



UTC fuel cells installed in new Lotte World Tower in Korea. See story below.

AROUND THE INDUSTRY

PureCell® to Power Lotte World Tower in Seoul

UTC Power of South Windsor, Connecticut, reports that Samsung Everland has purchased two PureCell Model 400 fuel cell systems to be installed at the Lotte World Tower, Korea's first super-tall skyscraper. The fuel cells will be installed in the basement of the tower and will provide 800kW of clean, efficient power to the Lotte World Mall in the building. Upon completion in 2015, the Lotte World Tower is expected to become one of the tallest skyscrapers in the world and will house the tallest

observation deck on its 123rd floor at 497.6 meters high.

The PureCell system is already in use by Korean utilities. This installation is UTC Power's first building application in the country and the first indoor installation for a fuel cell in Korea. The PureCell systems to be installed in the Lotte World Tower will help to meet South Korea's clean energy goals as part of the country's Renewable Portfolio Standard (RPS).

ClearEdge Power to Acquire UTC Power

ClearEdge Power of Hillsboro, Oregon, has reached an agreement with United Technologies Corp. (UTC) to purchase its South Windsor, Connecticut-based fuel cell manufacturing subsidiary, UTC Power. The transaction is expected to be finalized early this year.

"We plan to have operations on both coasts," says ClearEdge spokesman Neal Starling. The Oregon company intends to retain the South Windsor operation's 400 employees, including 100 hourly workers belonging to the machinists' union and 300 salaried employees.

"We are excited about the strategic combination of ClearEdge Power and UTC Power to address the demand for clean, continuous, distributed power solutions," says ClearEdge Power President and CEO, David B. Wright. "The wealth of talent, intellectual capital, and technology platforms enables us to provide highly innovative product and service solutions to our customers."

German Ministry Receives Fuel Cell Heater

In December, a fuel cell heater was integrated in the energy supply of the German Federal Ministry of the Environment (BMU – Bundesministerium für Umwelt). The heater was handed over by State Secretary Rainer Bomba of the Federal Ministry for Transport, Building and Urban Development (BMVBS – Bundesministerium für Verkehr, Bau und Stadtentwicklung) to BMU State Secretary Katherina Reiche. A viewing model was also provided that will be put on display at the Ministry's visitors center.



At the delivery of the fuel cell heater to the BMU are Rainer Bomba (State Secretary, BMVBS), Volker Nerlich (Hexis), Katherina Reiche (State Secretary, BMU), Dr. Klaus Bonhoff (Managing Director, NOW).

The testing of fuel cell heaters under everyday conditions is undertaken by the Callux joint project in which equipment manufacturers and energy suppliers work together towards preparing products for the commercial market. The federal government support Callux through the National Innovation Program for Hydrogen and Fuel Cell Technology (NIP), which is supported by the National Organization Hydrogen and Fuel Cell Technology. More than 300 fuel cell heating systems have been installed in residential homes since 2008.

U.K. Funding to Develop Fuel Cell Supply Chain

The UK's Technology Strategy Board is launching a funding program for business-led innovation to stimulate the development of fuel cell and hydrogen technologies, starting with two competitions for feasibility studies. The Technology Strategy Board, through the Building Fuel Cell Manufacturing and the Supply Chain competition, will invest up to £5 million (\$7.9 million) through grant funding to encourage the development of manufacturing capabilities and novel supply-chain partnerships to support fuel cell production.

The aim is to enable businesses to make step changes in fuel cell production volumes and in lifetime cost reduction, through the innovative application of approaches and capabilities available from other business sectors or the academic community.

Up to £1 million (\$1.6 million) is available for feasibility studies that explore the potential for innovative ideas and new partnerships as a precursor to further development. A further £4 million (\$6.3 million) will then

be available for collaborative research and development, to take the most promising ideas forward in a second phase that will open once the feasibility projects have concluded.

AFC Developing Ammonia Alkaline Fuel Cells

Scottish Hydrogen Fuel Cell member AFC Energy has announced that it has received notification of a European Union grant award totaling €1.96 million (£1.53 million) to launch its Alkammonia project, developing ammonia fed alkaline fuel cell systems.

The EU grant is being funded by the Fuel Cells and Hydrogen Joint Undertaking (FCH-JU), through the EU's Seventh Framework Program (FP7). The grant is still subject to final negotiation and agreement, but is expected to be agreed in time for the project to commence in March. If negotiations with FCH-JU conclude satisfactorily, AFC Energy will coordinate the project and expects its direct share of the project funding to be up to €0.64 million with the balance to be received by the other project partners.

The grant will provide U.K.-based AFC Energy and its European project partners with three years' financial support to develop ammonia-fed alkaline fuel cells. AFC Energy's alkaline fuel cells have the advantage of being able to tolerate ammonia traces in the fuel stream, a fact recently confirmed by AFC Energy's laboratory trials.

Parker and WATT to Commercialize SOFC

WATT Fuel Cell Corp. of Port Washington, New York, a developer and manufacturer of SOFC systems, reports the establishment of a strategic licensing and supply agreement with Parker Hannifin Corp. of Mayfield Heights, Ohio, the global leader in motion and control technologies. The agreement, established through Parker's Energy Systems Business Unit, stipulates Parker's production of a family of propane-driven, SOFC-based products for the RV, marine, over-the-road trucking and residential markets.

Combining Parker's core expertise in controls, fluid management and product development with WATT's cost-effective fuel cell technology, the agreement includes Parker's exclusive license of WATT Fuel Cell's innovative, low-cost balance-of-plant (BoP) technology and exclusive stack supply for use in 500W to 3000W RV, marine and over-the-road trucking markets. Parker will manufacture the BoP and controls and also integrate the fuel cell stacks into packaged SOFC products.

Zircar Zirconia Receives Ceramic Oxide Felts Order

Zircar Zirconia Inc. has received an order to supply kits of ceramic oxide gasket materials from a fuel cell

manufacturer contracted to build the world's largest fuel cell park. The scope of the agreement includes Zircar Zirconia's supply of nine different materials for the first quarter of 2013, and ensures an uninterrupted supply of kits, as deliveries under the existing orders for other projects concluded in December. The first of 11 deliveries was completed January 3.

Zircar Zirconia has supplied ceramic gaskets to fuel cell manufacturers since 1975 and its experience in developing customized solutions was beneficial in winning this contract. The company's ceramic textiles excel at solving thermal management problems by providing flexible, refractory materials in custom chemistries and formats that outperform conventional mineral wools and alumina-silicate fibers. At its R&D center in Florida, New York, Zircar Zirconia is currently developing the next generation stack gaskets to further extend the service life of molten carbonate fuel cells.

This 58.8 megawatt project is located in South Korea, the world's 15th largest economy, which has passed legislation for a national emissions trading scheme (ETS). The ultra-clean electricity generated by this fuel cell park will be supplied to the power grid and will assist the owners with compliance under the South Korean Renewable Portfolio Standard (RPS).

Dominion to Open Largest U.S. Fuel Cell Project

Dominion of Richmond, Virginia, one of the nation's largest energy companies, plans to develop a fuel cell power generating facility in Bridgeport, Connecticut. Dominion acquired this development from FuelCell Energy Inc. of Danbury, Connecticut. The facility will produce 14.9MW of electricity – enough to power approximately 15,000

homes – using a reactive process that converts natural gas into electricity.

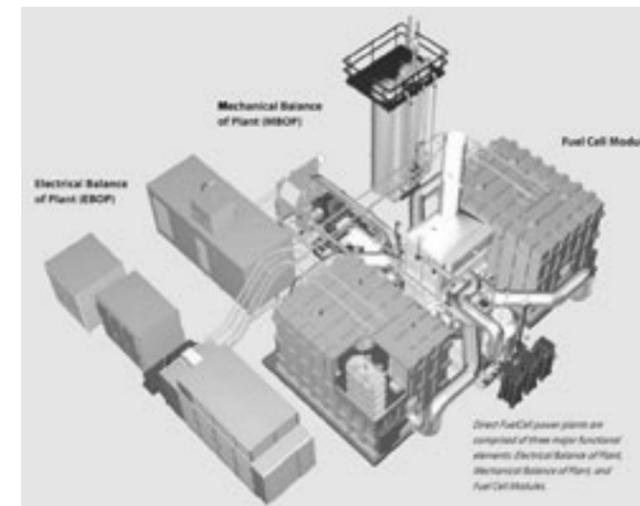
Dominion Bridgeport Fuel Cell LLC has contracted with FuelCell Energy Inc. to build, operate, and maintain the facility. FCE will supply five proprietary Direct FuelCell® stationary fuel cell systems and an organic rankine turbine that will use waste heat from the fuel cells to generate a total of almost 15MW of electricity.

