Pyongyang battery performance

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A POSTECH research team led by Professor Soojin Park and PhD candidate Sungjin Cho (Department of Chemistry) in collaboration with Professor Dong-Hwa Seo and Dr. Dong Yeon Kim (School of Energy and Chemical Engineering) at Ulsan Institute of Science and Technology (UNIST) have developed anode-free lithium batteries with performance of long battery life on a single charge.

The newly developed anode-free battery has a volumetric energy density of 977Wh/L which is 40% higher than the conventional batteries (700wh/L). This means that the battery can run for 630km on a single charge.

To overcome this issue, the research team succeeded in developing an anode-free battery in a commonly-used carbonate-based liquid electrolyte by adding an ion conductive substrate. The substrate not only forms an anode protective layer but also helps minimize the bulk expansion of the anode.

The study shows that the battery maintained high capacity of 4.2mAh cm-2 and high current density of 2.1 mA cm-2 for a long period in the carbonate-based liquid electrolyte. It was also proven both in theory and through experiments that substrates can store lithium.

Further, what"s drawing even more attention is that the team successfully demonstrated the solid- state half-cells by using Argyrodite-based sulfide-based solid electrolyte. It is anticipated that this battery will accelerate the commercialization of non-explosive batteries since it maintains high capacity for longer periods.

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