Department of Mechanical Engineering
THE UNIVERSITY OF HONG KONG

SEMINAR

Breaking and Reforming: The Key to Structurally Ordered Functional Polymers and Sustainable Materials via Dynamic Covalent Chemistry

Date: 11 December, 2025 (Thursday)
Time: 11:00 a.m.
Venue: Room 7-34 & 7-35, Haking Wong Building
HKU

Speaker: Professor Wei Zhang
Department of Chemistry and Materials Science & Engineering Program
University of Colorado Boulder
USA

Abstract:
Dynamic covalent chemistry (DCvC) has proven to be highly effective toward the construction of well-defined molecular and polymeric architectures. The error-correction mechanism enabled by the controlled reversible formation of dynamic covalent bonds leads to the formation of structurally ordered, thermodynamically favored species. One such example is the solvothermal synthesis of covalent organic frameworks (COFs) with periodic structural order and low defect density. The chemical compositions of such frameworks are usually well-defined and inter-monomer connectivity (covalent bonding) is robust. Bottom-up synthesis of covalently linked polymers through DCvC has many critical advantages, such as easy tunability of functional and structural properties in a controlled fashion through rational design of the precursors, formation of highly stable linkages, minimized structural defect, and possible access to sophisticated architectures that are hard to obtain otherwise. This talk will focus on our recent progress in the development of two types of DCvC, namely spiroborate exchange and dynamic nucleophilic aromatic substitution (DySNAr). These powerful synthetic tools enabled the bottom-up design and synthesis of novel polymeric materials, such as unprecedented single-crystal DNA-like helical covalent polymers (HCPs), 2D/3D open frameworks, and closed-loop recyclable polymers/composites.

Biography:
Dr. Wei Zhang received his B.S. in Chemistry from Peking University in 2000, and his Ph.D. in Chemistry from the University of Illinois at Urbana-Champaign (UIUC) with Prof. Jeffrey Moore in 2005. After conducting his postdoctoral research at MIT with Prof. Timothy Swager, he started his independent career at the Department of Chemistry and Biochemistry at University of Colorado Boulder in 2008. Currently he is a full professor and served as the Department Chair from 2022 to 2025. Dr. Zhang's research is focused on utilizing dynamic covalent chemistry to develop novel organic and hybrid functional materials for a broad range of environmental and energy applications, such as carbon capture, light harvesting, energy storage, catalysis, and development of sustainable polymeric materials and functional composites. He has received a

number of awards/recognitions in his independent career, such as University New Inventor of the Year, 3M Non-Tenured Faculty Award, CAPA Distinguished Junior Faculty Award, NSF CAREER Award, Alfred P. Sloan Research Fellow, Provost's Faculty Achievement Award, Guest Professor at ETH Zürich (Switzerland), Eminent Scholar and Guest Professor at Kyung Hee University (South Korea), American Chemical Society (ACS) Colorado Section Award (2022), Elected Senior Member of the National Academy of Inventors (NAI, 2023), CU College Scholar Award (2024), and Highly Cited Researcher (2024 and 2025, recognized by Clarivate).

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. X.B. Yin at 3910 2659.