FuelCell Energy estimates that the project will support 161 jobs over its 15-year life. The project is scheduled to be completed and placed into operation in late 2013. Dominion will sell the output of the fuel cell power station to Connecticut Light & Power under a 15-year fixed power purchase agreement.

Plug Power Announces Additional Site for P&G

Plug Power Inc. of Latham, New York, reports that Procter & Gamble Co., has selected its GenDrive® fuel cell products to power its electric lift truck fleet in its manufacturing facility located in Mehoopany, Pennsylvania. This additional facility now brings to four the number of sites converting to GenDrive fuel cells. Over 340 units will now be deployed throughout Procter & Gamble's manufacturing infrastructure. Additional P&G sites using green fuel cell technology include facilities in California, North Carolina and Louisiana.

Unlike the incumbent technology, GenDrive is powered by hydrogen, ensuring constant voltage to the truck and has a fueling cycle that takes just minutes. Lead-acid batteries need to be changed, charged, stored and maintained, a process that is timely and involves costly infrastructure. Since GenDrive is powered by hydrogen, an emerging clean-energy fuel, it is estimated that greenhouse gas emissions are reduced by more than 60%.



ADVANCED FUEL CELL TECHNOLOGY is published monthly by Seven Mountains Scientific, Inc., P.O. Box 650, 913 Tressler St., Boalsburg, PA 16827, USA; (814) 466-6559, Fax: (814) 466-2777, email: fct@7ms.com, Website: <http://www.7ms.com>

Managing Editor: Josephine Chesworth
 Technical Editor: Dr. E. Thomas Chesworth
 Circulation Manager: Patrick D. Elliott
 Production Manager: Brenda Geary-Bucek

Annual subscription rates including First Class or Air Mail postage are: USA, Canada and Mexico: US\$120; all other countries: US\$155. Pay by Visa, MasterCard, American Express or check written on a bank in the U.S. to: Seven Mountains Scientific, Inc.

With this fourth site conversion, P&G will lessen its environmental impact while realizing increased productivity, reduced operating costs and better predictability of its fleet performance.

Ballard: PO's In The Telecom Sector On The Rise

Ballard of Vancouver, Canada, has received orders for more than 400 ElectraGen™ fuel cell systems from distribution partners that deliver systems for deployment in African and Asian telecom networks. These orders represent growing traction for Ballard's ElectraGen™ family of fuel cell backup power systems, both direct hydrogen- and methanol-fueled, driven by the recognition of inherent value offered at an attractive lifecycle cost.



During the recent difficult circumstances presented by Hurricane Sandy, 17 Ballard ElectraGen™-ME systems provided critical electricity to the Bahamas mobile telephone network when the storm downed power lines and cut off grid power. In the three days that Hurricane Sandy passed over the Bahamas, each of the 5kW systems operated flawlessly.

To date, more than 2,000 Ballard backup power systems have been shipped for deployment in telecom networks around the globe.

Greek Fuel Cell Firm Moves to Connecticut

A \$1 million investment by Connecticut's quasi-public technology investment agency has lured a Greek energy company to relocate its headquarters and manufacturing operations to East Hartford, Connecticut. Connecticut Innovations' (CI's) investment in Advent Technologies will result in the company moving its headquarters from Athens, Greece. Advent makes renewable energy components and systems, with a focus on fuel cells.

CI's \$1 million investment was part of a larger \$2.3 million funding round that included two Greek companies:

Piraeus Capital Management, a financial firm, and Systems Sunlight, which develops renewable energy and power storage systems.

In addition to moving its headquarters from Greece, Advent will also develop manufacturing and research and development operations here, according to CI officials. The company also will retain research and development operations in Greece.

Sankosha and Hy9 Establish Strategic Partnership

Hopkinton, Massachusetts-based Hy9, a leading provider of point-of-use, high purity hydrogen generation products for fuel cells, and Tokyo, Japan-based Sankosha Corp., a provider of communications systems and enclosures for the telecommunications industry, have an agreement to collaborate to develop the Asian market for reformer-based fuel cell power systems which operate on readily available methanol as fuel.

"Our partnership with Hy9 Corp. creates a strong team in Asia where hydrogen generation systems are quickly becoming the preferred option to on-site hydrogen storage tanks," states Masayoshi Ito, president of Sankosha Corp.

Hy9 and Sankosha will work together to integrate fuel cell stationary power systems with Hy9's HGS on-site hydrogen generators and enclosures for turnkey backup power systems suitable for Asian markets including dense urban areas and rooftop installations.

sunfire and staxera Complete Merger

sunfire GmbH of Dresden, Germany, has competed its planned merger with staxera GmbH. The corresponding entry filed in the Commercial Register by Dresden District Court backdates the merger of staxera GmbH and sunfire GmbH to the 1st of April 2012. The new company will operate as sunfire GmbH headquartered in Dresden.

The merger enables new shareholders Bilfinger Venture Capital GmbH and KfW to come on board, ensures a consistent corporate image on the market and simplifies internal organizational processes. The weight and value of the staxera brand will not be lost, as it will continue to be used as a product name within the framework of fuel cell applications. Carl Berni nghausen and Christian von Olshausen will retain their roles as CEO and chief technology officer respectively. Existing contacts remain and all agreed terms and conditions retain their validity.

ENEOS Residential Fuel Cell Wins Award

Japan's JX Nippon Oil & Energy reports its ENEOS brand fuel cell has won the Nikkei Sangyo Shimbun



With the *Journal of The Electrochemical Society* at its helm, for close to 110 years ECS has recognized the need for researchers to publish technical content with a timely turnaround and have access to resources dedicated to their studies.

Now, to further enhance its mission to encourage research and dissemination of knowledge, ECS has developed two distinct publication channels for scholarly research: **Electrochemical Science & Technology** and **Solid State Science & Technology**, each to include a traditional and a rapid-publication journal.

Electrochemical Science & Technology Journals

Fundamental and applied areas of electrochemistry, including experimental and theoretical aspects of electrodes, interfaces, and devices.

Journal of The Electrochemical Society (JES)

JES will continue to accept full length manuscripts at a new website: ecs-journals.msubmit.net. Current lag time of 36 days to first review.

ECS Electrochemistry Letters (EEL)

EEL will accept short manuscripts requiring rapid publication at ecs-journals.msubmit.net. Lag time of 16 days to first review, based on current ECS standards for rapid publication journals.

(EEL and *ECS Solid State Letters* will replace the current rapid publication title, *Electrochemical and Solid-State Letters*.)

Solid State Science & Technology Journals

Fundamental and applied areas of solid state science and technology, including experimental and theoretical aspects of the chemistry and physics of materials and devices.

ECS Journal of Solid State Science and Technology (JSS)

JSS will accept full-length manuscripts at ecs-journals.msubmit.net. Lag time of 36 days to first review, based on current ECS standards for full-length article journals.

ECS Solid State Letters (SSL)

SSL will accept short manuscripts requiring rapid publication at ecs-journals.msubmit.net. Lag time of 16 days to first review, based on current ECS standard for rapid publication journals.

(SSL and *ECS Electrochemistry Letters* will replace the current rapid-publication title, *Electrochemical and Solid-State Letters*.)

