

# fuel cell

THE MAGAZINE OF FUEL CELL BUSINESS AND TECHNOLOGY

metal hydride  
fuel cell technology for

## backup power

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# Q&A with Peng K. Lim

CEO, Mechanical Technology Inc.  
MICRO FUEL CELLS AND PORTABLE POWER



Fuel Cell Magazine had the opportunity to ask Peng K. Lim, CEO of Mechanical Technology Incorporated (MTI), questions regarding micro fuel cells and MTI's developments within the market. The following is the Q&A with Lim, who discusses the company's current talks with Samsung, MTI's Mobion technology and what he foresees for the coming years.

**Q:** MTI Micro Fuel Cells developed Mobion micro fuel cell technology. What are the significant technology features and competitive advantages of Mobion?

**A:** Mobion micro fuel cells offer an alternative to batteries as an improved power source since they have the potential to allow for longer run times while minimizing time spent re-charging, and eliminate the need to be connected to an outlet or carry multiple bulky chargers.

We feel very strongly about the advantages that MTI Micro's Mobion technology offers compared to competitive micro fuel cell systems. One of the most important characteristics of our design is that our fuel cells use 100 percent methanol as fuel to power portable devices. Using 100 percent methanol translates into much higher energy, therefore allowing electronics devices to run for much longer with our fuel cell solution. Most of our competitors di-



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lute the methanol with water, which can severely reduce the system's energy density, as water has no energy content. Our passive water management technology in a direct methanol fuel cell (DMFC) system is our key for simplifying fuel logistics as well as enabling miniaturization. We feel that this unique approach gives the company a competitive advantage in addressing the consumer portable electronic market.

Another important feature of our fuel cell is that it is capable of operating at 0 - 40°C and at any humidity. These operating conditions are a requirement for shipping products in the consumer electronics market.

MTI Micro has a very strong IP portfolio with 89 patents filed in the U.S. and 26 granted. We also filed 23 patents internationally. As more companies try to move into the passive DMFC space, and the micro fuel cell industry comes closer to commercialization, we feel very strongly that our pioneering patent work will provide a valuable competitive advantage. Additionally, unlike batteries, which

contain heavy metal and are unfriendly to the environment, our Mobion technology is a green technology.

**Q:** Please describe what stage MTI is at with manufacturability in regard to portable electronics and micro fuel cells?

**A:** At MTI Micro, we are now laying the foundation for moving Mobion micro fuel cells into the fast growing market for portable power products. MTI Micro recently announced plans for manufacturing readiness in 2008 and a product launch in the consumer market in 2009. We continue to make technical advances in our Mobion platform and meet with leading OEMs in the portable electronics space to discuss additional opportunity for our Mobion technology for use in handheld consumer electronics. We are currently working with Samsung Electronics and are in discussion with them about our collaboration moving forward which could develop in a number of different ways. Additionally we work with Gillette/Dura-

cell, and plan to sign another consumer electronic OEM before the end of the year.

**Q:** What type of trends do you see happening within this market? Is the overseas market closer to commercialization? What product will adapt to this technology first? Why?

**A:** One key trend that remains constant in consumer electronics is the convergence of multiple functions into a handheld product. The mobile phone is a good example of this trend. Today, mobile phones are equipped with digital cameras, wireless technology to enable internet access via Wi-Fi as well as device to device connectivity, and also interactive gaming. These capabilities together in one device require significantly more power than what batteries can produce. A new type of energy source is required to keep pace with the convergence of functionality. Our micro fuel cells are designed to address these needs by providing high energy, and longer run time.

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"We see a lot of great opportunity for our micro fuel cells in the handheld consumer electronics market for applications such as cellular phones, PDAs, MP3 players, digital cameras, and portable gaming devices. All of these devices need batteries, however with the pace of all the added features that continue to emerge, batteries can not keep up with power demands. This is where our technology fits in."

PENG K. LIM, CEO, MTI

The worldwide energy source for the consumer portable electronic market is approximately \$12 billion this year and is expected to grow to over \$20 billion in 2012. This huge and growing market allows room for many players in the space. However, MTI Micro has developed a simple, complete system, whereby manufacturability needs and market opportunities for small fuel cells could be addressed early and cost-effectively. The system is uniquely suited for portable electronics. The company has developed a series of system prototypes, demonstrating size reductions and performance improvements, including operation on an increased concentration of up to 100 percent methanol.

We foresee high demand in Asia for micro fuel cells where we believe our Motion technology can have great potential. In fact, MTI Micro last year signed a strategic alliance agreement with Samsung Electronics for cell phone and cell phone accessory markets. MTI Micro also has an agreement with Gillette Duracell for the development and distribution of fuel re-fills around the world when micro fuel cells are mass marketed.

