

## Dr. Xueliang (Andy) Sun

Professor and Tier 1 Canada Research Chair, University of Western Ontario

Fellow of Royal Society of Canada

Fellow of Canadian Academy of Engineering

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# INTRODUCTION

Dr. Sun received his Ph.D degree in Materials Chemistry at the University of Manchester, UK, in 1999. Then, he worked as a post-doctoral fellow in the University of British Columbia, Canada, during 1999-2001. He was a Research Associate at the National Institut de la Recherche Scientifique (INRS), Quebec, Canada, during 2001-2004.

Dr. Sun's research is focused on advanced materials for energy conversion and storage including Li batteries and fuel cells.

Dr. Sun is an author and co-author of over 430 refereed-journals (e.g. Nature Energy, Nature Communications, Advanced Materials, J. Am. Chem. Soc., Angew. Chem., Nano Letter, Energy & Environmental Science) with citations of over 28,000 times and H-index of 87.

Dr. Sun was named as one of "Highly Cited Researchers" in 2018 and 2019. He edited 3 books and published 16 book chapters as well as filed 18 US patents. He has given more than 120 plenary/keynote/invited talks in international conferences, symposia and workshops.

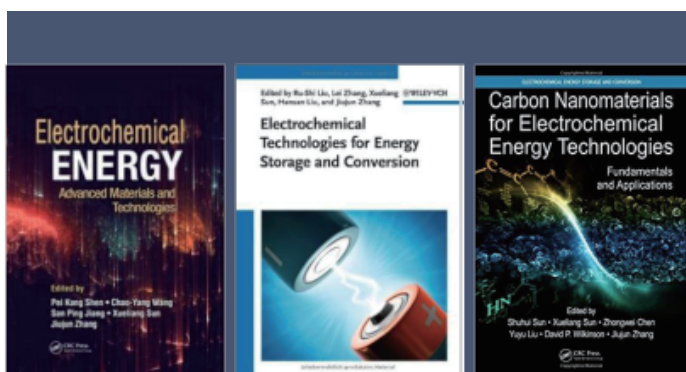
淡江大學熊貓講座  
Development of Advanced Nanotechnology for Energy Storage and Conversion

2018  
12/7 (週五)  
14:10-15:40  
守謙國際會議中心  
有蓮國際廳

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Dr. Sun is actively collaborating with industries and government labs such as Ballard Power Systems, General Motors, Lithium Phostech Inc., 3M, and China Automotive Battery Research Institute Co.. Since he joined Western in 2004, Dr. Sun secured over \$20M research funding

Dr. Sun received various awards such as Early Researcher Award (2006), Canada Research Chair (2007, 2013) and University Faculty Scholar Award (2010), Western Engineering Prize for Achievement in Research (2013), Fellow of Royal Society of Canada (2016), Fellow of the Canadian Academy of Engineering (2016), Professional Achievement Awards from Cross-cultural Professionals Association of Canada (CPAC, 2016), Award for Research Excellence in Materials Chemistry Winner from Canada Chemistry Society (2018), Award of Merit of the Federation of Chinese Canadian Professionals (2018), and Western Hellmuth Prizes (The highest Research Achievement Award in the University, 2019).



Dr. Sun is a Vice Chairman of the International Academy of Electrochemical Energy Science (IAOEES). He also serves as an Editor-in-Chief of "Electrochemical Energy Review" under Spring-Nature and an Associate Editor for Frontier of Energy Storage (2013-present).



## JOURNAL ARTICLES (418)

**Citation metrics: H-index – 80, Total Citations – 24,700 (Google Scholar Dec. 10th, 2019)**

Citation histogram from Google Scholar: Prof. Sun and his group named to 2018, 2019 "Highly Cited Researchers"







## Topic

Development of Advanced Nanotechnology for Energy Storage and Conversion

# ABSTRACT

Energy shortages and environmental pollution are two serious challenges that humanity will face in the long-term. Both energy storage and conversion such as batteries and fuel cells are important strategies to address these problems. In this talk, I will talk about how to use advanced materials to address challenges in both technologies, in particular, focusing on all solid-state batteries and single atom electrocatalysts in fuel cells.

