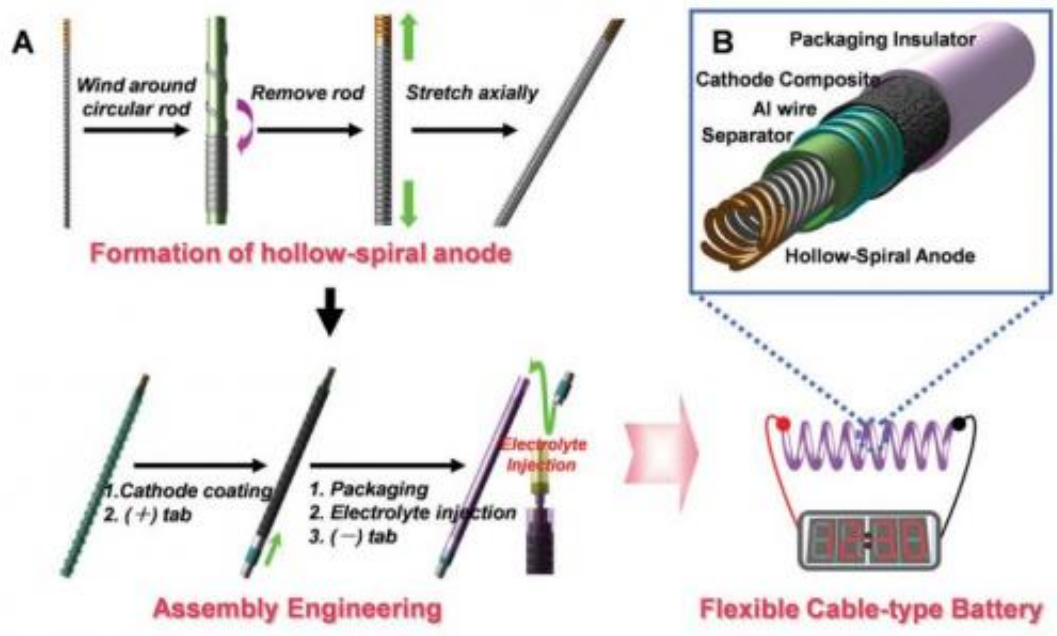
LG Chem cable batteries may reshape mobile designs

September 2 2012, by Nancy Owano



A) Schematic diagram showing fabrication of the cable battery. B) Schematic illustration of the cable battery with hollow-helix anode having multiplehelix structure. Image: DOI: 10.1002/adma.201202196

