

Yang Shao-Horn  
Massachusetts Institute of Technology, USA

**Abstract of the Presentation “Towards Net Zero”**

There is an urgent need to reduce our global carbon dioxide emissions to mitigate climate change. While low-cost electricity from solar and wind provides exciting opportunities to reduce emissions, converting electricity to electrons and molecules of energy consequence remains challenging to deep decarbonization. Electrochemical reactions are central to electrification via batteries, electrolysis in making decarbonized chemicals, fuels and materials, and negative emission technologies, which represent three key capabilities to connect electricity with our energy demands. Fundamental research on surface and molecular sciences, electron/ion transfer, and ion transport is instrumental to address scientific challenges and make breakthroughs in the core technologies such as lithium batteries and production of energy carriers. In this lecture, we will address scientific challenges and recent progress in regulating chemical physics of oxides and liquids to regulate the functions of lithium batteries, and electrolysis of making molecules of energy consequence.

**Prof. Dr. Yang Shao-Horn** is the W.M. Keck Professor of Energy and Professor of Mechanical Engineering and Materials Science and Engineering at the Massachusetts Institute of Technology. She earned her BSc degree from Beijing University of Technology and her PhD degree from Michigan Technological University. Her work applies fundamental understanding in reaction mechanisms to design new materials for electrocatalytic reactions. Prof. Shao-Horn has received a multitude of awards, such as the Faraday Medal of the Royal Society of Chemistry (2018) and the Battery Research Award of the Electrochemical Society (2016). She received the Dr. Karl Wamsler Innovation Award in 2020 „in appreciation of her visionary electrocatalysis research, developing universal guiding principles to store energy in chemical bonds“.