EST Technical Editors and Technical Content Areas

Daniel Scherson (Case Western Reserve University, USA)
Editor

Gerald S. Frankel (Ohio State University, USA)
Corrosion Science and Technology

Thomas F. Fuller (Georgia Institute of Technology, USA)
Fuel Cells, Electrolyzers, and Energy Conversion

Andrew A. Gewirth (University of Illinois, USA)
Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry

Charles L. Hussey (University of Mississippi, USA)
Electrochemical/Chemical Deposition and Etching

Rangachary Mukundan (Los Alamos National Laboratory, USA)
Sensors and Measurement Sciences

Dennis G. Peters (Indiana University, USA)
Organic and Bioelectrochemistry

John Weidner (University of South Carolina, USA)
Synthesis and Electrochemical Engineering

Martin Winter (Westfaelische Wilhelms University, Germany)
Batteries and Energy Storage

SSST Technical Editors and Technical Content Areas

Dennis W. Hess (Georgia Institute of Technology, USA)
Editor

Jennifer A. Bardwell (National Research Council, Canada)
Electronic Materials Processing

Stefan De Gendt (imec, Belgium)
Dielectric Science and Materials

Francis D'Souza (University of North Texas, USA)
Carbon Nanostructures and Devices

Yue Kuo (Texas A&M University, USA)
Electronic and Photonic Devices and Systems

Kailash C. Mishra (Osram Sylvania, USA)
Luminescence and Display Materials, Devices, and Processing



Every ECS journal adds depth to the ECS Digital Library, and features:

- Targeted research and technical content areas (visit www.electrochem.org).
- Immediate and wide dissemination of content to more than 1,000 academic, research, and corporate libraries worldwide, as well as individuals.
- No publication charges.





Superior Products Award for Excellence 2012. The annual award recognizes new products and services. Eneos' solid oxide fuel cell was introduced into the Japanese Ene-Farm residential fuel cell scheme in October 2011 and cogenerates electricity and heat using city gas. The 700W systems boast a power generation efficiency of 45% and can provide up to 70% of the power requirement for the average home. It is currently sold for ¥2.7 million (\$31,000) and comes with a 10 year warranty.

California Embraces a Fuel Cell Future

The state of California hopes to have 68 hydrogen dispensing stations in operation by the year 2016. These stations would be in the most popular areas. These stations are expected to service the first drivers to embrace FCV instead of gasoline-powered vehicles that are now the norm. The stations must come first so consumers know fuel is available before they purchase the FCV. Areas recommended for new stations include Irvine, southern Orange County, Torrance area communities, Santa Monica, West Los Angeles, San Francisco Bay area, and Berkeley.

There are still some problems associated with FCV technologies. Safety is an issue but is also one of the main focuses of getting hydrogen cars ready for the market. Price is another concern, but prices are steadily decreasing for the automobile and for gathering the hydrogen. Consumers have to be made aware of the new technology and what it means for them and the environment.

Japan Expects to Need More Platinum for Fuel Cells

Japanese demand for platinum group metals is likely to increase as the country looks to more energy efficient forms of power in the wake of the March 2011 tsunami.

The country's government is moving away from

nuclear power and imported fossil fuels, reports *South Africa's Business Day*.

Yoshinori Tanaka of the National Policy Unit believes platinum group metal demand will rise as more fuel cells using platinum as a catalyst are installed in cars and homes.

"The aim is to have 1.4 million fuel cells in residences by 2020 from only 10,000 currently and then grow this to 5.3 million by 2030," he told the newspaper. "In addition, the government aims to help with the construction of facilities for fuel-cell vehicles so that they can be marketed from 2015."

Johnson Matthey's Platinum 2012 Interim Review said there will be a 10% drop in worldwide platinum supplies to 5.84 million ounces this year. Demand will remain steady at 8.07 million ounces. Less recycling would shift the market into a deficit of 400,000oz.

Knaus Tabbert Group Installs EFOY

Berlin, Germany-based SFC Energy AG, technology and market leader in mobile and off-grid, fuel cell-based power solutions has responded to calls for more flexibility when installing the popular EFOY COMFORT fuel cell. A longer cartridge connection will in future enable users to position the M5 or M10 fuel cartridge at a different level to the device itself, allowing the fuel cartridge to be fitted above or below the EFOY COMFORT fuel cell. So on, the Knaus Tabbert Group will be offering the Eurostar, a modern caravan with a high share of technical equipment to make independent camping a comfortable experience. The EFOY COMFORT 140 is now factory-fitted as a standard component of the Eurostar self-sufficiency package in order to ensure the desired level of comfort. This makes the Knaus Tabbert Group the world's first vehicle manufacturer to offer a fuel cell as a factory-fitted option in a caravan.



FUEL CELL PATENTS

Compiled by Eddie T. Seo
email: seoeddie@gmail.com
Littleton, CO

Official Gazette, Vol 1384 (November 2012)

U.S. 8,303,674 (20121106), Hydrogen generator and fuel cell system, Yoshio Tamura, Kiyoshi Taguchi, Masataka Ozeki, and Hideo Ohara, Panasonic Corp. (JP).

U.S. 8,303,782 (20121106), Hydrogen generating apparatus and fuel cell power generation system, Bo-Sung Ku, Jae-Hyuk Jang, Kyoung-Soo Chae, and Jae-Hyoung Gil, Samsung Electro-Mechanics Co., Ltd. (KR).

U.S. 8,304,110 (20121106), Composition and energy storage device, Michael Alan Vallance, David Bogdan, Hari Nadathur Seshadri, Karthick Vilapakkam Gourishankar, Guruprasad Sundararajan, and Charles Dominic Iacovangelo, General Electric Co.

U.S. 8,304,112 (20121106), Electrode plate multi-end sides to single end side current collector of an electricity storage/discharge device, Tai-Her Yang.

U.S. 8,304,119 (20121106), Gasket, Yoshihiro Kurano and Takashi Mashimo, NOK Corp., Tokyo (JP).

U.S. 8,304,120 (20121106), Scalable microbial fuel cell and method of manufacture, Joseph A. Swift, Roger Bullock, and Stanley J. Wallace, Xerox Corp.

U.S. 8,304,122 (20121106), Solid oxide fuel cell systems with hot zones having improved reactant distribution, Joseph C. Poshusta, Charles W. Booten, and Jerry L. Martin, Protonex Technology Corp.

U.S. 8,304,123 (20121106), Ambient pressure fuel cell system employing partial air humidification, Richard A. Sederquist, Brian W. Wells, Alexander Mossman, and Craig R. Louie, Daimler AG (DE) and Ford Motor Co.

U.S. 8,304,124 (20121106), Hydrogen generator, fuel cell system, and methods for operating them, Yukimune Kani, Kunihiro Ukai, Seiji Fujihara, and Hidenobu Wakita, Panasonic Corp. (JP).

U.S. 8,304,125 (20121106), Power system including power supply controlling unit with temperature control, Minoru Noguchi, Takeshi Fujino, and Eisuke Komazawa, Honda Motor Co., Ltd. (JP).

U.S. 8,304,126 (20121106), Fuel cell, Tatsuya Yaguchi, Yasushi Nakajima, Keiko Kushibiki, Shigeo Ibuka, and Hirokazu Komatsu, Nissan Motor Co., Ltd. (JP).

U.S. 8,304,127 (20121106), Fuel cell stack, Kazuo Nunokawa, So Fujiwara, and Seiji Sugiura, Honda Motor Co., Ltd. (JP).

U.S. 8,304,128 (20121106), Solid oxide cell and solid oxide cell stack, Peter Vang Hendriksen, Rasmus Barfod, Yi-Lin Liu, and Ming Chen, Topsoe Fuel Cell A/S (DK).

U.S. 8,304,129 (20121106), Solid electrolyte fuel cell including a first cathode layer and a second cathode layer, Fumimasa Katagiri, Shigeaki Saganuma, Yasue Tokutake, Jun Yoshiike, and Michio Horiuchi, Shinko Electric Industries Co., Ltd. (JP).

U.S. 8,304,130 (20121106), Manufacturing method of a membrane electrode assembly, Tohru Morita, Toyota Jidosha Kabushiki Kaisha (JP).

U.S. 8,304,131 (20121106), Direct methanol fuel cell structure, Jiun-Ming Chen, Jyun-Yi Lai, and Yu-Chih Lin, Nan Ya PCB Corp. (TW).