### Outline of This Talk

#### BATERIES:

- [Interface Design for Li-S Batteries](#)
- [Interface Design for Cathode Materials in LIBs](#)
- [Na-Air batteries: in-situ Synchrotron Studies](#)
- [Interface Design for Solid-State Batteries](#)

#### FULL CELLS:

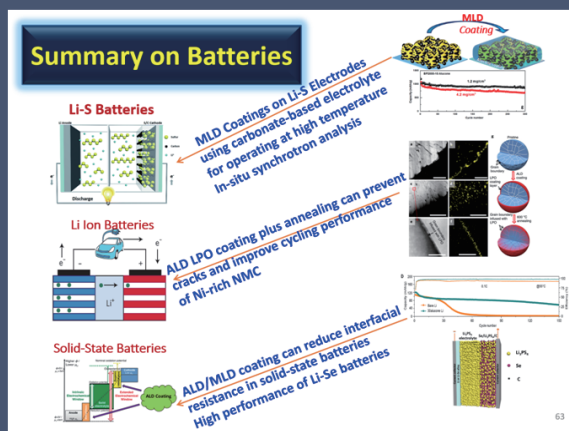
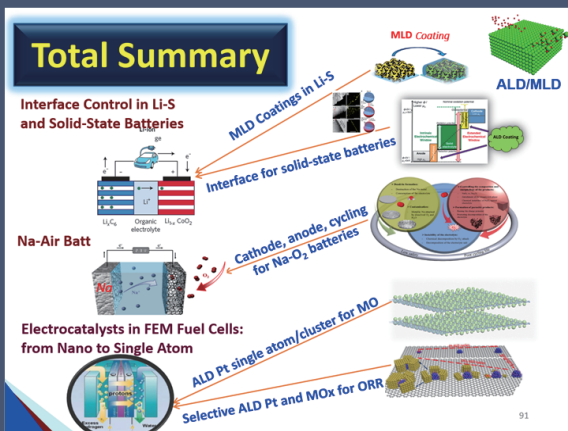
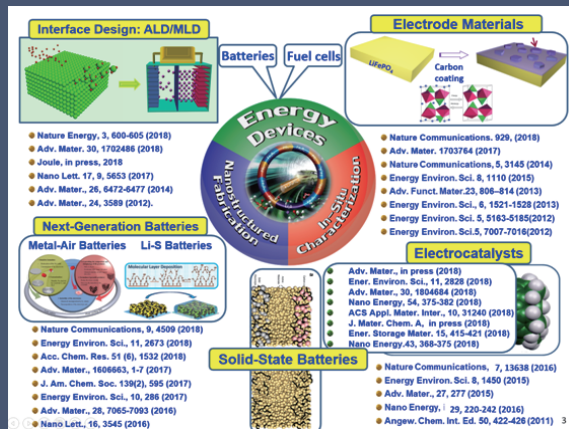
- [Electrocatalysts in PEM Fuel Cells: from Nano to Single Atom](#)
- *Some Examples Using ALD/MLD Techniques and In-situ Characterization*



All solid-state lithium batteries (SSLBs) have recently emerged as a promising alternative energy storage device due to their ability to overcome the intrinsic disadvantages of liquid-electrolyte LIBs and possess a greater volumetric energy density due to the use of solid-state electrolytes (SSEs). However, development of new solid-state electrolytes and the interfacial issues between SSEs and electrodes (both cathode and anode) are two big challenges, which have a significant impact on the stability and lifetime of SSLBs. I will talk these aspects.



Fuel cells are electrochemical devices that can convert the chemical energy of a fuel directly to electrical power. However, there are still challenges ahead which are hindering the market implementation of PEMFC technology, mainly high cost of materials and the durability during fuel cell life-time operation. The high cost is primarily associated with precious metal catalysts (Pt or Pt alloys). We used ALD to control the size of Pt down to single Pt atom catalysts and dimers. I will also discuss some future perspectives.



## MINUTE

Met with Chairman of the Board,  
Dr. Flora Chia-I Chang and TKU colleagues



Met with President,  
Dr. Huan-Chao Keh and TKU colleagues



Prof. Sun visited Tamkang University on December 6-9, 2018. Prof. Way-Faung Pong at Department of Physics at TKU made receptions and accompanied him during his stay. His visit was honored by Tamkang Clement and Carrie Chair Lecture Fund and the Ministry of Science and Technology in Taiwan. Besides TKU, he also visited National Synchrotron Radiation Research Center (NSRRC) and National Taiwan University of Science and Technology during his stay.

Before the Chair Lecture at TKU, Prof. Sun visited President, Dr. Huan-Chao Keh and Chairman of the Board, Dr. Flora Chia-I Chang. Warmest welcomes were presented.

During the Lectures, science and engineering faculty and students were crowded at the international conference center to listen to the two-hour chair speech on Development of Advanced Nanotechnology for Energy Storage and Conversion. When delivering his speech, Prof. Sun received great attentions from the audience, and interacting with the audience during the Q&A session successfully.





Delivering The Tamkang Clement and Carrie Chair Lecture at The International Convention Centre



Met with Vice-President, Dr. Chii-Dong Ho and TKU colleagues