



## **Department of Materials Science and Engineering Seminar Series 2024**

### **Synergistic Effect in Electrocatalysts for High Performance Energy Materials**

**Wang Junhui**

**Date and time: 4<sup>th</sup> June; 3-5 pm**

**Venue: EA-06-04**

### **Abstract**

Single-atom catalysts (SACs) have garnered significant research attention in last decade. However, the strong agglomeration and limited diversity of isolated metal atoms have hindered their practical application. To overcome these limitations, the synergistic effect, which can make different active species work together to deliver better catalytic performance, has been explored in my thesis. Three detailed research studies were conducted to understand the mechanism of synergistic effects. Firstly, synergistic effect enables the sample including W single-atoms (SAs) and nanoparticles (NPs)s to circumvent the scaling relationship in ORR, resulting in enhanced catalytic performance. Subsequently, in Pt-based catalysts, the relationship between synergistic effects, spatial structure, and reaction mechanisms for acidic HER has been explored. Results demonstrate that the spatial distribution is crucial to obtain synergistic effects. Finally, the concept of synergistic effects is applied in more complex catalytic species and reactions. In a Mo<sub>2</sub>C-interface-MoC sample with heterostructure, the synergistic effect between surface and interface helps to improve lithium polysulfides (LiPSs) conversion performance. Therefore, strategically adopting these synergies can transform “poor” catalysts into good ones, elevate “good” catalysts into even better ones, and extend the application of synergistic mechanism.

## **Biography**

Wang Junhui received his B. Sc and M.Sc. degree from Wuhan University of Technology. He is currently a PhD candidate in the Department of MSE under the supervision of Prof. John Wang and Dr. Shen Lei. His research focuses on the theoretical calculation and experimental work for catalysis and battery.

**Please join us!**

HOST: Prof. Ding Jun