U.S. 8,304,132 (20121106), Fuel cell, Hisashi Chigusa, Katsumi Ichikawa, Hitoshi Koda, Akiko Fujisawa, Shinichi Onodera, Hiroaki Wakamatsu, Shinichi Kanbayashi, and Naoyuki Takazawa, Kabushiki Kaisha Toshiba (JP).

U.S. 8,304,133 (20121106), Method for producing a polymer electrolyte membrane, Kousuke Sasai, Hiroki Yamaguchi, Yoshimitsu Sakaguchi, Kouta Kitamura, and Masahiro Yamashita, Toyo Boseki Kabushiki Kaisha (JP).

U.S. 8,304,134 (20121106), Polymer electrolyte composition, polymer electrolyte membrane, membrane electrode assembly and solid polymer electrolyte-based fuel cell, Naoto Miyake and Yuichi Inoue, Asahi Kasei E-materials Corp. (JP).

U.S. 8,304,135 (20121106), Proton-conductive polymer electrolyte membrane, method of manufacturing the proton-conductive polymer electrolyte membrane, and membrane-electrode assembly and polymer electrolyte fuel cell using the proton-conductive polymer electrolyte membrane, Tooru Sugitani, Hiroyuki Nishii, Otoo Yamada, and Sakura Toshikawa, Nitto Denko Corp. (JP).

U.S. 8,304,136 (20121106), Solid oxide fuel cell and solid oxide fuel cell bundle, Eon Soo Lee, Jae Hyuk Jang, Jae Hyoung Gil, Kyong Bok Min, Sung Han Kim, and Hong Ryul Lee, Samsung Electro-Mechanics Co., Ltd. (KR).

U.S. 8,304,137 (20121106), Fuel cell housing structure, Masanari Yanagisawa, Nissan Motor Co., Ltd. (JP).

U.S. 8,304,138 (20121106), Fuel cell system and method of use, Suriyaprakash Ayyangar Janarthanam and Victor Dobrin, Ford Global Technologies, LLC.

U.S. 8,304,139 (20121106), Fuel cell fluid flow field plates, Peter D. Hood, Philip J. Mitchell, Paul L. Adcock, and Simon E. Foster, Intelligent Energy Ltd. (GB).

U.S. 8,304,140 (20121106), Fuel cell separator comprising overlapping bosses and guide ridges, Seiji Sugiura, Yasuhiro Watanabe, Shuji Sato, Takahiro Takai, and Masaaki Sakano, Honda Motor Co., Ltd. (JP).

U.S. 8,304,141 (20121106), Stainless steel, titanium, or titanium alloy solid polymer fuel cell separator and its method of production and method of evaluation of warp and twist of separator, Hiroshi Kihira, Michio Kaneko, Mitsuharu Yamagata, Koki Tanaka, Yoichi Ikematsu, Yoichi Matsuzaki, Kazuto Kawakami, Wataru Hisada, and Suguru Suzuki, Sintokogio Ltd. (JP).

U.S. 8,304,142 (20121106), Fuel cell, Shinichiro Imura, SANYO Electric Co., Ltd. (JP).

U.S. 8,304,143 (20121106), Conductive and hydrophilic coating for PEMFC bipolar plate, Richard H. Blunk, Feng Zhong, Tina T. Salguero, and Kevin W. Kirby, GM Global Technology Operations LLC.

U.S. 8,304,144 (20121106), Fuel cell formed in a single layer of monocrystalline silicon and fabrication process, Giuseppe D'Arrigo and Salvatore Coffa, STMicroelectronics srl (IT).

U.S. 8,304,145 (20121106), High tortuosity diffusion medium, Christian Wieser and Paul D. Nicotera, GM Global Technology Operations LLC.

U.S. 8,304,362 (20121106), Core/shell-type catalyst particles and methods for their preparation, Marco Lopez, Michael Lennartz, Dan V. Goia, Carsten Becker, and Stéphanie Chevalliot, Umicore AG & Co. KG (DE).

U.S. 8,304,365 (20121106), Stabilized platinum catalyst, Minhua Shao, Belabbes Merzougui, Patrick L Hagans, and Susanne M Opalka, UTC Power Corp.

U.S. 8,304,367 (20121106), Hydrocarbon-decomposing porous catalyst body and process for producing the same, process for producing hydrogen-containing mixed reformed gas from hydrocarbons, and fuel cell system, Shinji Takahashi and Naoya Kobayashi, Toda Kogyo Corp. (JP).

U.S. 8,304,368 (20121106), Catalyst coated membrane (CCM) and catalyst film/layer for alkaline membrane fuel cells and methods of making same, Shimshon Gottesfeld, Dario Dekel, and David Stanislav Simakov, Cellera, Inc.

U.S. 8,308,133 (20121113), Freeze capable anode valve with a housed sliding plate orifice, Seth E. Lerner and Aaron Rogahn, GM Global Technology Operations LLC.

U.S. 8,308,848 (20121113), High temperature gas desulfurization sorbents, Gokhan Alptekin, Margarita DuBovik, and Ambalavanan Jayaraman, TDA Research, Inc.

U.S. 8,308,938 (20121113), Three-way diverter assembly for a fuel cell system, Benno Andreas-Schott and Thomas P. Migliore, GM Global Technology Operations LLC.

U.S. 8,308,943 (20121113), Hollow fiber membrane module and fuel cell system, Hirofumi Kanazawa, Toshiyuki Kondo, and Hiroyasu Shirakawa, Toyota Jidosha Kabushiki Kaisha (JP) and NOK Corp. (JP).

U.S. 8,308,970 (20121113), Acid-base mixture and ion conductor comprising the same, Tetsuji Hirano, Nobuharu Hisano, and Masayuki Kinouchi, Ube Industries, Ltd. (JP).

U.S. 8,308,989 (20121113), Electrocatalyst for oxygen reduction with reduced platinum oxidation and dissolution rates, Radoslav Adzic, Junliang Zhang, and Miomir Vukmirovic, Brookhaven Science Associates, LLC.

U.S. 8,309,218 (20121113), Lamination apparatus and methods, Scott Alan Ripley, Donald Ivan Hirsch, and William Frederic Bader, 3M Innovative Properties Co.

U.S. 8,309,261 (20121113), Fuel cell with control unit for recirculating fuel, Takuya Hashimoto and Hideki Kubo, Toyota Jidosha Kabushiki Kaisha (JP).

U.S. 8,309,262 (20121113), Fuel cell system, Shigeto Kajiwara and Katsuki Ishigaki, Toyota Jidosha Kabushiki Kaisha (JP).

U.S. 8,309,263 (20121113), Fuel cell assembly and electricity generation unit used in same, Takashi Ono, Naruto Takahashi, Masatoshi Ikeda, Kazumasa Maruya, and Michiaki Nishimura, Kyocera Corp. (JP).

U.S. 8,309,264 (20121113), Fuel cell flow field having strong, chemically stable metal bipolar plates, Sergei F. Burlatsky, Jean Colpin, Shubhro Ghosh, Nikunj Gupta, Patrick L. Hagans, and Weilong Zhang, UTC Fuel Cells, LLC.

U.S. 8,309,265 (20121113), Electrolyte membrane for fuel cells, its production and fuel cell using the same, Akihiro Miyauchi, Kenichi Souma, Shuichi Suzuki, Yoshiyuki

Takamori, Masahiko Ogino, Takashi Ando, and Hidetoshi Honbo, Hitachi, Ltd. (JP).

U.S. 8,309,266 (20121113), Fuel cell device and system, Alan Devoe and Lambert Devoe.

U.S. 8,309,267 (20121113), Polymer electrolyte fuel cell, Shiro Tanaka, Nissan Motor Co., Ltd. (JP).

U.S. 8,309,268 (20121113), Sealing of a membrane electrode assembly, Silvain Buche, Adam John Hodgkinson, Catherine Helen de Rouffignac, and Jonathan David Brereton Sharman, Johnson Matthey Fuel Cells Ltd. (GB).

U.S. 8,309,269 (20121113), Fuel cell, membrane-electrode assembly, and membrane-catalyst layer assembly, Haruhiko Shintani, Atsushi Nogji, Miho Gemba, Takashi Nakagawa, and Yoichiro Tsuji, Panasonic Corp. (JP).

