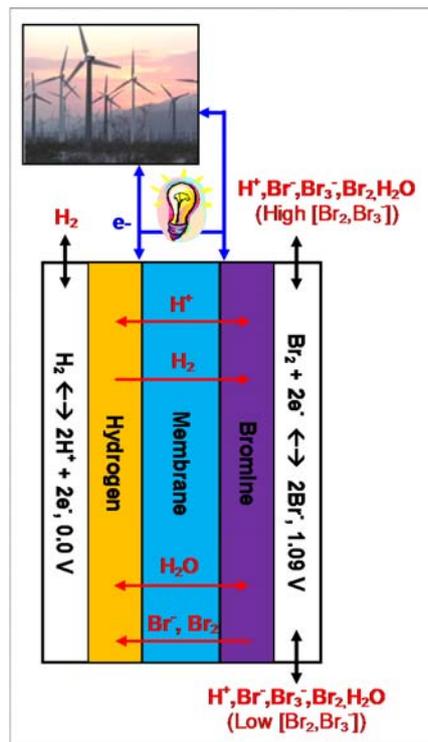


Hydrogen-Bromine Fuel Cells for Large-Scale Electrical Energy Storage

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Abstract

Renewable energy sources including wind and solar can supply a significant amount of electrical energy in the United States and around the world. However, because of their intermittent nature the potential of these two energy sources can be fully exploited only if a suitable energy storage system is provided. Considering the requirements of high energy capacity, high round-trip conversion efficiency, and cost of this application, the Hydrogen-Bromine (H_2 - Br_2) fuel cell has been identified as a highly attractive electrical energy storage system. The H_2 - Br_2 fuel cell has many advantages such as extremely fast reaction kinetics, high energy storage capacity, and low cost. This presentation will discuss 1) the main differences between stationary batteries and flow batteries/fuel cells to highlight the unique features that make flow batteries/fuel cells highly suitable for energy storage, 2) the advantages and disadvantages of the H_2 - Br_2 system, and 3) the research activities conducted by my team in this area.



Biography

Trung Van Nguyen is a Full Professor of Chemical & Petroleum Engineering at the University of Kansas. He has a BS from North Carolina State University and MS and PhD from Texas A&M University, all in Chemical Engineering. Prior to joining the faculty at the University of Kansas, he was a Member of Technical Staff at Bell Labs, Associate Director of the Center for Electrochemical Engineering at Texas A&M University, Senior Product & Process Development Engineer at Duracell, and Postdoctoral Fellow at Los Alamos National Lab. He also recently served for two-year as the first Program Director of the Energy for Sustainability Program at the National Science Foundation. He has contributed more than 90 publications and 5 patents, given over 200 invited and conference presentations, and received awards both for research and teaching. His works have been cited more than 5000 times. He was recently elected Fellow of the Electrochemical Society. He is also a founder of two fuel cell start-up companies. His current research is on transport and interfacial phenomena in fuel cells and batteries and mathematical modeling of electrochemical systems.