MEMBER NEWS

HPI's Hydrogen Now™ for Hybrids

By James D. Whitt
Chief Scientist, Hydrogen Power, Inc.

Hydrogen Power, Inc. (HPI) has successfully completed the first phase of converting an internal combustion engine vehicle to a hydrogen hybrid, ultimately to be powered by AlumiFuel™ for on-board hydrogen production. HPI's advancements in the Seattle-based laboratory production facility have been rapid since proving both HPI's Hydrogen Now™ technology and AlumiFuel powder as reliable and controllable entities. Hydrogen Now™ is HPI's patented hydrogen production process that involves a chemical reaction between water, aluminum, and an environmentally friendly catalyst to produce hydrogen on-site and on-demand. AlumiFuel™ technology, a high energy density derivative of the Hydrogen Now™ process, allows the user to safely store and transport a quantity of hydrogen in a convenient cartridge until ready to use.

Given the ease of storage and distribution, as well as its customized production capability, HPI's AlumiFuel™ and Hydrogen Now™ technology are intended to bypass infrastructure and cost barriers to commercial adoption of dual fuel hybrid vehicles. With the hydrogen conversion on the Ford Ranger complete, HPI's next step will be to integrate the AlumiFuel™ powered reactor with the truck to provide an on-board, on-demand hydrogen supply.

The mandate for near-zero emissions from power-generation and power-consuming units is translating into environmental regulations at a considerably faster rate than an economically attractive hydrogen-based economy can be realized. The result is a mandate for hydrogen-based power generation for small-sized equipment, particularly automobiles. There are several problems associated with shifting to a hydrogen-based economy, ranging from infrastructure of hydrogen distribution to methods of safe storage and cost-effective methods of generating hydrogen. Leveraging cost, safety, and environmental benefits of the technology HPI is expanding its product offerings in the transportation and automotive markets. Preliminary engineering work has commenced on the 1st Hydrogen Now filling station slated to produce 40-60 kg/day. The suite of HPI's automotive Hydrogen Now products is intended to allow the user to move away from gasoline dependence.

HPI's 30 Watt AlumiSystem™

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Hydrogen Power Inc., has successfully integrated its AlumiCell™ generator with a 30 watt fuel cell to create a fully functional portable power solution. HPI's AlumiSystem™, combines a module consisting of fuel cell fully integrated with a HPI's AlumiCell™ generator that accepts AlumiFuel™ cartridges. Applying expert knowledge of control systems, HPI's researchers have developed on-board controls to optimize the whole system and reduce the necessity of extraneous hydrogen storage. This prototype capitalizes on the versatility of the Hydrogen Now™ technology utilizing the proprietary AlumiFuel™ cartridges to fuel low-watt applications for durations exceeding the capabilities of traditional battery chemistries. As opposed to the inconvenience of multiple charger cords, a simple click of a refill cartridge can provide the module with enough power to run throughout the day. AlumiSystem™ is being developed as a solution for portable power applications requiring up to 100 watts.

Hydrogen Power Inc. has identified a significant business opportunity to produce hydrogen on demand and thereby overcomes many of the major difficulties associated with transporting and storing hydrogen. HPI is in the business of producing hydrogen through a metal hydride water splitting process. Hydrogen Now™ is an environmentally friendly enabling technology.

Instead of storing and transporting hydrogen, the HPI approach is to generate hydrogen at the point of use through its unique aluminum based Hydrogen Now™ technology. The reaction of aluminum with water to produce hydrogen can be thought of as metal hydride chemistry. In practice, while aluminum hydride is certainly known, it is not an item of significant commerce because it, like other hydrides, is very reactive. The aluminum metal is itself very reactive but its reactivity with water is not explosive because the passivation of aluminum by a thin oxide layer slows the rate of reaction enough to minimize the risk of combustion. The effect of the Hydrogen Now™ technology is then to raise that kinetic reactivity back up, in a controlled manner, to provide a reasonable rate of hydrogen production.

Hydrogen Power Incorporated has developed this novel solution for generating high-purity hydrogen at controlled rates into a line of products tailored for a host of applications. AlumiCell™ is a battery replacement technology developed to fully realize the potential of fuel cells as battery replacements in the low-watt power regime. The product will be available for both military and commercial applications.