New Mexico State University

COE Distinguished Lecture
for the Chemical Engineering Department
Shires Graduate Seminar Series

Hydrogen and Fuel Cells for a Clean Energy Infrastructure

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Abstract:

Hydrogen will play a critical role in the future comprehensive energy portfolio; hydrogen will be the decarbonizing tie between the different energy production sources and their end uses. Hydrogen acts as a zero-carbon energy carrier to couple energy sources to end uses including the major energy consumption sectors of (1) the electric grid, (2) transportation and (3) industrial processes. Transportation is a key sector that hydrogen can play the major role in decarbonizing. Fuel cells provide the same zero tail-pipe emissions benefits as battery power, plus offer extended range, shorter refueling times, and heavier payload capabilities that are especially important for heavy trucks, trains, and airplanes.

Although fuel cells are being deployed in cars in limited commercialization, they still fall short of the targets for this technology, which are required for widespread consumer acceptance. To advance performance and durability of polymer electrolyte membrane fuel cells (PEMFCs), the M2FCT (Million Mile Fuel Cell Truck) consortium was formed which is a $50M – 5-year project; Los Alamos National Lab co-leads this consortium. M2FCT is an integrated consortium that includes: (i) modeling analysis to define drive cycles, operating conditions and requirements, (ii) material development for design/synthesis of durable high-performing materials based on previously developed materials, (iii) integrating these materials into MEAs (Membrane Electrode Assemblies), testing and modeling of material performance and enabling their scale-up and manufacturing, and (iv) accelerated stress test (AST) development and durability evaluation to enable these MEAs and materials to meet the efficiency/durability targets.

Biography

Dr. Rod Borup has been a Scientist at Los Alamos National Laboratory since 1999, starting as a post-doctoral researcher in 1994 plus 3 years at General Motors; he also serves as the LANL program manager for the Hydrogen and Fuel Cells program. He also holds a research professor position at the University of New Mexico in the Chemical & Biological Engineering Department. He received his B.S.E. in Chemical Engineering from the University of Iowa in 1988, and his Ph.D. from the University of Washington in 1993. Rod is the former director for the multi-lab consortium for Fuel Cell Performance and Durability (FC-PAD - $25M), and is the current co-director for M2FCT (Million Mile Fuel Cell Truck - $50M). He has ~ 15 U.S. patents (several more submitted), authored approximately 150 papers related to fuel cell technology with over 12,000 citations and an H-index of 45. He is a Fellow of the ElectroChemical Society (2020) and won the LANL Fellows prize for leadership (2020).

Please join us at Jett Hall Room 259 or by Zoom, Friday, March 25th at 1:30pm

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