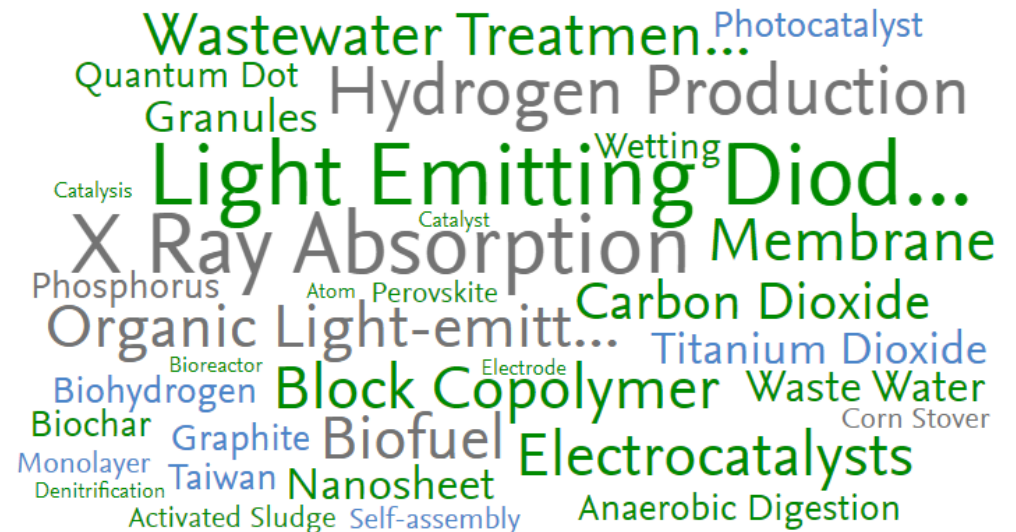
## 本校國際合作研究主題

● Top 50 keyphrases by relevance, based on 55 publications of World Top 10 & Asia Selected 10 Universities collaborating with NTU

● Top 50 keyphrases by relevance, based on 757 publications of international collaborating with NTU



AAA relevance of keyphrase | declining AA A growing (2018-2020)

