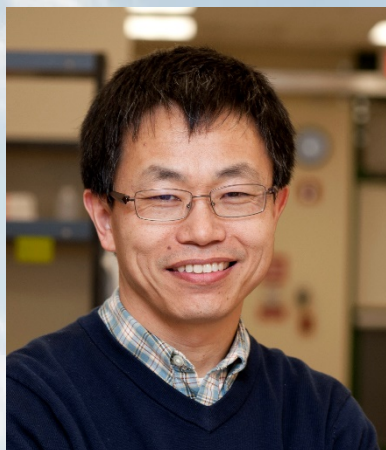


**MIT Chemical Engineering Department**  
**Spring 2019 Seminar Series**

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# Towards Platinum-Free Fuel Cells for Affordable Zero-Emission Cars



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**Friday, March 8, 2019**  
**3:00 PM (Reception at 2:45 PM)**  
**66-110**

**Abstract:** One of the grand challenges facing humanity today is the development of an alternative energy system that is safe, clean, and sustainable. A distributed renewable electrochemical energy and mobility system (DREEMS) can meet this challenge. At the foundation of this new energy system, we have chosen to study fuel cells, electrolyzers, and flow batteries. For all these devices polymer electrolytes and electrocatalysis play a critical role in controlling their performance, cost, and durability, and thus their economic viability. In this presentation, I will focus on our recent work on hydroxide exchange membrane fuel cells (HEMFCs) for which we have developed inexpensive hydrocarbon polymer membranes and nonprecious metal catalysts. More specifically I will show the roadmap we have developed for this technology, the progress we have made in developing the most stable membranes and the most active nonprecious metal catalysts. I will also try to answer the fundamental question: why are hydrogen oxidation reactions slower in base than in acid for precious metal catalysts?