UAA College of Engineering
University of Alaska Anchorage

Special Presentation – Visiting Professor

Fuel cell power module for electric forklift with integrated metal hydride hydrogen storage system

Presented by: Ivan Tolj, Ph.D.
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ABSTRACT: Fuel cells are gaining more attention in the material handling industry as they provide numerous benefits for warehouses, airports, seaports etc. The European commission (EC) recognized the importance of the fuel cell and hydrogen technology and their inevitable role in reducing greenhouse gas emissions by further encouraging hydrogen fuel cells in heavy-duty vehicles in their hydrogen strategy for a climate-neutral Europe. Fuel cell powered forklifts possess several advantages over battery powered ones: operation time up to 8 hours on a single tank of hydrogen, constant power throughout an entire shift, lower refuelling time, stable operation, etc. This presentation will address development of a prototype fuel cell power module with integrated novel and efficient metal hydride hydrogen storage for a 3-tonne electric forklift. Forklift was tested according to “Verein Deutscher Ingenieure” (VDI 60) drive cycle protocol to identify optimization methods for: improvement of operational stability at high loads, decreasing hydrogen consumption and balance-of-plant (BoP) power demands.

BIO: Ivan Tolj is an assistant professor at FESB, University of Split, in Split, Croatia. His research interests focus on hydrogen technologies such as: fuel cells; hydrogen production, storage, and compression; fuel cell hybrid system energy management and control. He teaches several courses: "Thermodynamics", "Heat and mass transfer", "Heating and air conditioning", "Metrology", "Fuel Cells" and "Hydrogen energy systems’’. He is Assistant Editor of the International Journal of Hydrogen Energy (IF

5.816) and guest editor of Energies (IF 3.004). He published numerous scientific papers (with an h-index of 15, more than 800 citations). He is a member of the scientific committee of several international conferences and the conference chair of the 6th International Symposium on Materials for Energy Storage and Conversion (mESC-IS 2022). He published one book, "Heat and Mass Transfer," and several book chapters. He leads the HORIZON2020 project: Hydrogen-fueled Utility Vehicles and Their Support Systems Utilising Metal Hydrides, and he is involved in several other projects dealing with green energy and mobility.

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