

TECHNICAL HIGHLIGHTS FOR NOVEMBER 2013

The Oak Ridge National Laboratory (ORNL) cited in Article Published in *Inside Science*

ORNL's recent achievement in ionic liquid (IL) additives for engine lubrication is featured in an article "Molten Salts Could Improve Fuel Economy," published in *Inside Science*, <http://www.insidescience.org/content/molten-salts-could-improve-fuel-economy/1492>. The article is syndicated to subscribers at FOXnews.com, NBCnews.com, LiveScience, and others.

Dual-Fuel Combustion with Additives Capability

A new capability was added to the multi-cylinder advanced combustion research engine at ORNL allowing dual fuel combustion with gasoline and gasoline doped with additives to increase the reactivity. The new configuration allows precise control over fuel temperature to allow for direct injection of doped gasoline through the production diesel direct injection fuel system. This capability will enable direct comparisons of dual-fuel reactivity controlled compression ignition (RCCI) combustion modes with different fuel and additive chemistries.

ORNL Biodiesel Researcher Cited in the Society of Automotive Engineers (SAE) Magazine, *Automotive Engineering International*

ORNL's Todd Toops was quoted several times as a technical expert in a biodiesel-related article entitled, "Tackling Biodiesel's Technical Challenges," which was published in SAE's *Automotive Engineering International* magazine, November 5, 2013. The article focuses on explaining the growing role of domestically produced biodiesel in the United States (U.S.) fuel supply and the technical challenges that still remain. The collaborative effort between ORNL, National Renewable Energy Laboratory (NREL), and Ford Motor Company that focuses on emissions control related compatibility concerns is also highlighted.

HIGH-LEVEL OR NOTEWORTHY VISITS

General Electric (GE) and Convergent Sciences Inc. Visited ORNL to Initiate to Simulation Collaboration

Charles Finney of the Fuels, Engines, and Emissions Research Center (FEERC) hosted Ravichandra Jupudi of GE India Technology Centre and Sameera Wijeyakulasuriya of Convergent Sciences, Inc. to kick-off a collaborative effort which will use the Titan supercomputer to investigate combustion stability in dual-fuel locomotive applications. Displacement of diesel with natural gas for locomotive operation has tremendous potential for cost savings and improving energy independence. However, small changes in the initial cylinder conditions tend to produce extreme cycle-to-cycle variation in combustion, limiting the practical application of dual-fuel operation. This project will utilize Titan to perform massively parallel computational fluid dynamic (CFD) engine simulations to investigate and understand the source of the combustion instability at a level of detail previously unachievable.

INVITED TALKS AND PRESENTATIONS

ORNL Research Presented at the 2013 Biodiesel Technical Workshop

ORNL researchers Todd Toops and Michael Lance gave invited presentations of their recent research at the 2013 Biodiesel Technical Workshop in Kansas City, Missouri. Their combined presentation in conjunction with Aaron Williams of NREL, "Materials Characterization to Investigate Location of Fuel-Borne Metals," highlighted a collaborative effort between ORNL, NREL, and Cummins. The project is

aimed at understanding compatibility issues associated with biodiesel introduction and investigating potential mitigation strategies.

FEERC Researchers Present at SAE Fuels, Lubricants and Aftertreatment Symposium

FEERC Researchers, Scott Curran and Jim Parks, gave invited talks at the 2013 SAE Fuels, Lubricants and Aftertreatment Symposium held in Long Beach, California. Scott Curran presented findings on a comparison of the well-to-wheels energy use of natural gas in compressed natural gas vehicles as compared to using natural gas in stationary power. Jim Parks presented an overview of emissions controls challenges for advanced combustion.

FEERC Staff Member invited to Participate in Corrosion Panel

Mike Kass of FEERC was invited to participate as a member of the corrosion panel of the Diesel Performance Group of the Coordinating Research Council. The panel is being set up to evaluate the corrosion potential associated with ultra-low sulfur diesel (ULSD) and the possible contribution of acetic acid to cases of observed accelerated corrosion. The panel will have input on several potential projects that are being outlined to address ULSD corrosion.