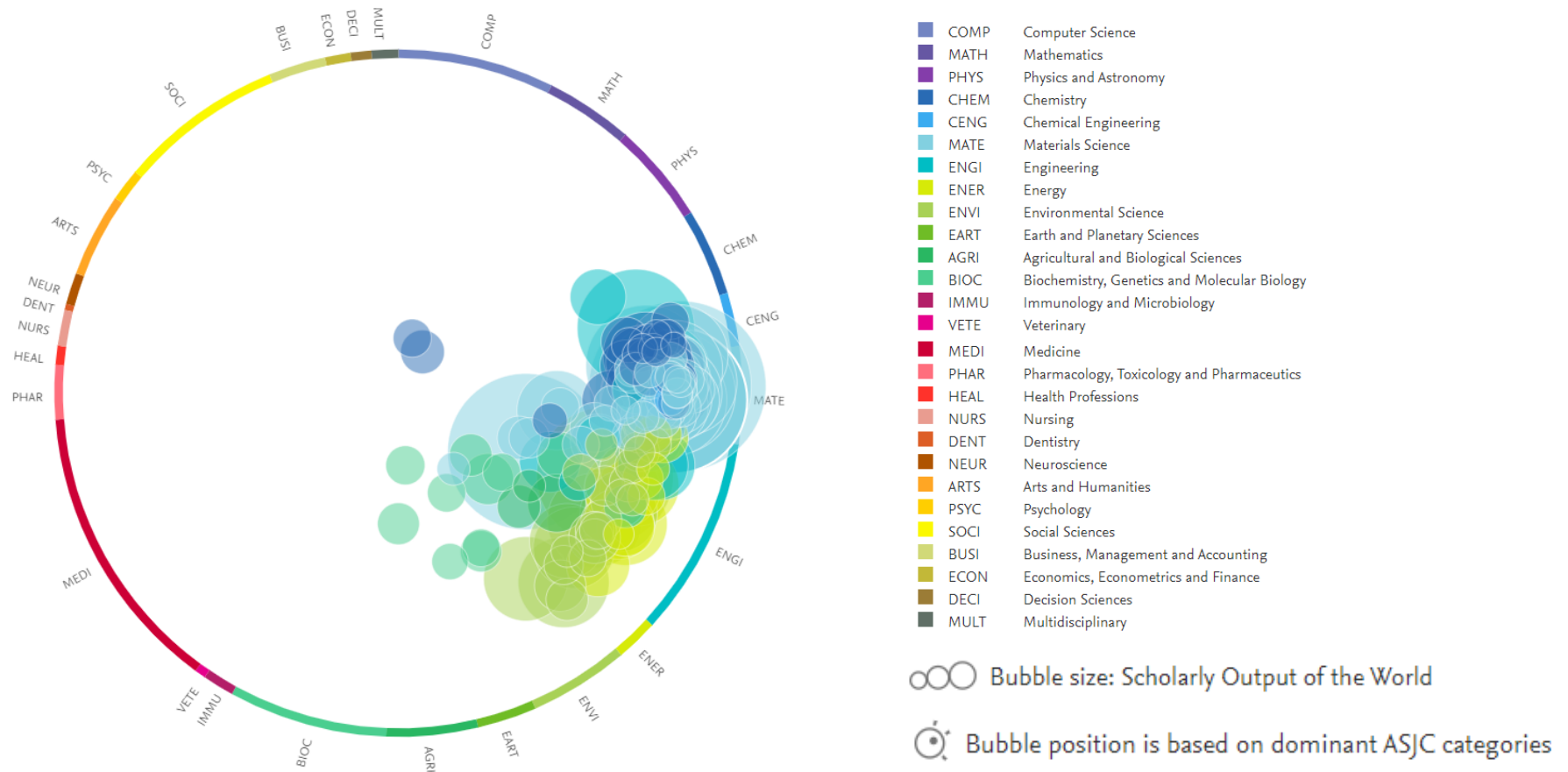


AAA relevance of keyphrase | declining AA A growing (2018-2020)

# 04

## 全球前 1% 熱門主題領域分布

► 研究主題熱門指數（Topic Prominence）是由 Scopus 近 2 年的引用次數、瀏覽次數和期刊影響指數三種指標綜合計算，排序後按照百分位表示，以顯示研究主題的發展趨勢（momentum）。







# 04

## 全球前 1% 熱門主題

- ▶ 依熱門指數排序，下圖列出全球前 10 位熱門指數之研究主題的全球論文數量、領域加權引用影響（FWCI\*），以及三個群組共 19 個學校參與研究主題情形。
- ▶ 完整 179 個 Topics 資訊請點選：[線上檢視](#)，可利用 Topic ID、學校名稱進行交叉組合查閱資訊，自行依需求選擇排序欄位檢視。

Topic ID	Topic 1st-3rd Relevance Keyphrases	Prominence percentile	Worldwide Scholarly Output	Worldwide Average FWCI	Number of Universities
T.2252	Cyanogen; Graphitic Carbon Nitride; Photocatalysts	99.993	9758	2.71	16
T.4025	Oxygen Production; Electrocatalysts; Catalyst	99.99	8733	2.55	19
T.6	Electrode; Cobaltous Sulfide; Electrode Materials	99.984	10320	2	17
T.350	Zinc Air Batteries; Electrocatalysts; Catalyst	99.983	7141	2.23	19
T.5899	Catalyst; Cobalt Phosphide; Water Splitting	99.979	6453	2.3	19
T.3479	Carbon Dioxide; Electrocatalysts; Chemical Re..	99.977	4748	2.4	19
T.1195	Fluorescence; Nanodots; Carbon Nanoparticles	99.967	6962	1.69	12
T.256	Shielding; Effective Bandwidth; Electric Network Analyzers	99.966	5967	2.75	11
T.5315	Organic Polymers; Triazines; Porous	99.961	3909	2.13	18
T.6669	Activation; Sulfate Radical; Advanced Oxidation	99.959	4046	2.66	12

\* 領域加權引用影響（Field-Weighted Citation Impact, FWCI）說明：[https://tw.service.elsevier.com/app/answers/detail/a\\_id/16216/supporthub/scopus/](https://tw.service.elsevier.com/app/answers/detail/a_id/16216/supporthub/scopus/)

# 04

## 各校熱門主題分析

- ▶ 本校全球前 1% 熱門指數研究主題佔論文百分比 2% 以上者計有 12 個，各校參與研究情形同時呈現如下圖，圓圈大小代表佔該校論文比例。
- ▶ 179 個 Topics 以及 19 個評析學校之完整資訊請點選：[線上檢視](#)。藉由各校研究主題、論文佔比情形等資訊，提供本校探索學術合作之參考。

