



# Pyongyang battery life

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LG Energy Solution, in collaboration with the Korea Advanced Institute of Science & Technology, has made a significant breakthrough in lithium metal battery technology that addresses key ...

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The discovery that could lead to ultra-long-life batteries happened by serendipity. A team of researchers led by Reginald Penner, chair of the university's chemistry department, had been studying nanowires, tiny conductive wires that show great promise for use in batteries. The problem is nanowires are fragile and generally begin to fray and crack after a certain number of charging cycles.

"She started to cycle these gel capacitors, and that's when we got the surprise," Penner recalls. "She said, 'this thing has been cycling 10,000 cycles and it's still going.' She came back a few days later and said 'it's been cycling for 30,000 cycles.' That kept going on for a month."

The team realized they had something special on their hands. While they're still not certain why using a gel electrolyte seems to keep the nanowires from breaking down, they have a hypothesis. The gel, Penner explains, is about as thick as peanut butter. The nanowires, which are hundreds of times thinner than human hair and made of manganese oxide, are 80 percent porous. Over time, the thick gel slowly seeps into the pores in the nanowires and makes them softer. This softness reduces their fragility.

Right now, the team is working to test this hypothesis. If it's correct, they'll continue to experiment with



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different types of materials and gels to see what works best. Should the work hold up, the gel-wrapped nanowires could eventually be a component in ultra-long-lasting batteries. This is likely several years down the road, Penner says, though he has been fielding calls from companies interested in his lab's creation.

"The big picture is that there may be a very simple way to stabilize nanowires of the type that we studied," Penner says. "If this turns out to be generally true, it would be a great advance for the community."

Since most household electronics have life spans limited by factors besides battery life, a battery that lasts for a decade or two could easily outlive the device it powers.

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Web: <https://hollanddutch tours.nl/contact-us/>

Email: [energystorage2000@gmail.com](mailto:energystorage2000@gmail.com)

WhatsApp: 8613816583346