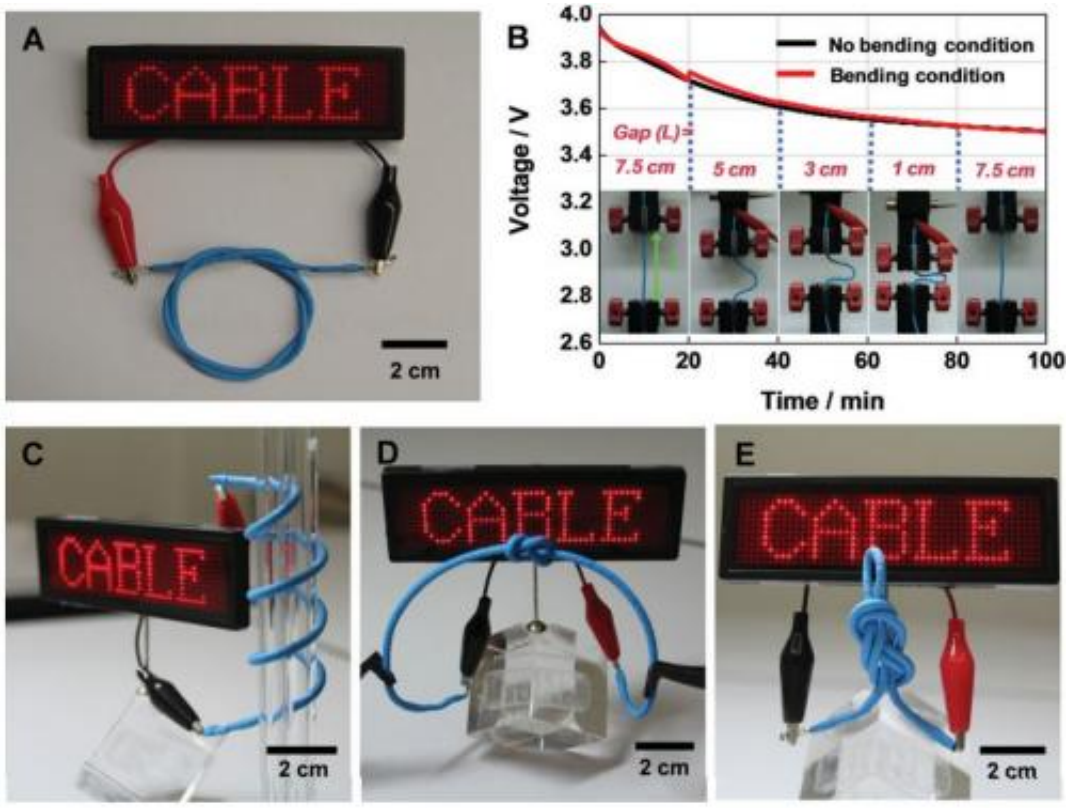
(Phys.org)—LG Chem says it has a cable-type lithium-ion battery that is so flexible it can be tied in knots and worn as a bracelet or woven into textiles. For mobile device designers, the eventual commercial production of such a battery would be a very big deal in reducing design constraints. Flexible batteries have been created before but made in flat sheets and have not stored much energy. The LG Chem flexible battery

is thin and very flexible, able to be placed anywhere in any shape. Thin strands of copper wire are coated with nickel-tin. The strands are made into a metal yarn and wrapped around a rod. Once the rod is removed, a strong spring results.

Full details of LG Chem's battery design are provided in the paper, "Cable-Type Flexible Lithium Ion Battery Based on Hollow Multi-Helix Electrodes," by Yo Han Kwon, Sang-Wook Woo, Hye-Ran Jung, Hyung Kyun Yu, Kitae Kim, Byung Hun Oh, Soonho Ahn, Sang-Young Lee, Seung-Wan Song, Jaephil Cho, Heon-Cheol Shin, and Je Young Kim. The research paper was published earlier this month in Advanced Materials.

"In our experiments," they wrote, "we found that our prototype was exceptionally flexible and could suffer large strain without malfunction."

The LG Chem researchers used a fourth-generation iPod Shuffle for testing; the researchers reported that the prototype successfully operated a red LED screen and MP3 player under severe twisting and bending conditions.



Photographs of the 25 cm prototype cable battery used to power a red LED screen and its discharge characteristics. Image: DOI: 10.1002/adma.201202196

The goal is to have this battery readied for mass production. The day can come none too soon for device designers who would be eager to work with more novel form factors but cannot because of the limitations set by batteries. They think the type of battery that is being developed by the company could potentially alter the device landscape.

As the authors point out, in the area of portable electronics, "the limiting factor is often the shape of the battery." They note that freeing up design limitations would constitute "a disruptive technology that could open up a path for design innovation."

They acknowledge that there have been efforts made elsewhere to

develop smaller thinner and lighter batteries, but the technologies have not yet resolved constraints owing to fixed cylindrical, prismatic, or pouch shapes.

The LG Chem researchers are to continue working on their design. They intend to test new anode materials, for the batteries to deliver more power, faster.

LG Chem lays claim to being an important force in battery design progress. They began mass production of Korea's first lithium-ion batteries in 1999. By the end of 2008, LG Chem was the fourth-largest maker globally.

More information: DOI: 10.1002/adma.201202196