Topic ID	Topic 1st-3rd Relevance Keyphrases	Natl Taiwan Univ	California Inst of Tech	Hong Kong Univ of Sci & Tech	Imperial Coll London	Korea Adv Inst of Sci & Tech	Kyoto Univ	MIT	Nanyang Tech Univ	Natl Univ of Singapore	Peking Univ	Seoul Natl Univ	Stanford Univ	Swiss Fed Inst of Tech Zurich	Tsinghua Univ	Univ of California, Berkeley	Univ of Cambridge	Univ of Hong Kong	Univ of Oxford	Univ of Tokyo
T.4025	Oxygen Production; Electrocatalysts; Catalyst	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.14487	Deionization; Water Desalination; Electrode	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.3479	Carbon Dioxide; Electrocatalysts; Chemicals	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.3044	Ligands; Cages; Self-Assembly	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.16	Bioenergy; Regenerative Fuel Cells; Bioelectricity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.1195	Fluorescence; Nanodots; Carbon Nanoparticles	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.5899	Catalyst; Cobalt Phosphide; Water Splitting	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.1144	Biomass; Levulinic Acids; Ethyl Levulinate	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.350	Zinc Air Batteries; Electrocatalysts; Catalyst	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.5267	Distillation; Direct Contact; Membrane	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.2252	Cyanogen; Graphitic Carbon Nitride; Photocatalysis	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T.155	Anaerobic Digestion; Biofuel; Methane Production	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

# 05

## 臺大圖書館領域網絡分析服務

本校專任教師或單位主管對本案分析報告有任何問題，或有個人研究領域 / 院系學術研究力之領域網絡分析服務需求，歡迎聯繫諮詢或[線上申請](#)。

▼ 點選獲得更多詳細說明 ▼



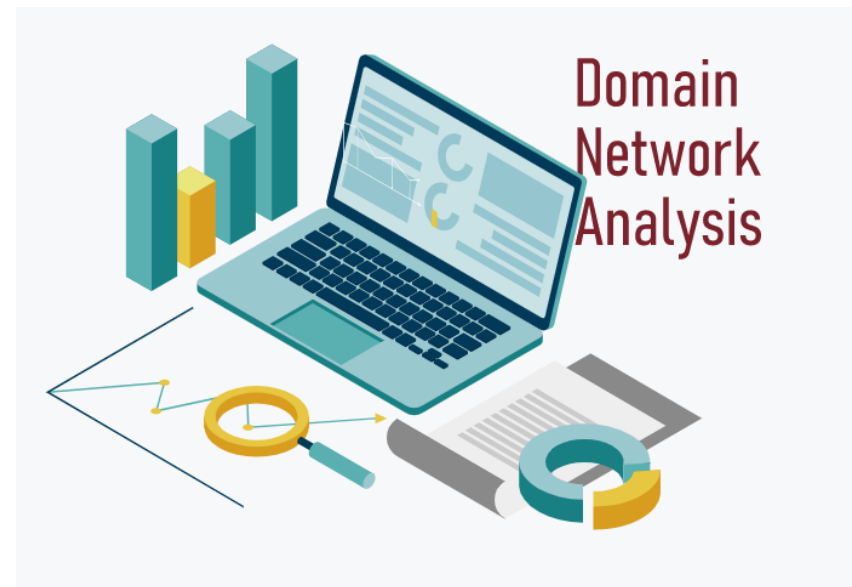
### 教師

- ◆ 領域熱點具像呈現
- ◆ 研究趨勢聚焦探索
- ◆ 申請計畫佐證加分



### 學院系所

- ◆ 評估單位研究動能
- ◆ 分析學術合作走向
- ◆ 輔助科學研究決策





國立臺灣大學

## 領域網絡分析概覽—化學工程 2022

At a Glance – Domain Network Analysis for  
Chemical Engineering 2022

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發行人：陳光華

出版者：國立臺灣大學圖書館

電話：02-33662326

地址：10617臺北市大安區羅斯福路四段一號

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報告執筆：林秋薰

業務指導：唐牧群

編輯單位：國立臺灣大學圖書館研究支援組

電話：02-33662336

Email：[ntulibcn@ntu.edu.tw](mailto:ntulibcn@ntu.edu.tw)

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