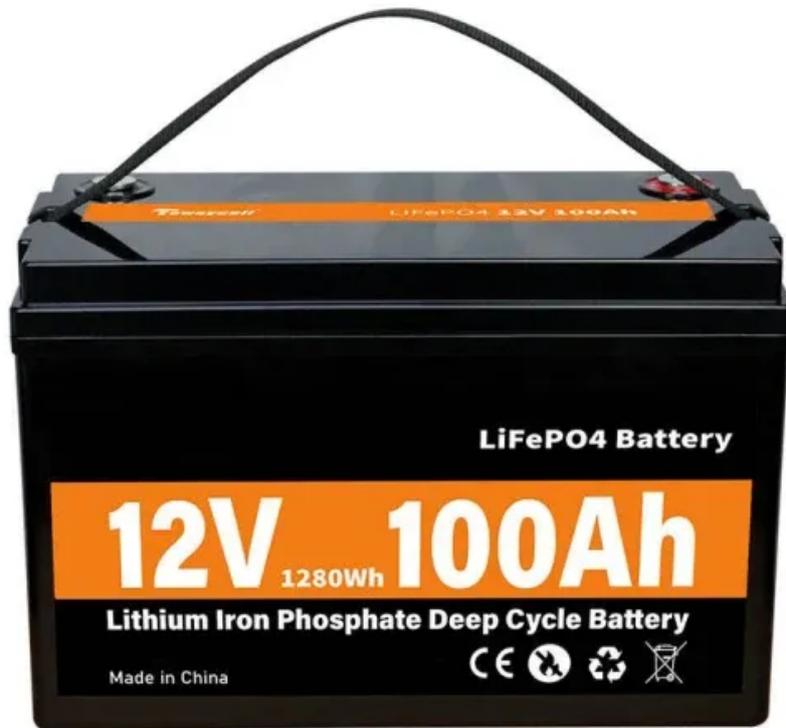


## SolarTech Power Solutions

# Flow battery discharge reaction



## Overview

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The self-discharge process of vanadium flow battery (VFB) assembled with Nafion 115 is investigated in very detail for the first time. The self-discharge phenomenon of VFB is closely related to the diffu.

How do flow batteries work?

Flow Batteries Flow batteries are electrochemical cells, in which the reacting substances are stored in electrolyte solutions external to the battery cell Electrolytes are pumped through the cells Electrolytes flow across the electrodes Reactions occur atthe electrodes Electrodes do not undergo a physical change Source: EPRI K. Webb ESE 471 4.

Can a flow battery be discharged without damaging the cell structure?

In flow batteries, high depth of discharge is possible which means most of its nominal capacity can be discharged without imposing any permanent damage to the cell structure 22. In addition, they can store electroactive materials required for battery operation in a tank outside the battery structure.

How does flow rate affect a battery system?

Appropriate control of the flow rate can enhance the mixing of electrolytes, ensure a uniform distribution of reactants, and reduce the likelihood of self-discharge. Studies have demonstrated that varying the flow rate can significantly affect the overall efficiency and stability of battery systems.

What are the components of a flow battery?

Flow batteries comprise two components: Electrochemical cell Conversion between chemical and electrical energy External electrolyte storage tanks Energy storage Source: EPRI K. Webb ESE 471 5 Flow Battery Electrochemical Cell Electrochemical cell Two half-cellsseparated by a proton-exchange membrane(PEM).

Do flow batteries need a fluid model?

Flow batteries require electrolyte to be pumped through the cell stack Pumps

require power Pump power affects efficiency Need a fluid model for the battery in order to understand how mechanical losses affect efficiency K. Webb ESE 471 29 RFB Fluid Model Power required to pump electrolyte through cell stack Pumping power is proportional to.

What determines the energy storage capacity of a flow battery?

Volume of electrolyte in external tanks determines energy storage capacity Flow batteries can be tailored for an particular application Very fast response times- < 1 msec Time to switch between full-power charge and full-power discharge Typically limited by controls and power electronics Potentially very long discharge times

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