U.S. 8,309,270 (20121113), Solid oxide fuel cell systems with improved gas channeling and heat exchange, Caine Finnerty and Charles Robinson, CP SOFC IP, LLC.

U.S. 8,309,271 (20121113), Tubular fuel cell and fuel cell module, Masaki Terada, Yukihiisa Katayama, Hirokazu Ishimaru, and Yuichiro Hama, Toyota Jidosha Kabushiki Kaisha (JP).

U.S. 8,309,272 (20121113), Solid oxide cell, Manabu Ihara, Shinichi Hasegawa, and Keiji Yamahara, Tokyo Institute of Technology (JP) and Mitsubishi Chemical Corp. (JP).

U.S. 8,309,273 (20121113), Polymer electrolyte fuel cell and fuel cell stack including the same, Miho Gemba, Yoichiro Tsuji, and Shinsuke Takeguchi, Panasonic Corp. (JP).

U.S. 8,309,274 (20121113), Separator plates formed by photopolymer based processes, Jeffrey A. Rock, Yeh-Hung Lai, Keith E. Newman, Gerald W. Fly, Alan J. Jacobsen, Peter D. Brewer, and William B. Carter, GM Global Technology Operations LLC.

U.S. 8,309,275 (20121113), Membrane electrode assembly (MEA), method for its manufacturing and a method for preparing a membrane to be assembled in a MEA, Hans-Peter Brack, Günther Scherer, and Lorenz Gubler, Paul Scherrer Institut (CH).

U.S. 8,309,276 (20121113), Process for preparing of a catalyst solution for fuel cell and a membrane electrode assembly using the same, Byungchul Jang, Young Taek Kim, Jung-Eun Yang, Youngsu Jiong, Dong Hwan Ryu, and Min-Ho Seo, Hanwha Chemical Corp. (KR).

U.S. 8,309,678 (20121113), Aromatic compound and polyarylene copolymer having nitrogen-containing heterocycle including sulfonic acid group in side chain, Toshiaki Kadota and Yoshitaka Yamakawa, JSR Corp. (JP).

U.S. 8,310,235 (20121113), NMR apparatus for in situ analysis of fuel cells, Rex E. Gerald II and Jerome W. Rathke, U.S. Department of Energy.

U.S. 8,313,680 (20121120), Method of producing fuel cell, Takaaki Mitsuoka, Akihiro Nonogaki, Tetsuhiro Takehara, Masaru Oda, Seiji Sugiura, Teruyuki Ohtani, and Keisuke Ando, Honda Motor Co., Ltd. (JP).

U.S. 8,313,867 (20121120), Fuel cell system, Joachim A. Wünnig and Hans-Peter Schmid, WS Reformer GmbH (DE).

U.S. 8,313,869 (20121120), Fuel cell power generating system and fuel cell power generating system operating

Register Now On-line

30th INTERNATIONAL BATTERY SEMINAR & EXHIBIT Primary & Secondary Batteries - Other Technologies

MARCH 11 - 14, 2013

**Broward County Convention Center
Fort Lauderdale, Florida**

**PREMIER SPONSOR
TOYOTA**

**INDUSTRY SPONSORS
ABT/FCT ~ Battery Power & Technology ~ CIAPS (China Industrial Association of Power Sources)**

**THE LONGEST RUNNING ANNUAL MEETING IN THE BATTERY INDUSTRY
CONTINUES TO BE THE BEST**

**SPEAKERS FROM AROUND THE WORLD
PRE-SEMINAR TUTORIALS * POSTER SESSION
THE LARGEST TRADE EXHIBIT**

Acknowledged as the Best Meeting to Make Contacts and do Business

**Technical Program
Dr. S.P. Wolsky, Ansum Enterprises, Inc.
Dr. A.H. Taylor, Portable Power Perspectives**

In the 30 years of its existence, this Seminar has been the leader in providing key industry speakers to discuss the state of the art of worldwide energy storage technology developments for portable products, power and vehicular applications. The meeting provides not only broad perspectives, but also informed insights into significant advances in materials, product development and application for all battery systems and enabling technologies.

The meeting is renowned for offering broad networking and exhibiting opportunities to the international battery community.

Areas of focus include: (1) In depth worldwide analysis of battery markets and technologies (2) Government battery developments (3) Battery safety enhancement and regulatory status (4) Consumer and large format batteries (5) Thermal and power management systems for consumer and electric, plug-in and hybrid vehicles (6) Battery development for the grid (7) Advances in new and improved materials for anode, cathode, electrolyte, separators, including nanomaterials (8) Battery materials availability (9) Advances in battery packs, charging and testing (10) Battery recycling for regulatory and resource recovery purposes (11) Review of the status and future outlook for other energy storage technologies.

SPONSORSHIP – Enhance your participation and visibility as an Industry Sponsor or by sponsoring a cocktail party, refreshment break or lunch.

EXHIBITS – Display your products and services at the LARGEST industry exhibition. Application available at www.POWERSOURCES.net. Space is allocated on a first come basis. Contact us today!

**Conference Information available at
www.POWERSOURCES.net**

- Sponsorship Opportunities
- Exhibiting
- Poster Paper
- Conference Registration

**The International Battery Seminar LLC
Tel 561-367-0193 • Fax 561-367-8429 • Email: info@powersources.net**

method, Yukimune Kani, Kunihiro Ukai, and Akira Maenishi, Panasonic Corp. (JP).

U.S. 8,313,870 (20121120), Integrated flow field (IFF) structure, Shyhing M. Pien and Marvin Warshay, ElectroChem, Inc.

U.S. 8,313,871 (20121120), Fuel cell heating, Dirk Wexel, Jurgen Thyroff, and Bernd Peter Elgas, GM Global Technology Operations LLC.

U.S. 8,313,872 (20121120), Fuel cell and fastening device for fuel cell, Hiroki Okabe and Yutaka Hotta, Toyota Jidosha Kabushiki Kaisha (KR).

U.S. 8,313,873 (20121120), Polymer membrane for a fuel cell, a method of preparing the same, and a membrane-electrode assembly fuel cell system comprising the same, Min-Kyu Song, Hae-Kwon Yoon, and Young-Mi Park, Samsung SDI Co., Ltd. (KR).

U.S. 8,313,874 (20121120), Structure of solid oxide fuel cell, Jae Hyoung Gil, Jae Hyuk Jang, Kyong Bok Min, Sung Han Kim, and Eon Soo Lee, Samsung Electro-Mechanics Co., Ltd. (KR).

U.S. 8,313,875 (20121120), High performance cathode with controlled operating temperature range, Anthony Wood, Zheng Tang, Sofiane Benhaddad, Tahir Joia, Kyle Marcotte, and David Waldbillig, Versa Power Systems, Ltd. (CA).

U.S. 8,314,622 (20121120), Method and apparatus for examining ion-conductive electrolyte membrane, Naoki Uchiyama, Kabushiki Kaisha Asumitec (JP).

U.S. 8,316,721 (20121127), Apparatus and method for non-destructive measurement of bending stiffness of GDL for fuel cell, Bo Ki Hong, Kook Il Han, Ji Yeon Park, Byeong Heon Jeong, and Sang Yeoul Ahn, Hyundai Motor Co. (KR).

U.S. 8,317,167 (20121127), Humidifier for fuel cell, Hyun Yoo Kim, Hyundai Motor Co. (KR) and Kia Motor Corp. (KR).

U.S. 8,317,884 (20121127), Hydrogen generating fuel cell cartridges, Andrew Curello, Floyd Fairbanks, Constance R. Stepan, Anthony Sgroi Jr., and Michael Curello, Société BIC (FR).

U.S. 8,317,907 (20121127), Water vapor transfer assembly, David A. Martinchek and Ian R. Jermy, GM Global Technology Operations LLC.

U.S. 8,318,241 (20121127), Method of manufacture of an electrode for a fuel cell, William John Waugh and Alan MacDonald Davidson, Court of Edinburgh Napier University (GB).

U.S. 8,318,362 (20121127), Fuel cell with electrolyte condensation zone, Richard D. Breault and Robert R. Fredley, UTC Power Corp.

