Polyfuel says a fuel cell system based on its membrane will be as cheap as lithium-ion batteries offering similar run times. The startup also claims that its membrane will reduce the size, weight, and cost of fuel cell systems by a third.

People, Patents, and Customer Wins at Chip Startups

• **Brecis Communications**, San Jose, CA, has won a $15 million contract with **Syspol Co. Ltd.** of South Korea. Syspol is the prime contractor to Indonesia's **PT Telkom** for a project to bring broadband communications services to Indonesia. Brecis's multiservice processor will power the equipment deployed in the project.

• **MathStar**, Minneapolis, a fabless designer developing reconfigurable logic platform chips for communications and DSP applications, has named Ronald K. Bell as chief technology officer. Bell previously served as CTO for **Micro Linear Technology**.

• **Silicon Wave**, San Diego, has established a strategic relationship with **RF Micro Devices** of Greensboro, NC, for the manufacturing and distribution of Bluetooth chips. Silicon Wave will grant manufacturing licenses to RF Micro Devices for its single-chip UltimateBlue 3000 radio processor and stand-alone CMOS Bluetooth radio modem. RF Micro Devices will be the exclusive distribution channel for these products.

• **GCT Semiconductor**, San Jose, CA, a provider of RF integrated circuits for wireless devices, has named Ron Wilderink as CFO. Wilderink joins the company from **Conductus**, where he served in a similar role. ❑

Correction

In the 5/5 issue, we reversed Airgo Networks' claims for its chips. The chips extend range by three to five times and increase data rate by up to ten times.

Polyfuel Enters Market with Methanol-Based Fuel Cell

Many high-tech startups have a few years of research behind them, but there are few that can claim more than a decade of scientific study for their technologies. **Polyfuel**, a startup in Menlo Park, CA, spun out from the Stanford Research Institute in 1999 after scientists there had spent more than 12 years developing membrane technology for mobile fuel cell applications. The startup expects to at last release a product this summer, in time to sell to the fuel cell makers who plan to be first in the market. Polyfuel is also raising new funding to support its move to production.

Polyfuel (www.polyfuel.com) has picked a strategy of focusing on a core part of the fuel cell market: the membrane, where fuel and air are converted into electricity. "We looked at a couple hundred fuel cell related deals. Of those, we identified that Polyfuel was a very exciting investment because it had a key enabling technology," says Jim Balcom, a former entrepreneur-in-residence at venture capital firm **Crysalix** who has been Polyfuel's CEO since the fall. Moreover, Balcom says, existing membranes have been designed for hydrogen rather than methanol, which will be the fuel used for most mobile applications.

The startup says a fuel cell system based on its membrane will be as cheap as lithium-ion batteries offering similar run times. Polyfuel, which has filed for 34 patents, also claims that its membrane will reduce the size, weight, and cost of fuel cell systems by a third. It has developed prototype systems for mobile phones and laptop computers and is working with **Intel**, an investor, to ensure that its prototypes will work with the chip maker's computing applications.

Balcom, who had spent four years in engineering development and fuel cell manufacturing at **Ballard Power Systems**, joined the firm after founding CEO, Gregg Semler, left the company.

Stationary devices powered by fuel cells would generally use hydrogen, but this fuel, which is difficult to store as a compressed gas and too heavy and expensive as a metal hydride, is ill-suited for mobile applications. Methanol, on the other hand, breaks down easily to generate electricity in a direct methanol fuel cell.

A major competitor in the field is **DuPont**, which launched its fuel cell business in 2001. DuPont believes there will be a $10 billion market for fuel cells by 2010. The company has specialized in proton exchange membranes and is now the world's major supplier. In November, DuPont reached an agreement with **Asia Pacific Fuel Cell Technologies** to provide proton exchange membrane fuel cells for the Taiwan electric-scooter market.

Balcom remains undaunted. He says DuPont's customers have found they cannot use its hydrogen membranes for the methanol applications that mobile devices require. Moreover, Polyfuel expects its methanol membrane to cost less than DuPont's membrane.

Polyfuel also has to watch out for **Toshiba**, **Hitachi**, **NEC**, **Samsung**, **Panasonic**, and **Motorola**, which have all announced fuel cell development programs. Private companies also have their eyes on this space, including **Integrated Fuel Cell Technologies**.

Another startup, **Neah Power Systems**, is developing a fuel cell system for laptops that will last two to three times longer than lithium-ion batteries. Rather than use a polymer membrane, the Bothell, WA, firm has created extra surface area on the electrode by etching pores 400 microns deep and five to seven microns apart into the silicon substrate. The dense system uses methanol reacting with oxygen to create electricity, along with carbon dioxide and water byproducts. Balcom argues that Neah's system uses corrosive materials such as sulfuric acid and hydrogen peroxide and requires complex chemistry that will make manufacturing difficult.

Polyfuel customers should have their fuel cell systems on the market in 2004 and 2005. Polyfuel may have a good chance for success in gaining customers, but ultimately its survival will depend on whether consumers prefer fuel cells to lithium-ion batteries. ❑