**Scientific Committee:  Materials, Metallurgy & Renewable Energies**

Research Work Title ▐

# The Design and Synthesis of Nanostructured Materials for Electrochemical Energy Storage

| **Researcher** ▌Xiongwen LOU | **Country** ▌The People's Republic of China |
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**Field** ▌Materials Chemistry

**Scientific Affiliation** ▌Nanyang Technological University of Singapore

## Abstract ▐

This study focuses on the design and synthesis of novel nanostructured materials for different electrochemical energy storage and conversion technologies, including rechargeable batteries, supercapacitors, fuel cells, electrocatalysis, and (photo-) electrocatalysis. This research develops new methodologies and an understanding of the general design and efficient synthesis of electroactive materials with advanced architectures and desired compositions/components. This is only possible with the acquired in-depth insights into the correlation between charge/mass transfer and nanoscale structures, compositions/components with a combination of theoretical modeling, electronic structure calculation, geometries optimization, and electrochemical technologies. The study develops general strategies to synthesize hollow structures with high complexity. These hollow structured functional materials, including metal oxides, sulfides, and phosphides exhibit exceptional electrochemical properties for batteries, supercapacitors, and electrocatalysis.
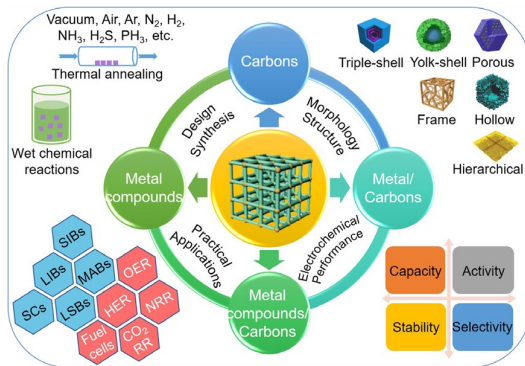


## Biography ▐

Prof. Xiongwen Lou received his B.Eng. degree from the National University of Singapore in 2002, and his Ph.D. degree from Cornell University in 2008. He is a Cheng Tsang Man Chair Professor in Energy at Nanyang Technological University of Singapore before he joined the City University of Hong Kong as a Chair Professor in 2023. Prof. Lou currently serves as a deputy editor for the Journal of Science Advances and as an associate editor for the Journal of Materials Chemistry A. He was elected as a Fellow of the Singapore National Academy of Science, and the Academy of Engineering in 2022. His main research interest is in the design and synthesis of nanostructured materials for energy applications. Prof. Lou has published over 380 papers and was listed as a Highly Cited Researcher in multiple fields by Thomson Reuters/Clarivate Analytics for nine years from 2014 to 2022 consecutively.