

Colloquium

Department of Engineering
and System Science,
Institute of Nuclear
Engineering and Science,
National Tsing Hua University

Catalyst Design and In-situ Investigation for Water and Carbon Dioxide Electrolysis

洪崧富教授, Prof. Sung-Fu Hung,
Assistant Professor, Department of
Applied Chemistry, National Yang
Ming Chiao Tung University

Electrical conversion of water and carbon dioxide into chemical fuels provides a promising approach to store massive renewable energy. In this talk, the catalyst design and in-situ investigation for water and carbon dioxide electrolysis will be presented. 3d transition metal oxide/non-oxides were developed as the high-efficient electrocatalysts for water electrolysis. The in-situ XAS and XRD were employed to study the detailed catalytic mechanisms. On the other hand, the synthesized single-atom catalysts exhibit high catalytic performance toward carbon dioxide electrolysis. The in-situ XAS identified the single-atom nature of the catalysts and the catalytic process. The catalytic environment for carbon dioxide electrolysis was also found to affect the catalytic activities significantly, included in this talk.

15:30-17:20 P.M., Wed., Sep. 29th, 2021
[synchronize online talk](#)

Biography:



Education :

PhD. at National Taiwan University,
Taiwan (2014~2018)

M.S. & B.S. at National Tsing-Hua
University, Taiwan (2008~2010, 2004~2008)

Experience :

1. Postdoctoral Research Fellow, University of Toronto & National Taiwan University (2019~2020, 2018~2019)
2. Research Associate, Nanyang Technological University (2014.02~09)
3. Research Assistant, National Taiwan University & Academia Sinica (2013~2014, 2010~2012)

Award :

1. Fellow of the Higher Education Academy (FHEA), UK, 2021
2. Yushan Young Scholar, 2020
3. IUPAC-Solvay International Award for Young Chemists, 2019 (5 winners per year international, the first winner in Taiwan)
4. Lam Research Award, 2018
5. The Best Thesis Award in Song-Pei Wu Applied Chemistry, Chemical Society Located in Taipei, 2018

Research Areas :

- Synthesis of nanostructural materials for (photo-)electrocatalysts
- (Photo-)electrocatalysis: oxygen evolution reaction (OER), hydrogen evolution reaction (HER), oxygen reduction reaction (ORR), and CO₂ reduction reaction (CO₂RR)
- Flow systems for scalable water and CO₂ electrolysis
- Development of in-situ technologies for (photo-)electrocatalysts: hard/soft X-ray absorption spectroscopy (XAS), high-energy-resolution fluorescence-detection X-ray absorption spectroscopy (HERFD-XAS), X-ray diffraction (XRD), Raman spectroscopy

sungfuhung@nctu.edu.tw