U.S. 8,318,363 (20121127), Reformer for fuel cell system and fuel cell system comprising the same, Hyun-Jeong Lim, Samsung SDI Co., Ltd. (KR).

U.S. 8,318,364 (20121127), Fuel cell system, Hiroaki Matsuda and Hideyuki Ueda, Panasonic Corp. (JP).

U.S. 8,318,365 (20121127), Fuel cell system with bypass path and operation method for controlling bypass path of fuel cell system, Akinori Yukimasa, Masataka Ozeki, Hideo Ohara, and Akinari Nakamura, Panasonic Corp. (JP).

U.S. 8,318,366 (20121127), Hydrogen generator and

fuel cell using the same, Jin-ho Kim, Jae-yong Lee, Yeong-suk Choi, and Kyoung-hwan Choi, Samsung SDI Co., Ltd. (KR).

U.S. 8,318,367 (20121127), Electrochemical energy generating apparatus and operating method thereof, and electrochemical device, Kengo Makita and Takashi Tomita, Sony Corp. (JP).

U.S. 8,318,368 (20121127), Portable systems for engine block, Ian W. Kaye and Kenneth J. Newell, UltraCell, LLC.

U.S. 8,318,369 (20121127), System and method for reducing radiator sizes for low temperature fuel cell systems, Leslie L. VanDine, UTC Power Corp.

U.S. 8,318,371 (20121127), Separator for fuel cell and fuel cell stack using the same, Young-Seung Na and Jun-Ho Sauk, Samsung SDI Co., Ltd. (KR).

U.S. 8,318,372 (20121127), Fuel cell stack and vehicle equipped with fuel cell system, Norihiko Saito, Toyota Jidosha Kabushiki Kaisha (JP).

U.S. 8,318,373 (20121127), Fuel cell assembly, Hanna Katariina Rajantie, Jonathan David Brereton Sharman, David Thompsett, David Emmerson Brown, Stephen Robert Tennison, Beverley Sowerby, and Vlad Strelko, Johnson Matthey Fuel Cells Ltd. (GB).

U.S. 8,318,374 (20121127), Fuel cell comprising oxygen electrode with surface nanostructure, Daisuke Ino, Mitsuru Hashimoto, Akira Taomoto, Nobuyasu Suzuki, and Yuka Yamada, Panasonic Corp. (JP).

U.S. 8,318,375 (20121127), Cathode for electrochemical reactor, electrochemical reactor incorporating such cathodes and method for making said cathode, Sophie Mailley, Frédéric Sanchette, Stéphanie Thollon, and Fabrice Emieux, Commissariat à l'Energie Atomique (FR).

U.S. 8,318,376 (20121127), Polymer electrolyte membrane with coating layer of anion binding agent and fuel cell using same, Ki Yun Cho and In Chul Hwang, Hyundai Motor Co. (KR).

U.S. 8,318,377 (20121127), Membrane-electrode junction agent, proton conducting membrane having junction layer, membrane-electrode assembly, polymer electrolyte fuel cell, and manufacturing method of the membrane-electrode assembly, Toshihito Miyami, Yoshiharu Konno, Hideyasu Nakajima, and Masashi Kanoh, Sekisui Chemical Co., Ltd. (JP).

U.S. 8,318,378 (20121127), Fuel cell and fuel cell fastening device, Norihiko Saito and Kimihide Horio, Toyota Jidosha Kabushiki Kaisha (JP).

U.S. 8,318,379 (20121127), Membrane-electrode assembly for mixed reactant fuel cell and mixed reactant fuel cell system including same, Chan Kwak, Alexey Alexandrovichserov, Myoung-Ki Min, and Si-Hyun Lee, Samsung SDI Co., Ltd. (KR).

U.S. 8,318,380 (20121127), Fuel cell and vehicle having fuel cell, Tomohiro Ogawa, Masaaki Kondo, Kazunori Shibata, Takashi Kajiwara, Tsutomu Shirakawa, and Satoshi Futami, Toyota Jidosha Kabushiki Kaisha (JP).

U.S. 8,318,382 (20121127), Fuel cell electrode containing proton conductive inorganic oxide, Jun Tamura, Yoshihiko Nakano, and Wu Mei, Kabushiki Kaisha Toshiba

(JP).

U.S. 8,318,383 (20121127), Fuel cell reaction layer, Norifumi Hasegawa, Kabushikikaisha Equos Research (JP).

U.S. 8,318,384 (20121127), Anode catalyst and methods of making and using the same, Jing-Li Luo, Karl Tze-tang Chuang, Zhengrong Xu, and Alan Sanger, The Governors of the University of Alberta (CA).

U.S. 8,318,385 (20121127), Process for producing fuel cell electrode, Bor Z. Jang, Aruna Zhamu, and Jiusheng Guo, Nanotek Instruments, Inc.

RESEARCH AND DEVELOPMENT

Researchers Develop Cobalt Boride Catalyst

Working together for the last four years, research students from the University of Mumbai and the University of Trento, Italy, have successfully completed their trial on a low-cost and safe method of producing hydrogen gas, which may revolutionize hydrogen fuel cell car technology.

The students have come out with a catalyst, cobalt boride, which efficiently releases hydrogen from ammonia borane (NH₃BH₃) by hydrolysis. Wonderful results have been obtained by using the nano form of cobalt boride. The new catalyst can replace noble and costly metals which are presently used in hydrogen cars.

“In the present day hydrogen-powered cars, either platinum, palladium or ruthenium are used as catalysts to enhance hydrogen production from its compounds. All these are noble metals, and very costly,” says lead researcher Nainesh Patel from the physics department of the University of Mumbai. “Cobalt boride gives superior results and is cheap and readily available.”

Instead of using the catalyst in powder form, the researchers have synthesized ‘cobalt nanoparticles-embedded boron matrix catalyst film’ for better results.

Though hydrogen can be obtained by breaking water molecules, it requires huge additional energy produced by conventional methods which turns out to be costly. “We have used ammonia borane as it can store more hydrogen and also release pure hydrogen by simple hydrolysis in the presence of a catalyst at room temperature,” says Prof DC Kothari, head of the university’s physics department.

RWE Power Testing New Electrolysis Technology

An innovative electrolysis system from Germany’s Siemens aims to separate water into its components, hydrogen and oxygen, using excess wind power. The novel technology comes with a PEM fuel cell and enables electric power to be converted into hydrogen.

The system is currently being built up in the

Coal Innovation Centre at the Niederaussem power-plant location. The electrolysis system is located in a standard container and will be tested through October.

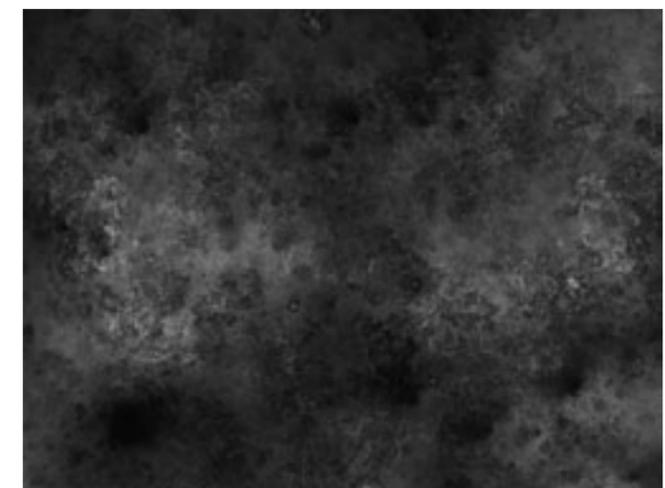
The hydrogen produced by the electrolysis system can be deployed in the most varied of ways. Some of it can be used with CO₂ from the power plant’s flue gas to produce methane in the adjacent new catalyst test facility.

“Renewables often generate more electricity than is consumed when energy demand happens to be low,” explains Dr. Ulrich Hartmann, RWE Power Board member responsible for Research and Development. “At our Coal Innovation Centre, we are investigating various ways of storing and using this excess energy.”