We see a lot of great opportunity for our micro fuel cells in the handheld consumer electronics market for applications such as cellular phones, PDAs, MP3 players, digital cameras, and portable gaming

devices. All of these devices need batteries, however with the pace of all the added features that continue to emerge, batteries can not keep up with power demands. This is where our technology fits in.

**Q:** What do you expect to see within the next 10 years? With micro fuel cells and portable electronics?

**A:** Within the next 10 years, we see the consumer electronics market accelerate the conversion of new technologies and functionality into devices. At the same time, the adoption of fuel cell technology will allow customers to be truly mobile by being able to cut free from the last wire that still makes portable electronics stationary – the charging wire.

We foresee that the adoption of micro fuel cells will begin in 2009. MTI Micro will be shipping its first commercial micro fuel cell product in 2009.

In the consumer market, there are typically three product approaches, which could evolve in parallel or series. The first approach is a standard multi-purpose charger for an array of portable devices, or a cradle device that adds functionality as well as power. The second approach is an attachment to the device itself – similar to an expanded battery, and then of course, the third approach is the embedded design, which integrates into the device it-

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self, allowing for a refuelling process that simply involves a replaceable or “hot swappable” cartridge.

Even initial fuel cell technology, however, can allow users to be free from tethering their devices to an electrical outlet, and eliminate the need to carry multiple bulky chargers and converters.

#### Q: What comments do you have in regard to micro fuel cell regulations?

A: In November 2005, the safety panel of The International Civil Aviation Organization (ICAO) approved the transportation and use of methanol fuel cells to power portable electronics in the passenger compartments of airplanes. Other fuels – like hydrogen and sodium borohydride – were not approved, which could pose market entry barriers for companies using those fuels.

Currently, a number of countries around the world have already implemented ICAO’s regulation including Japan, Canada and the United Kingdom. In the U.S., the formal adoption of the regulation is awaiting implementation from the Department

of Transportation who will be releasing a draft document of implementation for review by all parties shortly.

*Mr. Lim, a director of the board for MTI and MTI Micro and president and CEO of MTI Micro since May 8, 2006, became CEO of MTI effective Dec. 1, 2006. Prior to MTI Micro, Lim served as the president and CEO of Tapwave, Inc., a company he founded. Lim was behind the development of the Zodiac, a portable electronic multimedia device that won multiple awards including, “Best Gear” by Time Magazine in 2003. Prior to Tapwave, Lim served as vice president, Worldwide Product Development for Palm Computing where he was responsible for directing the entire life cycle of product development and engineering for Palm handheld products, operating system and application software. While at Palm, he helped capture 75 percent worldwide handheld operating system and 65 percent PDA market shares and quadrupled annual revenues to greater than \$1.5 billion. Lim was also part of the executive team that led Palm to a successful IPO in 2000. Prior to Palm, Lim was VP of engi-*

*neering at Fujitsu Personal Systems where he introduced industry-leading pen-based and wireless computers that captured a 56 percent market share. Prior to his tenure at Fujitsu, Lim served as engineering platform director at Texas Instruments and as director of advanced portable engineering at Zenith Data Systems. In both positions he introduced important innovations in state-of-the-art portable computers. Lim serves as a member of the Board of Directors for Novatel Wireless, a leading 3G wireless solutions company since 2001 and Board of Advisors for Inventec Appliances, a multi-billion-dollar ODM company since 2006. Lim holds a B.S. and a M.S. in Electrical Engineering from University of Windsor (Ontario, Canada) and a Master of Engineering Management from Northwestern University. Lim is an alumnus of the Stanford Executive Program for Growing Companies at Stanford University. f*

Want your company's voice and vision to be heard? Contact Lindsey K. Anderson, Editor, at [lindsey@milomediapub.com](mailto:lindsey@milomediapub.com) or by calling 847-852-4387 ext. 106 to discuss future Q&A sessions and topics.

## PFEIFFER VACUUM

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Steve Foster

## Call for authors!

Fuel Cell Magazine is looking for industry professionals, scientists and technical writers to pen upcoming features for the remainder of 2007. Topics include, but are not limited to:

- Technology showcase: materials & catalysts
- Application feature: SOFC update/utility vehicles
- Technology showcase: component integration
- Outlook 2008 - what's to come in the coming year?
- Hybrid fuel cell update
- Stationary power
- PEM fuel cell update
- And more!



Ideas, leads or more information, contact:

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