FACULTY OF SCIENCE
THE UNIVERSITY OF HONG KONG
香港大學理學院
Department of Chemistry
化學系

HKU SCIENCE
Distinguished
Lectures

Single-Atom Catalysis

October 24, 2025 (Friday)

11:00 am - 12:00 pm (HKT)

Lecture Theatre P1, Chong Yuet Ming Chemistry Building,
The University of Hong Kong

Professor Tao ZHANG

Dalian Institute of Chemical Physics,
Chinese Academy of Sciences

Professor Tao Zhang received his PhD in 1989 from Dalian Institute of Chemical Physics (DICP), Chinese Academy of Sciences (CAS). After spending one year as a postdoctoral researcher at the University of Birmingham, he rejoined DICP, where he was promoted to full professor in 1995. He served as the director of DICP (2007-2016) and as the vice president of CAS (2016-2023).

His research interests are mainly focused on Single-atom catalysis and catalytic conversion of biomass. He discovered a new catalytic process for converting cellulose to ethylene glycol in 2008 and successfully demonstrated it on a pilot scale (1000 tons/year) in 2023. Particularly, in 2011, he coined the new concept "**Single-Atom Catalysis**", which is now one of the hot frontiers in chemistry.

He has won numerous awards, including the Future Science Prize (2024), Tang Aoqing Award (2024), Advance of Catalysis Award of APACS (2023), ChinaNano Award (2018), and National Invention Prize (2005, 2006, and 2008). He has published more than 600 peer-reviewed papers and 110 patents (H-index 125 with over 75000 citations). He serves as the Associate Editor of *JACS*, the Editor-in-Chief of *Chinese Journal of Catalysis* and Co-Chair of the Editorial Advisory Board of *Chemistry – A European Journal*. He is also an Editorial Board Member of *Applied Catalysis B, Green Chemistry*, *ACS Sustainable Chemistry & Engineering, ChemPhysChem and Industrial & Engineering Chemistry Research.* He was elected an academician of the Chinese Academy of Sciences in 2013, a fellow of TWAS in 2018, and an international fellow of the Canadian Academy of Engineering in 2020. He is also a council member of the International Association of Catalysis Societies.

Abstract

Single-atom catalysis has emerged as a new and possibly the most active frontier in heterogeneous catalysis, since Professor Tao Zhang and his team coined this new concept in 2011 (*Nature Chemistry* **2011**, 3, 634-641). With the great potential for maximising the atom efficiency and the well-defined active sites in a catalytic process, single-atom catalysts (SACs) have received incredible attention. Great advances have been achieved in the past decade in the preparation of highly efficient SACs, the exploration of new reactions, as well as the understanding of catalysis mechanisms. In this lecture, Professor Zhang will introduce the fast progress of SACs and mainly focus on the research in his group to address some of the fundamental issues about single-atom catalysis, including the nature of the active sites in SACs, the essential role of the coordination structure of single atoms, as well as the dynamics of SACs during reactions. Moreover, the significant opportunities and challenges in this new field of catalysis will be discussed.

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