國立清華大學第 28 屆新進人員研究獎得獎人簡介

化學系　王育恒副教授

Personal Profile

Dr. Yu-Heng Wang is an Associate Professor in the Department of Chemistry at National Tsing Hua University (NTHU), where he leads the YHW Laboratory (https://www.nthuchemyhwlab.com/) dedicated to advancing clean energy research and greenhouse-gas utilization through molecular electrocatalysis and photochemistry. With a strong foundation in inorganic and organometallic chemistry, Dr. Wang has built his academic career around designing sustainable catalytic systems capable of addressing global challenges such as climate change, energy transition, and environmental sustainability.

Academic Background and Research Focus

Dr. Wang received his Ph.D. in Chemistry from the University of Wisconsin–Madison. Following his doctoral studies, he pursued postdoctoral research at the University of Pennsylvania. His research is rooted in the pressing need to mitigate carbon emissions while enabling renewable energy conversion and storage. He has consistently pursued the development of molecular catalysts for both electrocatalytic and photochemical transformations. His work emphasizes homogeneous catalysis, where molecularly well-defined systems allow for mechanistic clarity and tunable performance. By integrating kinetics, electrochemical techniques, and advanced spectroscopic tools, Dr. Wang seeks to reveal the underlying principles governing reaction pathways and efficiency.

Scientific Mission

Dr. Wang views greenhouse gases such as CO_2 not solely as pollutants but as abundant carbon feedstocks for future chemistry. His vision is to transform waste into value—converting atmospheric CO_2 into fuels and fine chemicals under mild and sustainable conditions. Simultaneously, his research program aims to optimize energy interconversion between electrical and chemical forms, thereby contributing to the broader field of renewable energy storage and utilization.

Vision and Outlook

Beyond individual reactions, Dr. Wang's long-term aspiration is to bridge fundamental molecular science with practical applications. His group strives to design catalysts that are not only efficient and selective but also robust and scalable, ensuring that they can eventually contribute to real-world clean energy solutions. He envisions molecular chemistry playing a pivotal role in the net-zero carbon future, with his research contributing to both academic discovery and societal impact.

個人簡介

王育恒博士現任國立清華大學化學系副教授 (NTHUCHEM YHW Lab, https://www.nthuchemyhwlab.com/)。他的研究核心在於開發分子層級的電催化與光催化系統，以應對全球能源轉型與氣候變遷挑戰。王博士長期專注於無機化學與配位化學領域，透過可持續的催化策略，推動二氧化碳等溫室氣體的利用，並開拓潔淨能源的生產、轉換與儲存。

學術背景與研究方向

王博士於美國威斯康辛大學麥迪遜分校取得化學博士學位，之後在賓州大學化學系進行博士後研究。面對全球碳排放與能源需求的壓力，王博士將均相催化視為研究核心，因為此方法可提供高度可控與可解析的分子系統，有助於深入理解反應機構。他結合動力學分析、電化學技術與光譜監測，探討能量相關反應中的電子轉移與質子耦合過程，進而設計高效、可調控的分子催化劑。

研究方法與策略

在研究策略上，王博士強調理論與實驗的結合。藉由設計具體分子模型，他能精確追蹤反應路徑並鑑別限制步驟，同時開發新型催化劑以突破傳統能效瓶頸。他探索兩大方向：電催化利用電能驅動化學反應；光催化則借助可見光作為潔淨能源觸發反應，展現出環境永續與能源創新的雙重意義。

願景與展望

王博士的長遠目標是將基礎研究成果推向實際應用，設計出兼具高效率、高選擇性與耐久性的催化系統，並具備產業化潛力。他期望分子化學能在淨零碳排的未來中扮演關鍵角色，並持續以科研成果貢獻於全球能源轉型與永續發展。王博士正持續推動分子電催化與光催化領域的發展，將基礎科學的突破轉化為能源與環境挑戰的解方。