Engineering Alternative Fuel With Cyanobacteria

Sandia National Laboratories Truman Fellow Anne Ruffing has engineered two strains of cyanobacteria to produce free fatty acids, a precursor to liquid fuels, but she has also found that the process cuts the bacteria’s production potential.

Ruffing considers her studies as proof-of-concept work that demonstrates engineering cyanobacteria for free fatty acid (FFA) production and excretion. She wants to identify the best hydrocarbon targets for fuel production and the best model strain for genetic engineering, as well as gene targets to improve FFA production.



She is using cyanobacteria – blue-green algae – because they are easier to genetically manipulate than eukaryotic algae, the natural oil-producing photosynthetic microorganisms more commonly used for algal biofuels,



and because cyanobacteria can be engineered to create a variety of target fuels. Genetically engineered cyanobacteria excrete FFA and allow fuel to be collected without harvesting the cyanobacteria. This lowers the requirement for nitrogen and phosphate and reduces costs. But current yields from engineered strains are too low for large-scale production.

Ruffing favors cyanobacteria because fuel from engineered cyanobacteria is excreted outside the cell, in contrast to eukaryotic algae, in which fuel production occurs inside the cell.

PRODUCT NEWS

Lilliputian Nectar Mobile Power Charger

Lilliputian Systems' Nectar mobile power system puts the convenience and longevity of a fuel cell into something that's easy to pocket or throw in your bag. Unlike rechargeable battery packs, the Nectar is entirely dedicated to disposable power. The \$300 core system can power up any gadget that can be charged through a USB (including smartphones, tablets, e-readers, etc.), and it's powered by fuel cell pods that cost \$10 each.

Each pod generates around two weeks of battery life.



Once a pod is used up, simply dump it in the recycling bin. The Nectar is powered by the company's patented Silicon Power Cell technology. Lilliputian is able to fit the brains of a fuel cell on a silicon chip.

For more information, visit www.nectarpower.com.

Commercial Fuel Cell Charger Runs on Water

The myFC PowerTrek is one of the world's first portable fuel cell chargers for commercial use. Made by Swedish fuel cell pioneers myFC, it runs on ordinary water. Users simply insert the PowerTrek puck and add ordinary water to provide instant power on the go.



Billions of people worldwide lack connection to the electricity grid from time to time. This applies for daily mobile phone users all over the world, as well as people in emerging markets and outdoor enthusiasts. With the launch of the first ever water based fuel cell charger for commercial use, there is now a clean energy solution when in need of a portable source of power. myFC PowerTrek is both a portable battery pack and fuel cell, intended for people who spend time away from the electricity grid. myFC PowerTrek provides instant power anywhere to electronic equipment such as mobile phones, cell phones, GPS-devices and cameras.

For more information, visit www.myfuelcell.se.

Fuel Cells 2000 Releases 2012 Report

The Business Case for Fuel Cells 2012: America's Partner In Power, a new report released by Fuel Cells 2000, a non-profit organization based in Washington, D.C., profiles companies achieving both economic and environmental benefits with fuel cell deployments as part of overall sustainability plan. Fuel cells are the perfect silent partner, quietly bolstering efficiency and reliability without harmful emissions, and work in tandem with other technologies, including renewable such as solar, wind and biogas, and conventional ones such as natural gas and batteries, as part of a comprehensive energy portfolio.

Many companies are becoming repeat fuel cell customers, purchasing additional systems after experiencing benefits and savings. The leaders are AT&T, with more than 17MW either installed or on order for 28 sites in Connecticut and California; Walmart, with 26 stores in California powered by fuel cells and 3 facilities in North America using fuel cell forklifts; and Sysco, with more than 700 fuel cell forklifts deployed at seven facilities in the U.S., with hundreds more on order.

To download the report, visit www.fuelcells.org.

ELECTRIC VEHICLES

Toyota to License Fuel Cell Car Tech to BMW

Toyota Motor Corp. is working on an agreement with BMW AG to provide the German firm with technology for fuel cell vehicles, reports the *Nikkei* in a recent morning edition. Toyota has been developing the technology since 1992 and this would be the first time to share it with another company.

Under the agreement, the Japanese auto maker would provide BMW with drivetrain and hydrogen storage technology this year. BMW will use it to build a prototype vehicle by 2015, with plans for a market release around 2020. Toyota plans to launch a fuel cell powered sedan as early as 2015 in Japan, the U.S., and Europe. Toyota's sedan will be priced at about ¥5 million (US\$56,500).

Daimler AG, General Motors Co., Nissan Motor Co., Honda Motor Co. and Hyundai Motor Co. are competing to develop these environmentally friendly vehicles. By licensing its technology to BMW, Toyota hopes to realize economies of scale and enhance price competitiveness.

Toyota and BMW signed a memorandum of understanding last June on technological cooperation centering on eco-friendly vehicles. They plan to also pursue joint development in areas such as hybrids.

Hydrogen Buses to Debut in Hawaii Park

Hawaii Volcanoes National Park expects to begin using two hybrid battery/hydrogen-fueled visitor shuttles this spring. The hope is that the new system will help to relieve congestion along the park's narrow, winding roads, while showing that such a task can be completed using climate-friendly technologies, said Cindy Orlando, the park superintendent. Each vehicle is 35 feet long and 8 feet wide, capable of carrying 20-25 passengers.

The pilot project is being funded in part through a \$989,000 research and development grant, according to a press release from the National Park Service. The park has partnered with the Hawaii Natural Energy Institute, the Hawaii Center for Advancement of Transportation Technologies, the Department of Defense, and the Federal Transit Authority, among others, for a two-year test run.

APFCT to Offer Hydrogen Scooter to Asian Market

Most of the world's leading automakers, such as Toyota, Honda, and Daimler, are developing hydrogen-powered vehicles for commercialization in 2015, if not sooner. APFCT of Taiwan, rather than a typical sedan, has

been working on building hydrogen-powered scooters.

The APFCT hydrogen-powered scooters have been road tested for the past several months. The scooters are equipped with an electric motor that receives its power from a single fuel cell. The fuel cell generates electricity through the use of hydrogen gas, which is stored in a small, pressurized canister. These canisters can be changed out or refilled to keep the fuel cell generating electricity. APFCT has announced that 80 of these vehicles will be made available to the general public in Taiwan, all of which have been road tested and qualify for the country's licenses.

APFCT is looking at a limited launch for its hydrogen-powered scooters. Though the scooters have been deemed safe for the road, there is not telling how consumers will respond to these new vehicles.

Scotland Plans World's First Hydrogen Vehicle Ferry

Scottish Hydrogen Fuel Cell Association (SHFCA) member Caledonian Marine Assets Ltd (CMAL) is working closely with Scotland's main ferry operator to develop the world's first car and vehicle ferry powered by hydrogen fuel cells. This revolutionary vessel could run on hydrogen produced using renewable electricity generated overnight from local wind farms or other renewables.



CMAL has just completed a feasibility study for Scottish Enterprise, which proves the viability of the hydrogen vehicle ferry. Guy Platten, chief executive of Caledonian Maritime Assets, said that £500,000 of further funding will be needed to develop the project design, including into the manufacture and storage of hydrogen in ports. A favorable outcome from this design study could lead to a £15 million demonstration vessel being built within a few years.

The project was inspired by a visit to Transport for London's hydrogen-powered buses. CMAL then teamed up with SHFCA members Logan Energy and St Andrews University, as well as the SHFCA. The program could cut costs and enable production close to ferry routes, and may

also bring additional benefits to communities developing renewable energy projects.

Hyundai IX35 Receives FuturAuto 2013 Award

The Union of Journalists of the Belgium Automotive Press (UJBA) has awarded its annual Innovation Prize FuturAuto on the occasion of the Brussels Motor Show. This year the award goes to the Hyundai ix35 FCEV, the first fuel cell vehicle, fed with hydrogen, going into mass production.

FuturAuto rewards a technological innovation in the field of safety, environment-friendliness, comfort, mechanic, economy, industry, and traffic

In fact, each domain that is remotely or closely in line with the sector. From a long list of 16 candidates, the association's professional auto journalists eventually selected five nominees, of which the Hyundai ix35 FCEV clearly took the lead and was chosen the winner by the trade press.



