

PORTABLE APPLICATIONS

WEDNESDAY, NOVEMBER 6 - ROOM 101-B, 4:00 PM - 5:30 PM

- **1 to 10-kW Diesel/Jet-Fueled SOFC Generators for Mobile Applications** - *Subir Roychoudhury, Precision Combustion, Inc.*
 - The performance data from Precision Combustion's 1-kW and 10-kW SOFC prototype systems will be presented, including operation with different fuels. This will include long-term system performance, transient and steady state data, system efficiency, conditioned power output, control response, safety, water recovery, maintenance requirements, emissions, packaging constraints, and effect of multiple start/stop cycles. This presentation will also highlight the system characteristics relating to sulfur cleanup, water balance, and stack performance. Performance metrics with respect to objectives and thresholds for system fielding will be discussed, which include start-up, shutdown, user interface, safety, external logistics, and maintenance requirements. Effect of scaling from 1 to 10 kW on the volumetric and gravimetric power density and durability will be shared.
- **The DBPFC-Battery Hybrid Motorbike-HYBROTO** - *Dr. Ayse Elif Sanli, Turgut Özal University*
 - In this study, a prototype hybrid motorbike called HYBROTO was constructed with a direct borohydride-peroxide fuel cell (DBPFC) and a LiPo battery pack (Figure.1.a). In the hybrid system, a 10-cell DBPFC stack with 120 W of maximum power was used as the main power source, a 12 LiPo battery pack with 6300 mAh and 65 C was placed for energy storage. The hybrid system also included an auxiliary power source and a brushless DC (BLDC) motor. In addition, a voltage-monitoring integrated circuit for fuel cells, a battery management unit, and a motor control circuit were developed to command the DBPFC, LiPo battery, and BLDC motor, respectively
- **Portable JP8-Fueled Solid Acid Fuel Cell System** - *Dr. Hau H. Duong, SAFCCell, Inc.*
 - This project addresses the Army's need for high-energy density, lightweight power sources for dismounted soldiers. Over two years of Phase II efforts, we have successfully integrated our proprietary solid acid fuel cell (SAFC) stack with a auto-thermal JP-8 reformer and other balance-of-plant components required to produce a 50 W_{net} person-portable, rugged, and efficient power supply, capable of running for 500 hours with a system energy density of 1000 Whr/kg. The system runs on military grade, desulfurized JP-8 fuel. Talk will detail project results and ongoing development efforts to produce a fully functional JP-8-fueled SAFC power generator for delivery and testing by the Army in December 2019.

- **Characteristics of Implantable Glucose Fuel Cells in the Various Power Generation Condition and Optimization Assuming Internal Environment** - *Ryosuke Ono, Tokyo University of Science*
 - Previous research has shown implantable glucose fuel cells have produced low power generation performance. Because almost all of the research has focused on the catalyst to improve the power generation performance, no one studied operating condition. In this study, we aimed to optimize the condition to improve the power generation performance. For instance, we investigated the influence on the fuel flow rates, catalyst carrier, the weight ratio of ionomer and carbon (I/C ratio), the dissolved oxygen and the method to prepare the electrode using abiotic catalyst.
- **Solid Acid Methanol System for O&G Remote Power Applications** - *Calum Chisholm, SAFCCell, Inc.*
 - Talk will describe the development and initial field trials of a solid acid reforming methanol fuel cell (RMFC) system for remote power O&G applications. System is designed for extended use without maintenance and under harsh environmental conditions expected for remote power applications (e.g, temperatures from -40°C to 45°C), and to run on "field methanol" which can be easily delivered to remote locations in large quantities.