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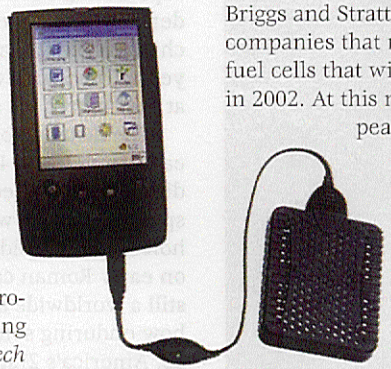
The Pocket-Sized Fuel Cell

I was introduced to the zinc-air fuel cell at a New York City Press Reception back on June 25. I didn't know what to make of the "fuel cell" handed to me by a representative of Electric Fuel Corp. Was it a new type of battery or was it really a fuel cell that uses metallic zinc in place of hydrogen? (You can learn more about hydrogen fuel cells by reading my November 2000 *Tech Directions* column.)



Fuel cell powers a pocket PC

Armed with the knowledge gained at the press reception, I was able to research zinc-air fuel cells. I learned that many venture capitalists and technologists see the zinc-air fuel cell as today's best way to generate cheap nonpolluting portable electricity for today's electronic and transportation systems. Briggs and Stratton is one of many companies that now have prototype zinc fuel cells that will be ready for market in 2002. At this moment, it would appear that the Electric Fuel Corporation, a company headquartered in Bet Shemesh, Israel, is the leader of the pack in this technology.

They have two zinc-air fuel cell systems already on sale throughout the world. Electric Fuel Corp. has research and development facilities in Israel and Alabama and corporate headquarters in the United States, United Kingdom, Germany, and Italy. They already produce primary (use it once and throw it away) and refuelable zinc-air cells for the military and civilian markets. At this moment they have major vehicle refuelable testing programs in a number of countries. You can learn more about the company and their large refuelable systems at their website at **www.electric-fuel.com**.

We will look at their small pocket-sized systems in this article. Each Instant Power Charger™ package contains a PowerCartridge™ wrapped in a sealed pouch and a SmartCord™ that connects to a specific PDA or cell phone. To use the power charger, just open the pouch and plug the fuel cell into your cell phone or PDA.

The Instant Power™ package is sold with a Smart-Cord™ designed to work with a specific electronic device. The cartridges are also sold separately since they aren't refillable and so must be replaced when their fuel is exhausted. The company has also molded their zinc-air cells into replacement cell-phone batteries.

Zinc-air fuel cell
Photos courtesy of Electric Fuel Corp.

The small holes in the zinc-fuel cell case provide the air for the catalytic reaction that occurs between the oxygen in the air and the metallic zinc. This reaction produces electricity. Even if you disconnect your electronic device from the fuel cell, the reaction that creates electricity will continue until the oxygen supply is cut off or the fuel inside the cartridge is exhausted. A resealable pouch is supplied so you can stop the reaction by denying the cartridge air. You can run your electronic device for many hours directly off a cartridge even while recharging your phone or PDA's standard battery.

It appears that the zinc-air fuel cell will soon play a major role in energy and power technology systems. If you further research these cells you will find that the scientific community doesn't agree as to whether or not zinc-air fuel cells should be called batteries or fuel cells.

If you were to think of this cell as a battery, you would consider the metallic zinc that just about completely fills the cell as the battery anode. The cathode isn't a physical part of the unit but actually the catalytic reaction that combines the oxygen in our air with the metallic zinc. Even without an electric circuit the ions and electrons freely flow during the zinc-oxidation reaction that produces electricity. The Electric Fuel Corp. zinc-air fuel cells don't contain mercury or any other dangerous materials, so they are environmentally friendly.

For more information, go to a search engine and type in the key words "zinc-air fuel cells"

Recalling the Facts

1. If hydrogen is the fuel in a hydrogen fuel cell, what is the fuel in this fuel cell?
2. How do these cells differ from your standard battery?
3. Why does this manufacturer have to supply a different style SmartCord for each style phone and PDA?