UPCOMING EVENTS

Call for Papers

Deadline: January 31

Battcon, May 6-8, Disney's Contemporary Resort, Lake Buena Vista, Florida.

Submit a brief abstract describing the proposed paper's main points, conclusion, title and contact information with a biography as a Word file attachment to Michael Salokar at michael.salokar@alber.com.

Contact Michael Salokar, Albercorp, 3103 N. Andrews Ave. Ext., Pompano Beach, FL 33064, (954) 623-6660, or visit www.battcon.com.

Deadline: January 31

IFBF: The International Flow Battery Forum, June 26-27, Venue TBA, Dublin, Ireland.

Submit a 500-word maximum brief abstract describing

the proposed paper's main points, conclusion, title and contact information with a biography as a Word file attachment to papers@flowbatteryforum.com.

Contact www.flowbatteryforum.com.

Deadline: February 15

EVS27, November 17-20, Venue TBA, Barcelona, Spain.

Submit a 750- to 1,000-word abstract describing the proposed paper's main points, conclusion, title and contact information online at http://papers.evs27.org.

Contact www.evs27.org.

Meetings and Symposia

January 28-30 – 10th Tactical Power Sources Summit, Hilton Alexandria Mark Center, Alexandria, Virginia.

Includes materials advancements to increase density and lower cost; improved lithium/air battery electrolytes; efficiency; biologically engineered batteries; breakthrough technology commercialization; power advancements; and minimizing power source weight and size.

Info: IDGA, 535 5th Ave., 8th Floor, New York, NY 10017.

February 4-8 – 13th International Advanced Automotive Battery Conference and Symposia (AABC), Pasadena Convention Center, Pasadena, California.

Automotive energy-storage experts discuss the technological progress and scenarios for the development of the market. The LLIBTA Symposium includes advances in materials, cell and pack designs, and analyzes battery performance, durability and safety in new applications.

Info: Carol Chambers, Advanced Automotive Batteries, phone: (530) 692-0140; fax: (530) 692-0142, or visit www.advancedautobat.com.

February 27-March 1 – Battery Japan 2012, 4th International Rechargeable Battery Expo, Tokyo Big Sight, Tokyo, Japan.

Advanced Fuel Cell Technology

January 2013

Index of Advertisers

ABTandFCT.....16
 ElectrochemicalSociety.....5
 30thInternationalBatterySeminarandExhibit.....9

To advertise in FCT,
 order a media kit by calling

Jo at (814) 466-6559 or

email: jo@7ms.com cc:brenda@7ms.com

Includes battery materials/components, rechargeable batteries, equipment for R&D and manufacturing rechargeable batteries and capacitors.

Info: Visit www.batteryjapan.jp/en/

March 10-15 – Internal Battery Association Conference, Hotel Catalonia Rambia, Barcelona, Spain.

Offers a blend of battery science and technology and serves as a specialized forum for the discussion of interdisciplinary battery research and development.

Info: Visit www.icmab.csic.es/iba2013/.

March 11-14 – 30th International Battery Seminar & Exhibit, Broward County Convention Center, Ft. Lauderdale, Florida.

Ideal for battery and small fuel cell manufacturers, users, OEMs, product designers, component, equipment and material suppliers, applications engineers, marketing analysts, patent attorneys, investors and those interested in the battery and small fuel cell industries.

Info: Thomas M. Devita, Seminar Coordinator, Florida Educational Seminars Inc., 2300 Glades Road, Suite 260W, Boca Raton, FL 33431, phone: (561) 367-0193, fax: (561) 367-8429, or visit www.powersources.net.

April 15-16 – Battery Congress 2013, MSU Management Education Center, Troy, Michigan.

Provides a forum for engineers, manager, scientists, academic researchers, and industry to exchange advances in battery technology and applications management systems. Dedicated to the research integration of new batteries into vehicles and other energy systems.

Info: Visit http://batterycongress.org.

April 16-18 – FDFC2013: 5th International Conference on Fundamentals and Development of Fuel Cells, Kongresszentrum, Karlsruhe, Germany.

Focuses on fuel cells and electrolyzers. Includes advances in materials, single cells, stacks and system development, as well as patent issues such as fuel cell diagnosis, power processing and control, characterization of MEA upon operation/aging.

Info: Visit http://fdfc2013.eifer.uni-karlsruhe.de.

May 6-8 – Battcon, Disney's Contemporary Resort, Lake Buena Vista, Florida.

Noncommercial, technical event for storage battery users from the power, telecom, UPS and other industries. End-users, engineers, battery and battery test equipment manufacturers, installers, and standards and safety experts gather to discuss storage battery innovations and solutions for existing systems; everyday applications; technical advances; and industry concerns. A trade show features storage power related vendors.

Info: Jennifer Stryker, Albercorp, 3103 N. Andrews Ave. Ext., Pompano Beach, FL 33064, (954) 623-6660 ext 23806, or visit www.battcon.com.

May 29-30 – 3rd Israeli Power Sources, Batteries, Fuel Cells, Smart-Grid & EV Conference, Daniel Hotel, Herzelia, Israel.

Brings together participants from leading private and

public companies, start-ups, investors, academics and businesses to discuss batteries, fuel cells, power sources, smart-grid and EVs.

nfo: Visit http://www.sdle.co.il.

June 10-12 – Electric Drive Transportation Association Conference and Annual Meeting, Washington Marriott Wardman Park, Washington, DC.

Provides in-depth, leading-edge information to promote the discussion and development of electric drive technology and power sustainable transportation. Includes electric, extended range electric, plug-in hybrids, hybrids and fuel cell vehicles. Ideal for academic, government, and industry leaders interested in the technical, policy and market challenges. Hundreds of exhibits are anticipated. Ride, drive and charge the latest battery, plug-in hybrid, and fuel cell electric drive vehicles, bikes and scooters.

Info: Visit www.electricdrive.org.

June 26-27 – IFBF: The International Flow Battery Forum, Venue TBA, Dublin, Ireland.

Promotes the latest developments in flow battery science, technology, and deployment; and flow batteries as a modern and effective electrical energy source.

Info: Visit www.flowbatteryforum.com.

July 12-15 – Hydrogen and Fuel Cells Conference 2013, Silverado Resort and Spa, Napa Valley, California.

Includes hydrogen production and materials; materials for hydrogen storage; fuel cell research and development; hydrogen and fuel cell applications; and hydrogen safety engineering.

Info: Visit http://www.zingconferences.com/index.cfm?page=conference&intConferenceID=109&fSignup=1&CFID=2267227&CFTOKEN=97972260.

September 1-4 – 4th International Microbial Fuel Cell Conference, Cairns, Queensland, Australia.

Organized by Pennsylvania State University (USA), Gwangju Institute of Science and Technology (Korea), and Wageningen University/WETSUS (The Netherlands) and includes all microbial electrochemical technologies.

Info: Visit www.mfc4.com.au.

September 10-13 – 15th Asian Battery Conference, Shangri-La Hotel, Singapore, China.

Industry C-Level executives, marketers, technical staff and sales teams discuss new and emerging technologies, understand future directions, meet new suppliers, conduct business and network with industry peers.

Info: Visit www.conferenceworks.com/au/15abc/.

November 17-20 – EVS27, Venue TBA, Barcelona, Spain.

Includes planetary sessions, oral sessions in parallels, poster sessions, exhibition, Ride&Drive, and projects dissemination. See the latest battery, hybrid and fuel cell electric vehicles available on the market, prototypes and infrastructures for the electric vehicles as well as all types of components.

Info: Visit www.evs27.org.

Staying Informed Is Essential.

Connecting With Customers and Suppliers Is Critical.



ABT and FCT Keep You Informed and Connected

ON LINE and **IN PRINT**—Every month ABT and FCT provide the latest battery and fuel cell industry news, U.S. patents awarded, products, vehicles, upcoming meetings and seminars. Special features include technical and meeting reports from industry experts. For 42 years, ABT and now in its 10th year, FCT together are two of the most respected publications in the industry.

To advertise or subscribe call (814)466-6559, or email brenda@7ms.com or visit www.7ms.com