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Research Seminar

Towards Holistic Approach for Decarbonizing Energy System

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Abstract: Decarbonizing the energy system is essential for mitigating climate change by replacing fossil fuels with alternative sources emitting significantly less carbon dioxide. Recognizing that no single alternative energy source can meet global demand, our approach involves utilizing multiple sources for a future carbon-neutral energy system. We focus on developing highly selective and efficient catalytic processes to convert diverse carbon feedstocks, including renewable and waste carbons. In this seminar, I will showcase our groundbreaking biphasic tandem catalytic processes, achieving exceptional carbon-atom efficiencies in converting renewable biomass into biofuels.

Additionally, our innovative sequential catalytic process enables highly selective deconstruction of mixed waste plastics into valuable monomers and fuels. The presentation will also delve into the synergy of integrating direct air capture of CO₂ for its utilization in producing value-added carbon-neutral products. Ultimately, our research aims to implement a holistic approach, decarbonizing the energy system, and establishing a sustainable supply of low-carbon intensity chemicals, materials, and fuels from renewable and waste carbon resources.

Biography: *Dr. Hongfei Lin is a Professor at the Voiland School of Chemical Engineering and Bioengineering at Washington State University and Chief Scientist in the Energy and Environment Directorate at Pacific Northwest National Laboratory. He earned his B.E. and M.S. degrees from Tsinghua University, completed his Ph.D. in Chemical Engineering at Louisiana State University, and further honed his expertise as a postdoctoral fellow at the University of California, Santa Barbara. With nearly two decades of multidisciplinary research experience, Dr. Lin focuses on catalysis and sustainability, particularly in developing novel catalytic processes to derive value-added fuels and chemicals from renewable and waste carbon resources. His commitment to a sustainable, low-carbon, circular economy is evident through his numerous publications, multiple patents, and extensive support from entities such as DOE, NSF, and USDA. Dr. Lin actively contributes to the academic community, serving on the international advisory board of Energy Technology, the editorial board of Advanced Composites and Hybrid Materials, and previously as the Program Chair of the Energy and Fuels Division of the American Chemical Society.*