NTU-KU Joint Funding

Final Report

Section 1

NTU principle investigator	
Name (last name, first name)	Wu, Kevin C.-W.
Position	Professor
Faculty/Department	Department of Chemical Engineering

KU principle investigator	
Name (last name, first name)	Furukawa, Shuhei
Position	Professor
Faculty/Department	Institute for Integrated Cell-Material Sciences
Visiting ECR*	
Name (last name, first name)	Han, Po-Chun
Position	student
Faculty/Department	Ph.D. Program of Green Materials and Precision Devices

*Please complete this section if the KU principal investigators hosted ECRs from NTU.

Host researcher*	
Name (last name, first name)	
Position	
Faculty/Department	

*Please complete this section if the host researcher is different from the KU principal investigator.

Section 2

Project title
Controlled Functionalities of Metal-Organic Polyhedra (MOP) for Fructose Dehydration to 5-hydroxymethylfurfural

Section 3

Period of project	
From dd/mm/yy to dd/mm/yy	From 01/April/2022 to 28/February/2023

Section 4

Summary of the project (approx. 100 words)
*KU PIs are required to submit a summary of the project in Japanese in addition to the English summary (approx. 200–300 characters).

(Please enter the summary of the project)

Despite the pandemic preventing foreign professors from attending, the PI from NTU still organized the Taipei International Conference on Catalysis (TICC) in order to facilitate the communication of knowledge related to catalysis. Additionally, the ECR was sent to KU with the acquired knowledge of catalysis to learn more about chemical synthesis techniques from the PI at KU. By leveraging the expertise of both professors from NTU and KU, our collaboration resulted in the successful development of a multivariate nanomaterial with the potential to catalyze multiple types of biomass conversion simultaneously. (as shown in Section 6.)

Section 5 (Please complete this section if ECRs from NTU participated in collaborative research at KU)

Achievements and Outcomes of ECRs' Stay (approx. 100–250 words)
*This section should be filled by each of the ECR(s) (one paragraph per ECR) based on his/her experience of staying in Japan.

(Please enter the achievements and outcomes for each of the ECR(s).)

As a chemical engineering student, the opportunity to join Prof. Furukawa's renowned material chemistry group at KU was like discovering a gateway to a completely new realm of knowledge. To summarize my newfound knowledge and accomplishments during my visit, I have compiled a few takeaways below:

1. I have acquired several techniques for synthesizing and characterizing metal-organic polyhedral (MOPs), including column chromatography, nuclear magnetic resonance (NMR), and dynamic light scattering (DLS).
2. After going back to NTU, we applied the MOPs for the passivation of perovskite, developing a new strategy to create a high performance and stable perovskite solar cell. The resulting outcome was published in the international journal. (J. Mater. Chem. C, 2022, 10, 14542-14548)
3. Pursuing a multivariate porous material based on the MOPs is ongoing in KU, I started some trials in this research when I was in KU and kept cooperating with their researchers after my visit. Finally, a new type of colloidal gel with high chemical complexity was successfully discovered and well-studied. The resulting outcome was published in the international journal. (Small Struct., 2022, 3, 2100197)

Section 6

Photographs with captions
*Please submit digital files (such as JPEG or GIF files) of the photographs used in your report as attachments. The size of each image should be at least 4MB, so that it can be used for printed materials. Please ensure that none of the photographs submitted will cause any issues relating to portrait rights.
URL at which project outcomes can be viewed (Optional)
*E.g. workshop notifications/programs/reports, evidence of academic papers published or otherwise made available, etc.
URL: https:/ /doi.org/10.1039/D2TC0211 OB https:/ /doi.org/_10.1002/sstr.202100197