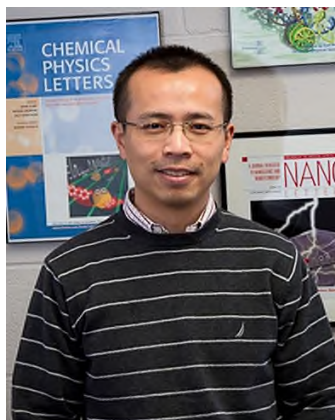


CBC Virtual Seminar Series



Professor Peng Chen
Cornell University, New York

Single-molecule Catalysis: Nanoparticles and Polymers

This presentation will describe our efforts in developing single-molecule approaches to study catalysis, focusing on two stories. The first story will be about our single-molecule fluorescence imaging work on the catalytic properties of individual nanoparticles at single-turnover resolution and nanometer precision. I will describe the insights we gained into the catalytic activity and dynamics of individual metal nanoparticles, and the surprising spatial and temporal activity patterns and dynamics within single nanocatalysts. The second story will be about our work in using magnetic tweezers to track single polymer growth in real time under living polymerization catalysis conditions. I will describe how the real-time growth dynamics of single polymers reveal the formation and unraveling of conformational entanglements that play key roles in the polymerization kinetics and kinetic dispersion among individual polymers.

Key references:

- 1) W. Xu, J. S. Kong, Y.-T. E. Yeh, P. Chen* "Single-Molecule Nanocatalysis Reveals Heterogeneous Reaction Pathways and Catalytic Dynamics" *Nature Mater.* 2008, 7, 992-996.
- 2) X. Zhou, N. M. Andoy, G. Liu, E. Choudhary, K.-S. Han, H. Shen, P. Chen* "Quantitative Super-resolution Imaging Uncovers Reactivity Patterns on Single Nanocatalysts" *Nature Nanotech.* 2012, 7, 237-241.
- 3) J. B. Sambur, T.-Y. Chen, E. Choudhary, G. Chen, E. J. Nissen, E. M. Thomas, N. Zou, P. Chen* "Sub-particle reaction and photocurrent mapping to optimize catalyst-modified photoanodes" *Nature* 2016, 530, 77-80.
- 4) C. Liu, K. Kubo, E. Wang, K.-S. Han, F. Yang, G. Chen, F. A. Escobedo,* G. W. Coates,* P. Chen* "Single polymer growth dynamics" *Science* 2017, 358, 352-355.
- 5) N. Zou, X. Zhou, G. Chen, N. M. Andoy, W. Jung, G. Liu, P. Chen* "Cooperative communication within and between single nanocatalysts" *Nature Chem.* 2018, 10, 607-614.
- 6) X. Mao, C. Liu, M. Hesari, N. Zou, P. Chen* "Super-resolution imaging of nonfluorescent reactions via competition" *Nature Chem.* 2019, 11, 687-694.

Biography

Peng Chen is the Peter J.W. Debye Professor of Chemistry at Cornell University. He received his B.S. in Chemistry from Nanjing University, China in 1997, and his Ph.D. in bioinorganic/physical inorganic chemistry (with Ed Solomon) from Stanford University in 2004. After postdoctoral training in single-molecule biophysics (with Sunney Xie) at Harvard University, he started his faculty appointment at Cornell University in 2005. His current research focuses on single-molecule imaging of heterogeneous and homogeneous catalysis as well as of metal homeostasis machineries in vitro and in living cells.

Date: 3rd July 2020, Friday
Time: 10.00am to 11.30am
Venue: Zoom Platform
Host: Dr Zhang Zhengyang

For Zoom registration:

