United states flow batteries

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Redox flow batteries (RFBs) or flow batteries (FBs)--the two names are interchangeable in most cases--are an innovative technology that offers a bidirectional energy storage system by using redox active energy carriers dissolved in liquid electrolytes. RFBs work by pumping negative and

Researchers at PNNL developed a cheap and effective new flow battery that uses a simple sugar derivative called v-cyclodextrin (pink) to speed up the chemical reaction that converts energy stored in chemical bonds (purple to orange), releasing energy (electrons) to power an external circuit.

A promising technology for performing that task is the flow battery, an electrochemical device that can store hundreds of megawatt-hours of energy--enough to keep thousands of homes running for many hours on a single charge. Flow batteries have the potential for long lifetimes and low costs in part due to their unusual design.

Last year, the European tech firm nanoFlowcell set up a US office to pitch its new QUANTiNO twentyfive electric car featuring new flow battery technology, and now the company is hatching plans...

Sumitomo Electric Industries, Ltd. has announced that it will expand its redox flow battery business in the United States. The announcement was made at DISTRIBUTECH International 2023, one of the world"s largest Smart Grid related technology conferences, which was held in San Diego from February 7 to 9.

Sugar additive plays a surprise role, boosting flow battery capacity and longevity for this grid energy resilience design

Flow battery researcher Ruozhu Feng poses with ingredients for a long-lasting grid energy battery

(Photo by Andrea Starr | Pacific Northwest National Laboratory)

RICHLAND, Wash.--A common food and medicine additive has shown it can boost the capacity and longevity of a next-generation flow battery design in a record-setting experiment.

The study, just published in the journal Joule, details the first use of a dissolved simple sugar called v-cyclodextrin, a derivative of starch, to boost battery longevity and capacity. In a series of experiments, the scientists optimized the ratio of chemicals in the system until it achieved 60 percent more peak power. Then they cycled the battery over and over for more than a year, only stopping the experiment when the plastic tubing failed. During all that time, the flow battery barely lost any of its activity to recharge. This is the first laboratory-scale flow battery experiment to report more than a year of continuous use with minimal loss of capacity.

The v-cyclodextrin additive is also the first to speed the electrochemical reaction that stores and then releases the flow battery energy, in a process called homogeneous catalysis. This means the sugar does its work while dissolved in solution, rather than as a solid applied to a surface.

"This is a brand new approach to developing flow battery electrolyte," said Wei Wang, a long-time PNNL battery researcher and the principal investigator of the study. "We showed that you can use a totally different type of catalyst designed to accelerate the energy conversion. And further, because it is dissolved in the liquid electrolyte it eliminates the possibility of a solid dislodging and fouling the system."